

giosperms are a monophyletic group (Hamby & Zimmer 1992; Chase et al. 1993; Doyle et al. 1994) and that among living plants the Gnetophyta are the sister group of the angiosperms. In other words, the Gnetophyta are more closely related to the angiosperms than to any other living gymnosperm group (Chase et al. 1993; Doyle et al. 1994); however, this does not necessarily mean that the Gnetophyta is the gymnosperm group that gave rise to the angiosperms. While there is general consensus that the angiosperms evolved from gymnosperms, the exact gymnosperm group is as yet unknown with certainty.

The historical division of flowering plants into Class Monocotyledonae (monocots) and Class Dicotyledonae (dicots) is not supported by molecular data. Rather, the monocots appear to be a well-supported monophyletic group derived from within the Magnoliidae group of dicots (Chase et al. 1993; Duvall et al. 1993; Qiu et al. 1993). The dicots are therefore paraphyletic and thus, from the cladistic stand point, inappropriate for formal recognition (see explanation and Fig. 41 in Appendix 6). However, for practical reasons we are continuing to recognize these two traditional classes. The monocots are listed after the dicots to indicate their derivation from within the dicots.

REFERENCES: Cronquist 1981, 1988, 1993; Hamby & Zimmer 1992; Thorne 1992; Chase et al. 1993; Duvall et al. 1993; Qiu et al. 1993; Reveal 1993a, 1993b; Doyle et al. 1994; Takhtajan 1997.

## CLASS DICOTYLEDONAE

Plants herbaceous or woody, often with secondary tissues derived from a vascular cambium; seedlings usually with 2 seed leaves or cotyledons; stems or branches elongating by apical growth; leaves not elongating when once expanded; new leaves and branches developing from terminal or axillary buds; leaves when present alternate, opposite, whorled, or basal, commonly with a petiole and expanded blade; leaf blades usually net-veined, with midrib and less prominent, spreading branch-veins (these sometimes nearly parallel in very narrow leaves), but veins sometimes buried in thick or fleshy leaves; perianth herbaceous, with dissimilar inner and outer whorls (= petals and sepals), or all parts about alike (= tepals), the perianth parts separate or united, commonly in 2s or 5s or numerous, occasionally in 3s or perianth absent.

☛ Worldwide, the Dicotyledonae is a group composed of ca. 193,700 species in 10,534 genera divided into 321 families (Mabberley 1997); 124 of these families occur in nc TX. Based on molecular analyses (Chase et al. 1993), the dicots are a paraphyletic group with the monocots derived from within the dicot subclass Magnoliidae (see explanation and Fig. 41 in Appendix 6). From a cladistic standpoint, the dicots are thus not appropriately recognized in a formal taxonomic sense. One traditional dicot family, Ceratophyllaceae, is apparently the sister taxon to, and highly divergent from, all the rest of the flowering plants. The major division within the remaining flowering plants (excluding Ceratophyllaceae) is not between monocots and dicots, but rather between two groups corresponding to the two major angiosperm pollen types: uniaperturate and triaperturate. The uniaperturate (= 1-pored) group includes the “woody magnoliids” (e.g., Magnoliales, Laurales), the “paleoherbs” (e.g., Aristochiales, Piperales, and Nymphaeales), and the monocots. The triaperturate (= 3-pored) group includes all remaining dicots (Chase et al. 1993). This triaperturate group is referred to as the “eudicots” and appears to be monophyletic (Raven et al. 1999).

REFERENCES: Cronquist 1981, 1988, 1993; Downie & Palmer 1992; Hufford 1992; Olmstead et al. 1992; Thorne 1992; Wagenitz 1992; Chase et al. 1993; Kubitzki et al. 1993; Qiu et al. 1993; Reveal 1993a, 1993b; Takhtajan 1997; Raven et al. 1999.

## ACANTHACEAE ACANTHUS OR WILD PETUNIA FAMILY

Ours perennial herbs (some woody basally and 1 shrub) often with squarish stems; foliage of-

ten with minute cystoliths (= mineral concretions) on surface; leaves opposite, sessile to petioled, simple; leaf blades entire or indistinctly toothed; stipules absent; flowers axillary or terminal, solitary or in peduncled spikes, cymes, or panicles; sepals 5, lanceolate or linear-lanceolate, united at base or up to 1/3 their length; corollas 2-lipped, or nearly radially symmetrical and 4-to 5-lobed, often with a color pattern; stamens 2 or 4; pistil 1; pistil of 2 carpels; ovary superior; style 1; fruit a capsule usually with 2 or 4 seeds; each seed typically supported by a small hook-like outgrowth (called a retinaculum or a jaculator)

☛ A large (3,450 species in 229 genera), cosmopolitan, but mainly tropical family of mostly shrubs with some herbs, twiners, trees, and even aquatics; a number are used ornamentally including *Acanthus*, *Justicia brandegeana* Wassh. & L.B. Sm. (SHRIMP-PLANT), and *Thunbergia* (CLOCKVINE). The family is closely allied to the Scrophulariaceae and some genera are intermediate between the two. Family name from *Acanthus*, BEAR'S-BREECHES, a genus of 30 mostly spiny xerophytic species of Old World tropical and warm areas; the leaf motif in the capitals of Corinthian columns supposedly originated from *A. spinosus* L. (Greek: *acanthos*, thorn, in reference to the spiny leaves and bracts) (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: herbs (and 1 shrub) with opposite, simple, entire or indistinctly toothed leaves; flowers with sympetalous, 2-lipped or sometimes nearly radially symmetrical flowers in often *bracteate* inflorescences; stamens 2 or 4; fruit a capsule with seeds on small hook-like structures. In the somewhat similar Lamiaceae the fruits are of 4 one-seeded nutlets. REFERENCES: Wasshausen 1966; Long 1970; Daniel 1984.

1. Plant a trailing or climbing vine; corollas yellow to orange, cream, or white, with a conspicuous dark purple center; seeds not supported by a small hook-like retinaculum \_\_\_\_\_ **Thunbergia**
1. Plant not a vine, either a ± erect herb or small shrub; corollas various, but not as above; seeds each supported by a small hook-like retinaculum.
  2. Corollas not deeply 2-lipped, nearly radially symmetrical to slightly bilabiate, the lobes ± equal; stamens 4 (except 2 in the rare *Carlowrightia*).
  3. Corollas 15–65 mm long, lavender to bluish purple or white, with 5 lobes; stamens 4; widespread in nc TX.
    4. Calyces about 3/4 as long as corollas; anther sacs basally awned or mucronate; leaf blades linear to oblanceolate; corolla tube 7 mm or less long \_\_\_\_\_ **Dyschoriste**
    4. Calyces less than half as long as corollas; anther sacs basally rounded; leaf blades usually much broader than linear to oblanceolate; corolla tube usually much > 7 mm long \_\_\_\_\_ **Ruellia**
  3. Corollas 6–7 mm long, white with maroon nerves on lobes, with 4 lobes; stamens 2; rare in nc TX \_\_\_\_\_ **Carlowrightia**
2. Corollas deeply 2-lipped and/or lobes clearly unequal; stamens 2.
  5. Corollas reddish, 30–40 mm long; plants definitely woody, small shrubs \_\_\_\_\_ **Anisacanthus**
  5. Corollas white to violet, lavender, purple, rose, or flesh-colored, sometimes with darker dots, 10–28 mm long; plants herbaceous or woody only at base.
    6. Calyces 4-lobed; corolla tube long, slender, and cylindrical, very conspicuous, longer than the corolla lobes; plants woody at base; plants of upland habitats; in w part of nc TX \_\_\_\_\_ **Siphonoglossa**
    6. Calyces 5-lobed; corolla tube inconspicuous, ca. as long as corolla lobes or shorter; plants not woody at base; plants of wet or moist areas; widespread in nc TX.
      7. Leaves usually long-petioled (petioles (0.5–)2–7 cm or more long); flowers in small clusters, subtended and covered by 2 to 4 obovate bracts; peduncles < 4 cm long, usually shorter than or equal to the petioles of subtending leaves; corollas with lower lip unlobed \_\_\_\_\_ **Dicliptera**
      7. Leaves usually sessile or with shorter petioles; flowers in a slender, 1-sided spike or in a dense head-like spike, subtended by small, linear to subulate bracts; peduncles elon-

gate, usually > 4 cm long, much longer than the petioles of subtending leaves; corollas with lower lip 3-lobed.

**Justicia**

### ANISACANTHUS ANISACANTH

☛ A genus of 8 species native to the sw United States and Mexico; some are cultivated as ornamentals. (Greek: *anisa*, unequal, and *Acanthus*, from *akanthos*, a thorn)

REFERENCES: Hagen 1941; Henrickson 1986.

**Anisacanthus quadrifidus** (Vahl) Nees var. **wrightii** (Torr.) Henr., (sp.: four-cut; var.: for Charles Wright, 1811–1885, TX collector), WRIGHT'S ANISACANTHUS, HUMMINGBIRD-BUSH, FLAME-ACANTHUS. Shrub to ca. 1.5 m tall; leaf blades to 5 cm long and 2 cm wide; petioles to 1 cm long; flowers single or in pairs in terminal, 1-sided, spike-like inflorescences; calyces ca. 5 mm long; corollas reddish, 3–4 cm long, 2-lipped, the upper lip entire or nearly so, the lower lip 3-lobed; corolla tube longer than lobes, ± straight, slender, scarcely dilated at throat; stamens 2; capsules ca. 15 mm long; seeds 2(–4). Used in landscapes and escapes; adventive in Dallas Co. but not well-established (E. McWilliams, pers. comm.); native to Edwards Plateau. Jun–Aug. [*A. wrightii* (Torr.) A. Gray]

### CARLOWRIGHTIA

☛ A genus of 23 species of warm to arid areas from the sw U.S. to Costa Rica. (Named for Charles Wright, 1811–1885, botanical collector mainly in TX, Cuba, and his native Connecticut; correspondent of Asa Gray)

REFERENCES: Henrickson & Daniel 1979; Daniel 1980, 1983.

**Carlowrightia texana** Henr. & T.F. Daniel, (of Texas), TEXAS CARLOWRIGHTIA. Strigulose perennial (5–)10–30 cm tall from a much branched twiggy base; leaves petiolate; leaf blades (2.5–)6–16(–42) mm long, oblong-ovate, broadly ovate to orbicular, entire; flowers 1–3 in middle and upper leaf axils or occasionally in terminal spike-like inflorescences with reduced leaves/bracts; calyces 3–5 mm long; corollas 6–7 mm long, white with maroon nerves on lobes; capsules 7.5–11 mm long, glabrous, 4-seeded. Rocky slopes, often disturbed areas; described as a new species by Henrickson and Daniel in 1979; their distribution map showed 2 nc TX localities (no counties given); Daniel (1983) cited Callahan and Tarrant cos.; mainly s TX w across Edwards Plateau to Trans-Pecos. Apr–Nov.

### DICLIPTERA

☛ A genus of ca. 150 species of tropical and warm areas; some are cultivated as ornamentals. (Greek: *diklis*, double-folded, as of doors, etc., and *pteron*, a wing, alluding either to the 2-winged fruit or possibly the involucre)

**Dicliptera brachiata** (Pursh) Spreng., (branched at right angles), FALSE MINT. Perennial herb to 0.7(–1) m tall; leaf blades to 12(–15) cm long, (1.5–)2–7 cm wide; petioles (0.5–)2–7 cm or more long; flowers in axillary, short-peduncled to sessile clusters, the clusters subtended by an involucre of 2–4 floral bracts; floral bracts obovate, to 7 mm long, 2–5 mm wide; corollas purplish or pinkish (rarely white), 15–20 mm long including tube, the upper lip entire or shallowly 2-lobed, the lower lip usually entire; capsules ovoid, 5–6 mm long, stipitate, emarginate apically, with 2–4 seeds. Moist wooded stream bottoms, wet habitats; se and e TX w to East Cross Timbers. Jun–Nov. ☒/87

### DYSCHORISTE

☛ A genus of ca. 65 tropical and warm area species. (Greek: *dys*, hard, and *chorist*, separate or asunder, referring to the coherent, hard to separate capsule valves)

REFERENCE: Kobuski 1928.

**Dyschoriste linearis** (Torr. & A. Gray) Kuntze, (linear, narrow with sides nearly parallel), NARROW-LEAF SNAKEHERB, NARROW-LEAF DYSCHORISTE, SNAKEHERB. Rhizomatous, ± pubescent herbaceous perennial; stems erect or partly decumbent, usually 7–30 cm long; leaves sessile, linear to oblanceolate, obtuse; flowers axillary, sessile, shorter than the leaves, with foliaceous bracts; sepals long acuminate, united about 1/4, the lobes 9–13 mm long; corollas lavender, with dark dots in throat, 15–27 mm long; capsules with 2–4 seeds. Rocky or sandy ground; throughout most of TX, especially w 2/3. Apr–Jul, sporadically to Oct. ☒/88

## JUSTICIA WATER-WILLOW

Ours perennial herbs; leaves simple, entire; flowers in axillary pedunculate heads or spikes; calyx lobes 5; corollas 2-lipped, the lower lip 3-lobed; stamens 2; capsules 4-seeded, the 2 valves reflexed at maturity.

☛ A genus of ca. 600 species of herbs and shrubs of tropical and warm areas of the world and temperate North America; some such as *J. brandegeana* Wasm. & L.B. Sm., SHRIMP-PLANT, (formerly treated in *Belopeone*), are cultivated as ornamentals. (Named for James Justice, 18th century Scottish botanist)

1. Flowers closely crowded in dense head-like spikes that become oblong at maturity; lower lip of corolla arched-recurving; widespread throughout nc TX \_\_\_\_\_ **J. americana**
1. Flowers in loosely-flowered, elongate spikes, usually spaced along 1 side of the axis of the inflorescence; lower lip of corolla ± flat; limited to extreme ne part of nc TX \_\_\_\_\_ **J. ovata**

**Justicia americana** (L.) Vahl, (of America), AMERICAN WATER-WILLOW. Plant glabrous, colonial, rhizomatous, producing long leafy shoots late in summer; stems erect, to ca. 100 cm tall; leaves sessile or nearly so; leaf blades narrowly oblong-lanceolate to elliptic-lanceolate; spikes to 3 cm long, peduncles to 15 cm long; sepals separate nearly to base, linear-lanceolate, ca. 7 mm long; corollas 10–12 mm long, white or violet with red-purple dots; capsules ca. 12 mm long. Wet ground, margins of streams and ponds; se and e TX w to West Cross Timbers and Edwards Plateau. May–Jun. ☒/94

**Justicia ovata** (Walter) Lindau var. **lanceolata** (Chapm.) R.W. Long, (sp.: ovate, egg-shaped; var.: lanceolate, lance-shaped), LANCE-LEAF WATER-WILLOW. Stems erect or spreading, 10–30 cm tall; leaves sessile or nearly so; leaf blades linear to elliptic-lanceolate, to 10 cm long and 3 cm wide, minutely puberulent; spikes 3–10 cm long; corollas ca. 9–10 mm long, lavender with darker markings; capsules 10–15 mm long. Wet areas; Lamar Co. in Red River drainage, also Callahan Co. (Stanford 1976); mainly se and e TX, also Edwards Plateau. Mar–Jun. [*J. lanceolata* (Chapm.) Small]

## RUELLIA WILD PETUNIA

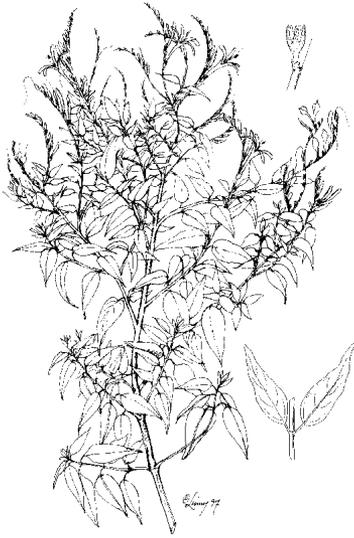
Ours glabrous or pubescent perennial herbs, the base sometimes woody; leaves sessile or short-petioled; leaf blades narrowly lanceolate to ovate-lanceolate or oblong-elliptic; sepals united a short distance at base, acuminate; ours with corollas usually lavender to bluish purple, often with reddish or purple spots down one side, or white (in *R. metziae*), large and showy, opening in the morning, falling by late afternoon (some species also produce cleistogamous flowers); capsules usually explosively dehiscent.

☛ A genus of ca. 150 species found mainly in tropical areas of the world with a number in temperate North America; some are cultivated as ornamentals. (Named for Jean Ruelle, 1474–1537, early French herbalist)

REFERENCES: Tharp & Barkley 1949; Long & Uttal 1962; Long 1961, 1966, 1971, 1973, 1974, 1975; Turner 1991a.

1. Flowers terminating the main stem in panicle-like inflorescence on long peduncle (lateral few-flowered inflorescences of cleistogamous flowers also produced early); corollas white or lavender to bluish purple.
  2. Corollas ca. 4–5(–5.5) cm long, lavender to bluish purple, conspicuously curved; calyx lobes 10–15 mm long in flower \_\_\_\_\_ **R. nudiflora**
  2. Corollas (5–)5.5–6.5 cm long, usually white (sometimes pale bluish purple), very slightly curved; calyx lobes 14–20 mm long in flower \_\_\_\_\_ **R. metziae**
1. Flowers axillary, sessile or in  $\pm$  peduncled glomerules or cymes OR at tips of side branches; corollas lavender to bluish purple.
  3. Leaf blades linear to linear-lanceolate < 2 cm wide,  $\approx$ 10 times as long as wide \_\_\_\_\_ **R. brittoniana**
  3. Leaf blades wider, much < 10 times as long as wide.
    4. Flowers at leafy-bracted tips of branches OR on peduncles from axils of the main axis OR the axillary cymose inflorescences branched.
      5. Bracts linear or linear-lanceolate; leaf blades usually lanceolate; flowers on once or twice dichotomously branched peduncles \_\_\_\_\_ **R. malacosperma**
      5. Bracts wider; leaf blades wider, lanceolate, oblong, elliptic, or ovate; flowers solitary–3 (or rarely loosely cymose) at ends of usually unbranched peduncles.
    6. Largest leaf blades usually < 30 mm wide; ovary pubescent; calyx lobes narrowly linear, 1–1.2 mm wide, with prolonged linear-acicular tips \_\_\_\_\_ **R. pedunculata**
    6. Largest leaf blades usually > 30 cm wide; ovary glabrous; calyx lobes lanceolate to linear-lanceolate, 2–4 mm wide, flat to the tips \_\_\_\_\_ **R. strepens**
  4. Flowers in sessile or short-peduncled glomerules from axils of main stem or main leafy branches.
    7. Calyx lobes linear-lanceolate to lanceolate, (1.5–)2–4 mm wide, flat to the tips; flowers mainly cleistogamous \_\_\_\_\_ **R. strepens**
    7. Calyx lobes narrowly linear, the prolonged tips very slender to almost bristle-like; flowers usually chasmogamous, rarely cleistogamous.
  8. Leaves sessile or subsessile (petioles to 3 mm long), erect-ascending (= staying close to the stem); common in nc TX \_\_\_\_\_ **R. humilis**
  8. Leaves subsessile to distinctly petioled, those on main stem with petioles 2–30 mm long, mostly spreading away from the stem; rare or of limited range in nc TX, mainly e and sc TX.
    9. Glomerules of flowers few, restricted to the upper nodes; leaf blades linear-lanceolate to lanceolate, usually 20 mm or less wide \_\_\_\_\_ **R. caroliniensis**
    9. Glomerules of flowers several–many, extending well down on the stem and branches; leaf blades linear-lanceolate to broadly elliptic or ovate, up to 90 mm wide.
      10. Leaf blades relatively narrow, linear to lanceolate; fruits often glabrous or with long hairs, to ca. 17 mm long; mainly e TX, no recent collections from nc TX \_\_\_\_\_ **R. caroliniensis**
      10. Leaf blades relatively wide (to 90 mm), broadly elliptic to ovate; fruits minutely canescent, ca. 10 mm long; sc TX n to nc TX \_\_\_\_\_ **R. drummondiana**

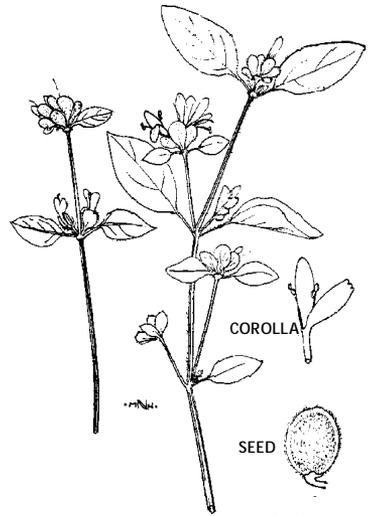
**Ruellia brittoniana** Leonard, (Nathaniel Lord Britton, 1859–1934, botanist at NY Botanical Garden). Plant to 1 m tall; foliage glabrous except for cystoliths (= mineral concretions); bracts linear to linear-lanceolate; cymes axillary, loose, elongate. Common in nursery trade, readily escapes cultivation; Tarrant Co., also Dallas Co. (Wasshausen 1966; Turner 1991a); se and e TX w to nc TX and Edwards Plateau. Jun–Nov. Native to e Mexico. 



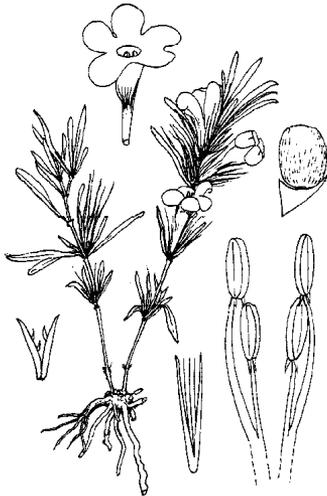
*Anisacanthus quadrifidus* var. *wrightii* [HEA, SID]



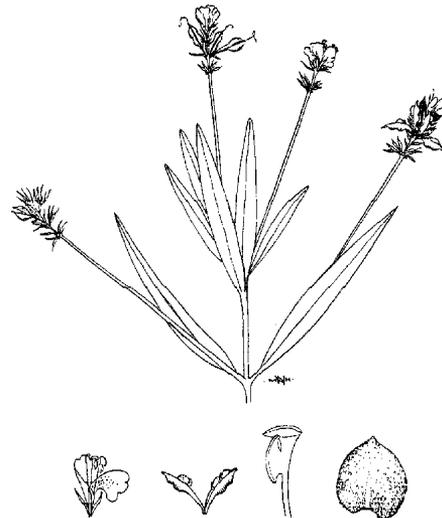
*Carlwrightia texana* [POW]



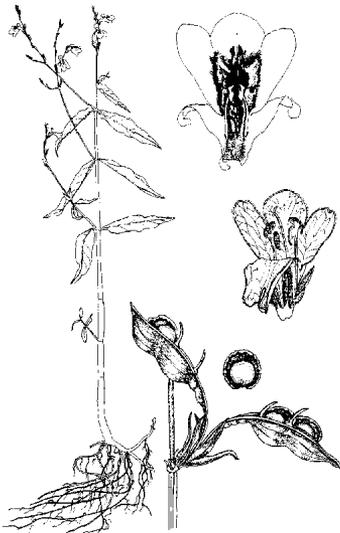
*Dicliptera brachiata* [LUN]



*Dyschoriste linearis* [LUN]



*Justicia americana* [LUN]



*Justicia ovata* var. *lanceolata* [COI]



*Ruellia brittoniana* [HEA]



*Ruellia caroliniensis* [ST1]

**Ruellia caroliniensis** (J.F. Gmel.) Steud., (of Carolina), SMALL-FLOWER RUELLIA. Plant to ca. 0.9 m tall, inconspicuously and sparsely pubescent; flowers in sessile or very short peduncled glomerules mostly at the upper 1–4 nodes. Sandy open woods and open ground; collected by Reverchon in Dallas Co. (Mahler 1988), also Henderson Co.; mainly se and e TX. May–Sep. [*R. caroliniensis* (J.F. Gmel.) Steud. var. *salicina* Fernald, *R. caroliniensis* (J.F. Gmel.) Steud. var. *semicalva* Fernald]

**Ruellia drummondiana** (Nees) A. Gray, (for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), DRUMMOND'S RUELLIA. Plant to ca. 0.75 m tall, densely pubescent with short, spreading to appressed hairs. Wooded, riparian, often rocky areas; Bell, Bosque, and Williamson cos., also Hamilton (HPC), Dallas, and McLennan (Turner 1991a) cos.; sc TX n to nc TX; endemic to TX. Aug–Sep. ↘

**Ruellia humilis** Nutt., (dwarf, low-growing), PRAIRIE-PETUNIA, LOW RUELLIA, FRINGE-LEAF RUELLIA. Plant to ca. 0.8 m tall, usually rather densely short-pilose; leaf blades lanceolate to ovate or broadly elliptic. Prairies and open woods; se and e TX w to Panhandle and Edwards Plateau. May–Sep. [*R. humilis* var. *depauperata* Tharp & E.A. Barkley, *R. humilis* var. *expansa* Fernald, *R. humilis* var. *longiflora* (A. Gray) Fernald] Jones et al. (1997) recognized var. *depauperata*.

**Ruellia malacosperma** Greenm., (soft-seeded), SOFT-SEED RUELLIA. Plant to ca. 0.8 m tall; cystoliths numerous; leaf blades glabrous or with a few spreading hairs; loose cymes conspicuous; peduncles 1–2 times branched, to 8 cm long; capsules 20–25 mm long. Common in nursery trade, escapes from cultivation; Dallas and Tarrant cos.; probably native to s TX and Mexico. May–Nov. Turner (1991a) suggested that *R. brittoniana* and *R. malacosperma* are "... probably no more than regional populational leaf variants of the same species."

**Ruellia metziae** Tharp, (for Sister Mary Clare Metz, 1907–?, nun and professor of botany at Our Lady of the Lake College, San Antonio, TX). Plant to ca. 0.6 m tall; leaves petioled; leaf blades oblong-lanceolate to narrowly ovate-oblong, 3–12 cm long, undulate to toothed; corollas usually white (sometimes pale bluish purple); cleistogamous flowers sometimes produced early from axillary peduncles only; this is the only nc TX species that usually has white corollas. Limestone outcrops, gravel, thickets, and open woods; Bosque, McLennan, and Mills cos., also Brown, Grayson, (Turner 1991a), Hamilton (HPC), Burnet, and Williamson (Tharp & Barkley 1949) cos.; mainly Lampasas Cut Plain s and sw to c TX and Edwards Plateau. Apr–Jul.

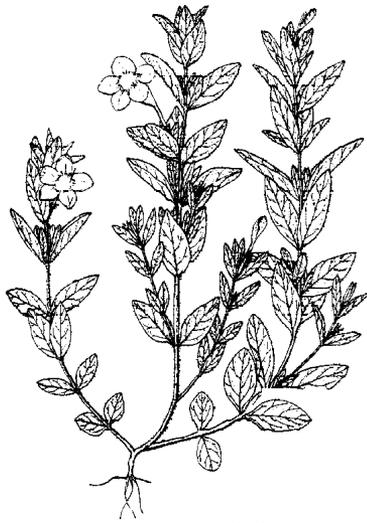
**Ruellia nudiflora** (Engelm. & A. Gray) Urb. var. **nudiflora**, (naked-flowered), VIOLET RUELLIA. Stems spreading-pilose, becoming glabrate, to 0.7 m tall; leaves petioled; flowers opening near sunrise, falling during afternoon; sepals with gland-tipped hairs or hispid-pubescent to slightly scabrous, without gland-tipped hairs. Sandy open woods; Bell, Bosque, Dallas, Grayson (Buckner Preserve), Hill, Johnston, McLennan, and Navarro cos.; also Burnet, Williamson (Turner 1991a), and Brown (HPC) cos.; se and c TX n to nc TX. Apr–May. [*R. nudiflora* (Engelm. & A. Gray) Urb. var. *hispidula* Shinnery]

*Ruellia nudiflora* var. *runyonii* (Tharp. & E.A. Barkley) B.L. Turner, (for Robert Runyon of Brownsville, a friend of Tharp and Barkley and student of the vegetation of the lower Rio Grande Valley), is cited (as *R. runyonii*) by Hatch et al. (1990) for vegetational area 4 (Fig. 2), but apparently occurs only to the s of nc TX. It can be distinguished by its small corollas (< 4 cm long).

**Ruellia pedunculata** Torr. ex A. Gray, (with a flower stalk), STALKED RUELLIA. Plant to ca. 0.7 m tall; leaves short-petioled; peduncles to ca. 7 cm long; calyces pilose with slender pointed hairs. Open woods and along streams; Fannin, Hopkins, and Lamar cos.; se and e TX w to ne part of nc TX. May–Sep.



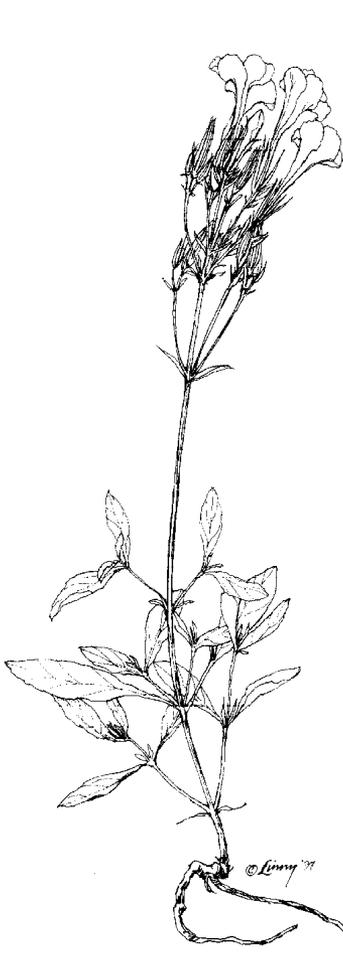
*Ruellia drummondiana* [HEA]



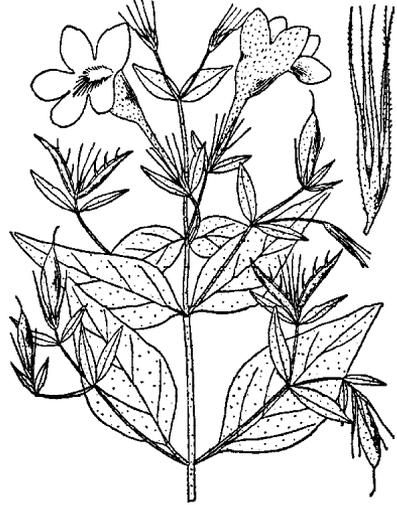
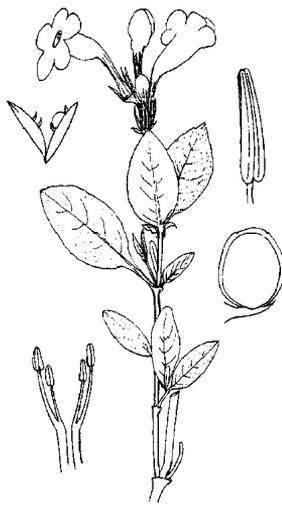
*Ruellia humilis* [STE]



*Ruellia malacosperma* [HEA]



*Ruellia nudiflora* var. *nudiflora* [LUN]



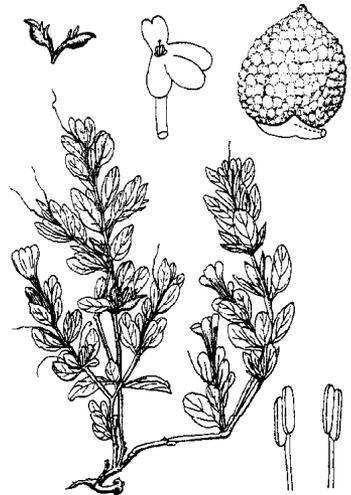
*Ruellia pedunculata* [BB2]



*Ruellia metziae* [HEA]



*Ruellia strepens* [BB2]



*Siphonoglossa pilosella* [LUN]

**Ruellia strepens** L., (rustling or rattling), LIMESTONE RUELLIA, SMOOTH RUELLIA. Stems to ca. 1 m tall, glabrous or pubescent in lines; leaves petioled; leaf blades ovate- or elliptic-lanceolate, acute; peduncles 1-3-flowered, leafy-bracted, the bracts lanceolate to elliptic-ovate. Stream and hillside woods; se and e TX w to East Cross Timbers, also Hamilton (HPC) and Brown (Stanford 1976) cos., also Edwards Plateau. Apr–Jun, with solitary, open flowers, also Sep–Oct, with clustered, often smaller, open or usually cleistogamous flowers. [*R. strepens* var. *cleistantha* A. Gray]

*Ruellia davisiorum* Tharp & F.A. Barkley, (for L. Irby Davis and Anna Tarrance Davis of Harlingen, TX, friends of Tharp and Barkley and donors of collections), cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), apparently occurs only to the s of nc TX. It is similar to *R. metziae*, but differs in having bluish lavender corollas and short (3–6 cm long), ovate to broadly ovate leaf blades.

### SIPHONOGLOSSA TUBETONGUE

☛ A genus of 7 species of mostly tropical America. (Greek: *siphona*, a tube or pipe, and *glossa* tongue, possibly in reference to the stamens of some species being exerted from the corolla tube)

**Siphonoglossa pilosella** (Nees) Torr., (little pilose—covered with long soft hairs), HAIRY TUBETONGUE, TUBETONGUE, FALSE HONEYSUCKLE. Low suffrutescent perennial; leaves subsessile; leaf blades ovate to oval, to 4 cm long; flowers solitary in axils or on short axillary peduncles 4 mm or less long; floral bracts none; bractlets subtending the calyces small, to 2.5 mm long; corollas lavender to rose or white, to 28 mm long, the tube slender, cylindric, elongate, the upper lip entire or 2-lobed, the lower lip 3-lobed, much larger, typically with a white spot and purple dots at base; stamens inserted near mouth of corolla tube; capsules 8–9 mm long. Rocky, sandy or grassy areas; Brown, Callahan, Mills, and Stephens cos.; mostly s 2/3 of TX. Apr–Oct. Jones et al. (1997) treated this species in the genus *Justicia* [as *J. pilosella* (Nees) Hilsenb. [ined.]].

### THUNBERGIA CLOCKVINE

☛ An Old World tropical genus of 90 species of climbing or erect herbs and shrubs with bracts enclosing the calyces; a number are cultivated as ornamentals. (Named for Carl Peter Thunberg, 1743–1828, Swedish student and successor of Linnaeus and traveler to Asia and South Africa)

**Thunbergia alata** Bojer ex Sims, (winged), BLACK-EYED-SUSAN, BLACK-EYED CLOCKVINE. Perennial, herbaceous, trailing or climbing vine often grown as an annual; stems usually ca. 1 m long; tendrils absent; leaf blades 2.5–8 cm long, ovate to triangular ovate, apically acute, basally cordate to ± hastate, entire to few-toothed, pubescent; petioles wing-margined, often nearly as long as blades; flowers usually axillary, solitary, pedunculate, subtended by 2 conspicuous foliaceous bracts ca. 15 mm long; calyces small, hidden by the bracts; corollas large and showy, 2.5–4 cm long, yellow to orange, cream, or white, with a dark purple center, with a slender tube and a spreading 5-lobed limb; lobes of limb rounded distally, not differing greatly in size or shape; stamens 4; capsules 8–10 mm in diam., with a stout beak ca. 10 mm long. Long cultivated in nc TX (an 1885 Reverchon collection is known from Dallas—Wasshausen 1966) and known to escape in se, e, and s TX and the Edwards Plateau; included because of possibility of escape in nc TX. Mar–Apr. Native of Africa. ☛

## ACERACEAE MAPLE FAMILY

☛ A small (113 species in 2 genera) of trees and shrubs of n temperate areas and tropical mountains; the genus *Dipteronia* with 2 species of c and s China has fruits winged all the way around. Aceraceae are closely related to Sapindaceae and appear to represent a clade within

that family. From a cladistic standpoint they should be lumped to form a more inclusive, monophyletic Sapindaceae (Judd et al. 1994). (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: trees with leaves opposite, simple and palmately lobed and veined or in 1 species pinnately compound; fruits distinctive—of 2 one-seeded, *winged* samaras.

REFERENCES: Brizicky 1963b; Murray 1970; Judd et al. 1994.

## ACER MAPLE

Polygamo-dioecious or dioecious, deciduous trees with watery often sweet sap; leaves opposite, simple and palmately lobed or pinnately compound; flowers pedicellate, in racemes, panicles, or corymbose or in umbellate fascicles, radially symmetrical, small, mostly 5-merous, usually completely or functionally unisexual; ovary superior; fruit a schizocarp of 2 one-seeded, winged samaras which eventually separate and function as wind-dispersed small “helicopters.”

☛ A genus of 111 species of trees and shrubs of the temperate zone and tropical mountains. Some species are important sources of maple syrup (e.g., *A. saccharum* Marsh.—SUGAR MAPLE) or as ornamentals, these often with brightly colored fall foliage. Others are valued for their timber which yields a hard, usually white wood used in furniture, musical instruments, flooring, gunstocks, etc. (Latin name of the maple; also meaning sharp, referring to the hard wood)

REFERENCES: Desmaris 1952; Gehlbach & Gardner 1983.

1. Leaves pinnately compound with 3–5(–9) distinct leaflets. \_\_\_\_\_ **A. negundo**
1. Leaves simple (but lobed).
  2. Central lobe of leaf narrowed basally where it joins the other lobes; leaves silvery-white beneath. \_\_\_\_\_ **A. saccharinum**
  2. Central lobe of leaf not narrowed basally; leaves light green to somewhat silvery-white beneath.
    3. Spaces (= sinuses) between the main lobes of the leaf rounded or U-shaped; margins of leaf lobes entire or somewhat lobulate; plants of areas near the Edwards Plateau \_\_\_\_\_ **A. grandidentatum**
    3. Spaces between the main lobes of the leaf ± sharply angled or V-shaped; margins of leaf lobes coarsely toothed; plants mainly of e TX \_\_\_\_\_ **A. rubrum**

**Acer grandidentatum** Nutt. var. **sinuosum** (Rehder) Little, (sp.: large-toothed; var.: wavy-margined), PLATEAU BIG-TOOTH MAPLE, UVALDE BIG-TOOTH MAPLE, LIMEROCK MAPLE. Flowers appearing as the leaves are expanding or after; petals absent; sinus between the two samaras U-shaped; samaras to ca. 31 mm long, typically much shorter. Limestone canyons; Bell Co. (HPC), also Coryell Co. (Gehlbach & Gardner 1983); Edwards Plateau n to Lampasas Cut Plain; other varieties are found in far w TX. While we are following Hatch et al. (1990), Kartesz (1994), and Jones et al. (1997) in terms of nomenclature, the most appropriate name for this taxon is not completely clear. It is closely related to and is sometimes put into *A. saccharum* Marshall (SUGAR MAPLE) [as *A. saccharum* var. *sinuosum* (Rehder) Sarg.]. Gehlbach and Gardner (1983) argued that all the relict maple populations in nc, c, and w TX should be treated as *A. saccharum* var. *floridanum* (Chapm.) Small & A. Heller (SOUTHERN SUGAR MAPLE).

**Acer negundo** L., (from the native name of *Vitex negundo*, because of supposed similarity of leaves), BOX-ELDER, ASH-LEAF MAPLE, ARCE, FRESNO DE GUAJUCO. Leaflets pinnately veined; terminal leaflet elliptic to obovate; lateral leaflets narrower and coarsely few-toothed to entire; flowers appearing just before the leaves, greenish; petals absent; samaras ca. 25–35 mm long. Stream banks, low woods. (Feb–)late Mar–Apr. Leaves with 3 leaflets can sometimes resemble and be confused with those of POISON-IVY. However, BOX-ELDER has opposite leaves in contrast to the alternate leaves of POISON-IVY and most other Anacardiaceae. This is by far the most common *Acer* in nc TX.

1. Younger twigs glabrous \_\_\_\_\_ var. **negundo**

1. Younger twigs coated with short velvety pubescence \_\_\_\_\_ var. **texanum**

var. **negundo**. Mainly in the e 1/2 of TX.

var. **texanum** Pax, (of Texas), TEXAS BOX-ELDER. Se and e TX w to Blackland Prairie.

**Acer rubrum** L., (red), RED MAPLE, SCARLET MAPLE. Branchlets and petioles usually reddish; flowers appearing before the leaves develop, reddish; petals ca. 2 mm long; sinus between the 2 samaras V-shaped; samaras usually 15–25 mm long. Low woods; Lamar Co. in Red River drainage, also Fannin Co. (Little 1971); mainly se and e TX. Feb–Apr. The leaves become bright crimson in autumn. Varieties are often recognized (Kartesz 1994; Jones et al. 1997); in var. *rubrum* the lower surface of the leaf blades are glabrous or with hairs only along the veins while in var. *trilobum* Torr. & A. Gray ex K. Koch and var. *drummondii* (Hook. & Arn. ex Nutt.) Sarg. the lower surface of the leaf blades are densely and usually permanently hairy; var. *trilobum* is differentiated by having the leaf blades with only 3 lobes, the smaller lateral basal lobes suppressed, while var. *rubrum* and var. *drummondii* have leaf blades usually with 5 lobes (the lateral basal lobes small). The leaves and bark are poisonous and have caused the death of livestock (Fuller & McClintock 1986). ☠

**Acer saccharinum** L., (sugary, from the sap), SILVER MAPLE, SOFT MAPLE. Leaves deeply 5-lobed, spaces between the main lobes of the leaf ± sharply angled or V-shaped; margins of leaf lobes coarsely toothed; flowers appearing before the leaves develop or immediately with them, greenish or reddish; petals absent; sinus between the two samaras V-shaped, samaras to 50(–60) mm long. Naturalized in sandy low woods, wooded lake shore, and stream banks; Grayson and Lamar cos.; introduced to TX; native further e in North America. Feb(?)–Mar.

## AIZOACEAE ICEPLANT OR FIG-MARIGOLD FAMILY

☞ A medium-large (1,850 species in 128 genera), tropical and subtropical family of betalain-containing, succulent herbs or small shrubs centered in s Africa; most have the CAM type of photosynthesis, a physiological adaptation for hot dry conditions; some are cultivated as ornamentals including the PEBBLE PLANTS or LIVING STONES (*Lithops*) that mimic rocks and *Mesembryanthemum* (ICEPLANT), a huge genus now split into over 100 segregate genera. *Mollugo* and *Glinus*, treated here in the Molluginaceae, were formerly included in the Aizoaceae. Family name from *Aizoon*, a genus of 25 species of the Mediterranean, s Africa, and Australia. (Latin name for an evergreen plant) (subclass Caryophyllidae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is a *succulent*, decumbent herb with opposite or subopposite leaves, inconspicuous axillary flowers, and circumscissile capsules.

REFERENCES: Bogle 1970; Hartmann 1993; Behnke & Mabry 1994.

### TRIANTHEMA HORSE-PURSLANE, SEA-PURSLANE

☞ A genus of 17 species of warm areas of the world, especially Australia; some contain alkaloids and are used medicinally. (Greek: *tri*, three, and *antheon*, flower)

**Triantema portulacastrum** L., (with flowers like *Portulaca*—purslane), DESERT HORSE-PURSLANE, SEA-PURSLANE, VERDOLAGA BLANCA. Glabrous, succulent, annual herb branching from the base; branches usually decumbent; leaves subopposite to opposite, in unequal pairs, petiolate; leaf blades broadly obovate to nearly orbicular, to ca. 4 cm long; flowers solitary, axillary, sessile; calyx lobes 5, ca. 2.5 mm long, pinkish purple within, green outside; petals absent; stamens 5–10; ovary superior; fruit a 1–several-seeded capsule ca. 4 mm long with prominent winged appendages at apex, circumscissile near the middle. Sandy soils and waste ground; Dallas, Grayson, and Tarrant cos.; mainly s and w TX. May–Oct.

## AMARANTHACEAE AMARANTH OR PIGWEED FAMILY

Ours annual or perennial, often weedy herbs; leaves opposite in our species (except *Amaranthus*), simple, entire or nearly so; stipules absent; inflorescences axillary or terminal, of small clusters, head-like, or in spikes or spike-like racemes or compact panicles; flowers very small, each subtended or enclosed by 3 scarious or prominently scarious-margined bracts/bracteoles, perfect or unisexual; tepals 0–5 in 1 series; stamens usually 5; pistil 1; ovary superior; fruit a dehiscent or indehiscent utricle.

☛ A medium-sized (750 species in 71 genera) family of mostly herbs or shrubs, climbers, or rarely trees of tropical and warm areas of the world with a few in temperate regions; the family includes a number of ornamentals (e.g., *Celosia*—COCKSCOMB) and weeds as well as grain crops (e.g., *Amaranthus*); pigments present are of the nitrogen-containing type known as betalains (Cronquist & Thorne 1994). Molecular evidence indicates the family is most closely related to Chenopodiaceae (Downie & Palmer 1994). (subclass Caryophyllidae)

FAMILY RECOGNITION IN THE FIELD: herbs with simple leaves entire or nearly so and very small apetalous flowers in usually dense inflorescences; flowers subtended by *scarious often colored bracts*; filaments united. Chenopodiaceae are similar in flower structure (e.g., very small, lacking petals), but lack scarious bracts and have separate filaments.

REFERENCES: Standley 1917; Reed 1969b; Robertson 1981; Townsend 1993; Downie & Palmer 1994; Behnke & Mabry 1994.

1. Leaves alternate \_\_\_\_\_ **Amaranthus**
1. Leaves opposite.
  2. Stems and leaves densely stellate-pubescent (at least young portions); plants with gray-green foliage and inconspicuous flowers in small axillary clusters lacking white or colored bracts; in extreme w part of nc TX \_\_\_\_\_ **Tidestromia**
  2. Stems and leaves without stellate hairs; plants not as above; widespread in nc TX.
    3. Inflorescence a panicle up to 20 cm broad; flowers unisexual \_\_\_\_\_ **Iresine**
    3. Inflorescence a head or narrow spike (a number of these can be grouped together); flowers perfect.
      4. Flowers in large, globose to short cylindric heads 2–2.8 cm in diam., often variously colored and showy \_\_\_\_\_ **Gomphrena**
      4. Flowers in much smaller heads, short thick spikes, or elongate inflorescences, neither colored nor showy (but sometimes strikingly whitish).
        5. Flowers in narrow, elongating, single or grouped spikes; tepals united \_\_\_\_\_ **Froelichia**
        5. Flowers in heads or short thick spikes; tepals separate.
          6. Floral bracts slightly shorter than or longer than the tepals; tepals acuminate or awn-tipped \_\_\_\_\_ **Alternanthera**
          6. Floral bracts about half as long as the tepals; tepals subacute or acute \_\_\_\_\_ **Gossypianthus**

### ALTERNANTHERA CHAFF-FLOWER

Ours perennials; leaves opposite, entire; inflorescences in head-like spikes, flowers perfect; tepals usually 5, separate; fruit an utricle.

☛ A genus of 100 species of tropical and warm areas, especially the Americas; some are edible while others, because of their colorful leaves, are used as bedding plants. (Latin: *alternans*, alternating, and *anthera*, an anther, referring to the sterile alternate anthers)

REFERENCES: Melville 1958; Buckingham 1996.

1. Inflorescences sessile or nearly so, the peduncles at most 1 cm long; plants terrestrial in sandy disturbed areas and waste places; leaf blades spatulate to suborbicular, 8–20 mm long \_\_\_\_\_ **A. caracasana**

1. Inflorescences pedunculate, the peduncles ca. 2–7 cm long; plants aquatic or semi-terrestrial;

leaf blades linear to linear-lanceolate or obovate, 20–110 mm long \_\_\_\_\_ **A. philoxeroides**

**Alternanthera caracasana** Kunth, (of Caracas, Venezuela), MAT CHAFF-FLOWER, VERDOLAGA DE PUERCO. Stems prostrate, branched, sometimes hirsute; leaves clustered; leaf blades glabrous or sparsely pubescent (chiefly beneath and on margins), dark green and glossy above; floral bracts and tepals creamy white; tepals awn-tipped, unequal, at least the shorter ones pubescent with numerous barbed hairs. Disturbed areas and waste places; w Blackland Prairie s and w to w TX. Jun–Oct. There are questions concerning the native range of this species; Henrickson (1993) indicated it is native to Central and South America; however, Robertson (1981), in his treatment of the family for the se U.S., considered it native to the s U.S.; Hatch et al. (1991) treated it as native to TX. [*A. peploides* (Humb. & Bonpl. ex Schult.) Urb.]

**Alternanthera philoxeroides** (Mart.) Griseb., (like *Philoxerus*, an Australian genus of Amaranthaceae), ALLIGATOR-WEED. Trailing and mat-forming with erect flowering stems; leaves well-spaced on flowering stems, thick and fleshy, glabrous; floral bracts 1/4 as long as tepals; tepals nearly equal, glabrous, silvery white. Aquatic or in very wet areas; Dallas and Tarrant cos. (both along the Trinity River); mainly se TX. Mar–Aug. Native of South America. [*Achyranthes philoxeroides* (Mart.) Standl.] This species can be a problematic weed contributing to clogging of aquatic habitats (Buckingham 1996). In Texas, ALLIGATOR-WEED is considered a “harmful or potentially harmful exotic plant” and it is illegal to release, import, sell, purchase, propagate, or possess this species in the state (Harvey 1998). The species was first reported in the se U.S. in Florida in 1894; it subsequently spread widely and in some areas formed nearly pure stands, outcompeting native vegetation; biological controls (various insects) have been used; the species apparently does not produce viable seeds in the U.S.—reproduction occurs by plant fragments (Robertson 1981). ☞

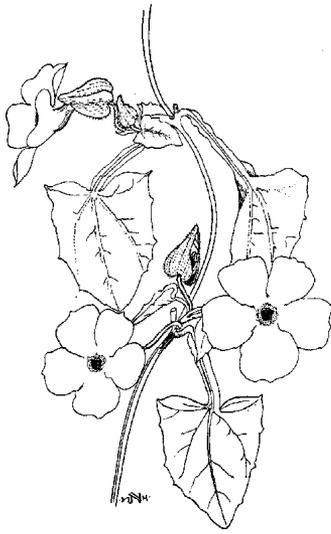
### AMARANTHUS GREEN PIGWEED, AMARANTH

Ours annuals with taproots; leaves alternate; inflorescence of dense, terminal or axillary spikes or panicles; flowers perfect or unisexual; fruit a 1-seeded, circumcissile, irregularly splitting or indehiscent utricle; seeds lenticular.

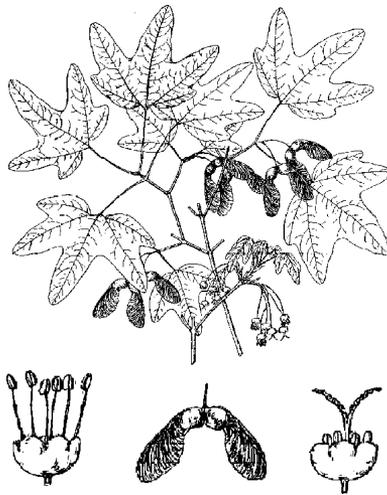
☞ A genus of 60 species of tropical and temperate areas of the world. As treated here, *Amaranthus* includes the segregates *Acnida* and *Acantochiton*. The seeds of *Amaranthus* species were used as a major “grain” crop by Native Americans in pre-Colombian times (e.g., *A. caudatus* L.—INCA-WHEAT, *A. hybridus*—especially in Mexico). The protein-rich leaves have been used for millenia and are one of the most common vegetables in the tropics; ☞ some species, however, can accumulate toxic levels of nitrates (Cheatham & Johnston 1995); some are cultivated as ornamentals; others are widespread weeds considered by some to be among the worst annual garden weeds—they grow rapidly and can produce hundreds of thousands of seeds which can survive dormant in the soil for decades (Baumgardt 1982). Hybridization is common and widespread in the genus (Sauer 1955). (Greek: *amaranthos*, unfading, because the dry calyx and bracts are persistent)

REFERENCES: Sauer 1955, 1967.

1. Floral bracts subtending individual flowers much enlarged, enfolding and concealing the flowers, and broadly cordate in fruit; rare in nc TX \_\_\_\_\_ **A. acanthochiton**
1. Floral bracts subtending individual flowers not much enlarged, neither enfolding and concealing the flower nor cordate in fruit; including species widespread in nc TX.
  2. Flowers in small axillary clusters, main stem and branches leafy to tip.
  3. Tepals with tips broader than base, somewhat spatulate, 3-nerved, apiculate; stems erect; part of nc TX \_\_\_\_\_ **A. polygonoides**



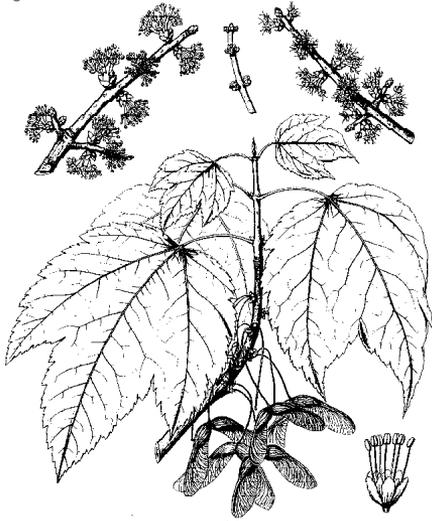
*Thunbergia alata* [LUN]



*Acer grandidentatum* var. *sinuosum* [SA1]



*Acer negundo* var. *negundo* [SA5.8]



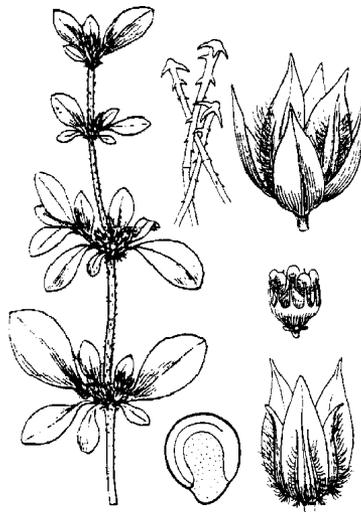
*Acer rubrum* [SA3]



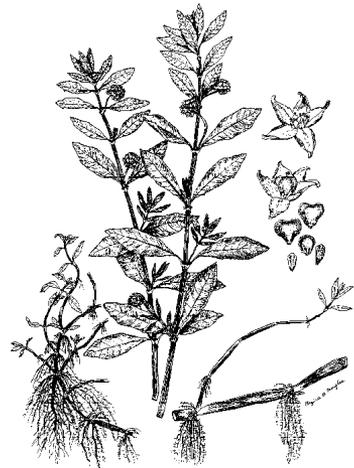
*Acer saccharinum* [SA3]



*Trianthera portulacastrum* [GLE]



*Alternanthera caracasana* [FAW]



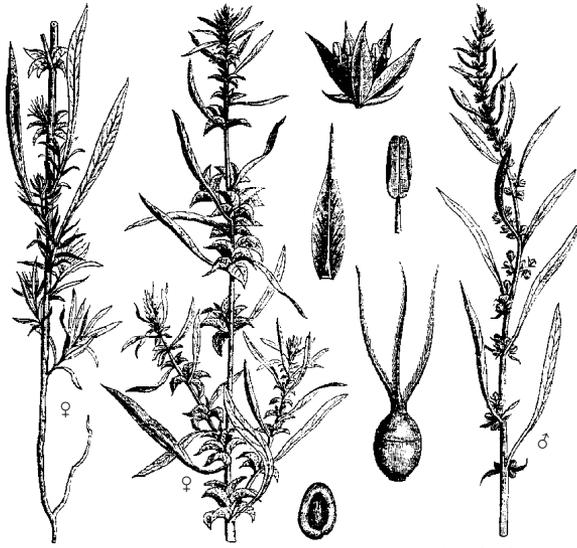
*Alternanthera philoxeroides* [REE]

3. Tepals oblong or lanceolate, narrowed at tip, 1-nerved, acute to acuminate; stems prostrate or erect; widespread in nc TX.
4. Plants prostrate; tepals 4 or 5 \_\_\_\_\_ **A. blitoides**
4. Plants stiffly erect; tepals 3 \_\_\_\_\_ **A. albus**
2. Flowers in terminal, spike-like panicles (often some of the lower ones also axillary); main stem and branches with reduced leaves or none apically.
5. Upper leaf axils and lower flower clusters with long spines (5–10 mm long) \_\_\_\_\_ **A. spinosus**
5. Upper leaf axils and inflorescence without spines (but bracts can be prickly).
6. Bracts at base of flowers 1.5–2.5 mm long; pistillate tepals 1 or 2 with 1 rudimentary (or 5 in the rare *A. arenicola*); staminate and pistillate flowers on separate plants (= dioecious); inflorescences not noticeably prickly to the touch.
7. Pistillate tepals 0, 1 or 2; bracts with midveins clearly excurrent or not so; outer staminate tepals acuminate; including a species very abundant in nc TX.
8. Plants pistillate.
9. Tepals 2, 1 of these well-developed, ca. 2 mm long; fruits with circumscissile dehiscence; midrib of bracts clearly excurrent; very abundant in nc TX \_\_\_\_\_ **A. rudis**
9. Tepals completely absent or if present rudimentary (< 1 mm long); fruits indehiscent or irregularly dehiscent; midrib of bracts not conspicuously excurrent; rare in nc TX \_\_\_\_\_ **A. australis**
8. Plants staminate.
10. Bracts ca. 2 mm or slightly more in length, with heavy midribs; outer tepals definitely longer than the inner; very abundant in nc TX \_\_\_\_\_ **A. rudis**
10. Bracts 1.5–1.8 mm long, usually with slender midribs; outer tepals not appreciably longer than the inner; rare in nc TX \_\_\_\_\_ **A. australis**
7. Pistillate tepals 5; bracts with midveins barely if at all excurrent; staminate tepals obtuse or retuse (= slightly notched at apex); rare in nc TX, reported only from Bell Co. \_\_\_\_\_ **A. arenicola**
6. Bracts at base of flower 3–6 mm long; pistillate tepals usually 3–5; plant dioecious OR staminate and pistillate flowers on the same plant (= monoecious) OR flowers perfect; inflorescences prickly to the touch OR not so.
11. Plants dioecious; bracts 4–6 mm long; tepals 2.5–4.5 mm long with conspicuous extension of the midvein; terminal spikes long, 15–70(–120) cm, often lax or drooping to erect, usually prickly to the touch \_\_\_\_\_ **A. palmeri**
11. Plants monoecious or flowers perfect; bracts 3–5 mm long; tepals 1.5–3.2 mm long, with less obvious extension of the midrib; terminal spikes to ca. 20 cm long, usually erect, usually not prickly to the touch.
12. Spikes slender, 6–10(–12) mm broad; tepals acute, 1.5–2(–2.5) mm long \_\_\_\_\_ **A. hybridus**
12. Spikes thick, 10–20 mm broad; tepals rounded to truncate, usually notched apically, often mucronate, 2.5–3.2 mm long \_\_\_\_\_ **A. retroflexus**

**Amaranthus acanthochiton** J.D. Sauer, (named for the genus *Acanthochiton* that word derived from roots meaning thorny hard outer covering), GREENSTRIPE. Stems erect, to 0.8 m tall; seeds 1–1.25 mm in diam., dark reddish brown. Sandy or rocky areas; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); se TX nw to nc TX and w to Trans-Pecos. Jul–Oct. [*Acanthochiton wrightii*Torr.]

**Amaranthus albus** L., (white), TUMBLEWEED, TUMBLEWEED AMARANTH, WHITE AMARANTH. Stems erect, stiff, whitish or pale green, 0.2–1.2 m tall; branches spreading; seeds 0.6–0.8 mm in diam., reddish brown, shiny. Disturbed sites; widespread in TX. Aug–Dec.

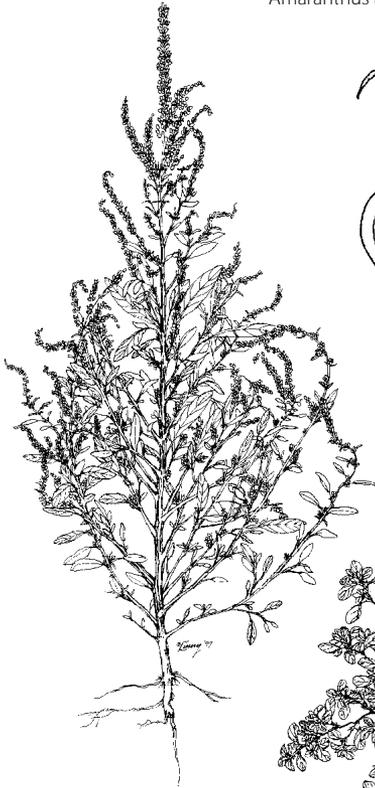
**Amaranthus arenicola** I.M. Johnston, (growing in sandy places), TORREY'S AMARANTH, SANDHILL AMARANTH. Plant erect, to 2(–3) m tall; seeds 1–1.3 mm in diam., dark reddish brown, shiny.



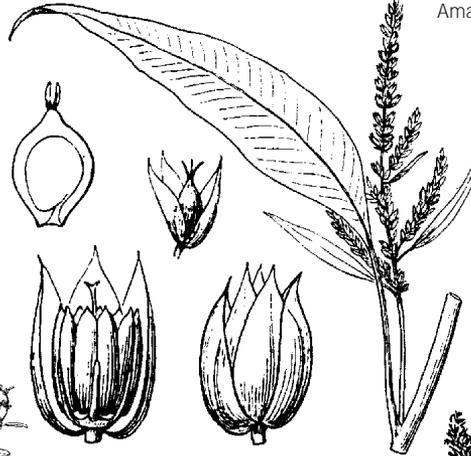
*Amaranthus acanthochiton* [EN2]



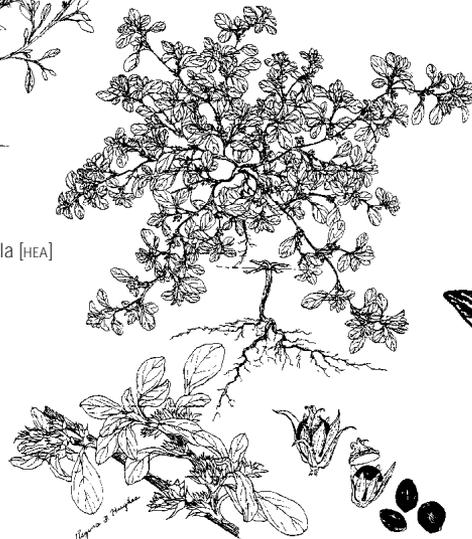
*Amaranthus albus* [REE]



*Amaranthus arenicola* [HEA]



*Amaranthus australis* [FAW]



*Amaranthus blitoides* [REE]



*Amaranthus hybridus* [GLE]

Sandy areas; Bell Co. (Reed 1969b); widespread in TX. [*A. torreyi* of authors, not (A. Gray) Benth. ex S. Watson]

**Amaranthus australis** (A. Gray) J.D. Sauer, (southern), SOUTHERN WATER-HEMP, SOUTHERN AMARANTH. Plant erect, 2–3(–9) m tall; seeds 1–1.25 mm in diam., dark reddish brown to black, shiny. Marshy places; Dallas, Denton, and Ellis cos.; central TX nw to nc TX. May–Aug. [*Acnida australis* A. Gray, *Acnida cuspidata* Bertero ex Spreng.]

**Amaranthus blitoides** S. Watson, (resembling blithe—a common name for *Chenopodium* species), PROSTRATE PIGWEED, QUELITE MANCHADO. Stems prostrate to rarely ascending, trailing and forming mats, to 1 m long, glabrous or nearly so; leaf blades oblong-oblongate; seeds 1.3–1.6 mm in diam., black, dull. Disturbed sites, weedy areas; widespread in TX. Jun–Oct. [*Amaranthus graecizans* of authors, not L.]

**Amaranthus hybridus** L., (hybrid), GREEN AMARANTH, SLENDER PIGWEED, SLIM AMARANTH, SPLEEN AMARANTH, QUELITE DE COCHINO, QUELITE MORADO. Stems erect, stout, 0.5–1.5(–2.5) m tall; spikes slender, 6–10(–12) mm broad, terminal and axillary; fruits dehiscent; seeds round, 1.1–1.3 mm in diam., black, shiny. Pioneer weed, disturbed areas; Brown Co., also Bell Co. (Reed 1969b); widespread but more common in w part of state. May–Oct. Native to e North America, also Mexico to n South America; naturalized weed in Mediterranean region, South Africa, Australia, and e Asia (Correll & Johnston 1970).

**Amaranthus palmeri** S. Watson, (for its discoverer, Edward Palmer, 1831–1911, English-American surgeon and botanist, collected in w U.S. and Mexico), CARELESSWEED, PALMER'S PIGWEED, PALMER'S AMARANTH, REDROOT. Plant erect, 1–2(–3) m tall; branches of inflorescence often very long, densely flowered, cylindrical, half-drooping; seeds 1–1.3 mm in diam., dark reddish brown. Disturbed sites and weedy areas; widespread in TX, often abundant. Jun–Oct. Implicated in livestock poisoning through the accumulation of nitrates (Kingsbury 1964; Burlage 1968). ☠

**Amaranthus polygonoides** L., (resembling *Polygonum*—knotweed), TROPICAL AMARANTH, BERLANDIER'S AMARANTH. Stems erect, stiff, 0.15–0.3 m tall, branching from the base; branches spreading, prostrate to ascending; seeds ca. 1 mm in diam., black, shiny. Disturbed sites; McLennan and Brown cos.; s TX n to s part of nc TX and w to Trans-Pecos. May–Oct. [*Amaranthus berlandieri* (Moq.) Uline & W.L. Bray]

**Amaranthus retroflexus** L., (reflexed or twisted back), RED-ROOT PIGWEED, ROUGH PIGWEED, GREEN AMARANTH, QUELITE. Plants erect, 0.3–3 m tall; fruits dehiscent; seeds 1 mm in diam., dark reddish brown, shiny. Disturbed sites; Collin, Dallas, Grayson, Jack, and Tarrant cos., also Bell Co. (Reed 1969b); nearly throughout TX. May–Oct. Apparently introduced in Texas; first found in the state in 1894 (Mahler 1988). A cosmopolitan weed possibly native to the e U.S. Animals may be poisoned from eating the plants due to the accumulation of large amounts of nitrates (Burlage 1968; Stephens 1980). ☠

**Amaranthus rudis** J.D. Sauer, (wild), NUTTALL'S WATER-HEMP, WATER-HEMP. Plant highly variable, glabrous, 0.15–2.5 m tall; seeds ca. 1 mm in diam., dark reddish brown. Low, moist, disturbed sites, fields; invader species; nearly throughout TX. Late Apr–Oct. [*Acnida tamariscina* of authors, not (Nutt.) A.W. Wood, *Amaranthus tamariscinus* of authors, not Nutt.] One of the most abundant native weeds of late summer and fall.

**Amaranthus spinosus** L., (full of spines), SPINY PIGWEED, THORNY AMARANTH, QUELITE ESPINOSO. Plant erect, 0.2–1.2 m tall; the only species in nc TX with distinct spines; leaf blades ovate to rhombic-lanceolate; seeds 0.7–1 mm in diam., black, shiny. Disturbed sites; Bell, Cooke, Dallas, Grayson, and Tarrant cos., also Denton and Williamson cos. (Reed 1969b); se and e TX w to East

Cross Timbers and Edwards Plateau. May–Oct. Pantropical weed. Reported to cause internal mechanical injury and bloat in livestock if ingested (Burlage 1968). ☞☞

*Amaranthus blitum* L., (old name for *Chenopodium capitatum* (L.) Asch.—strawberry-blite), (GREEN AMARANTH), is cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2) but apparently occurs only to the e and s of nc TX. It is monoecious and somewhat similar to *A. retroflexus* and *A. hybridus*, but erect or prostrate, 1 m or less tall, with lateral spikes not much shorter than the terminal, and with indehiscent fruits. Native of Europe. [*A. ascendens* Loisel., *A. lividus* L.] ☞☞

### FROELICHIA SNAKE-COTTON, COTTONWEED

Ours annuals, gray with ± matted pubescence, simple or with long, erect or partly decumbent branches from basal part of plant; leaves few, mostly in basal part of plant; leaf blades oblong or oblanceolate; inflorescences leafless; floral bracts white or yellowish, unequal, shorter than the perianth; flowers perfect; perianth densely and obviously woolly outside, becoming hardened at maturity; petals absent; stamens with united filaments forming a scarious tube, resembling an additional inner perianth; fruit an utricle surrounded by the hardened perianth.

☛ A genus of 18 species of warm areas of the Americas and the Galapagos Islands. Hybridization between species is not uncommon. (Named for Joseph Aloys Froelich, 1766–1841, a German botanist)

1. Fruiting spikes 1–10 cm long, 10–13 mm thick, appearing whitish when fresh; fruiting perianth 4–6 mm long, usually with entire or deeply dentate to lacerate wings or crests; main stem usually erect, 2.5–7 mm thick near base, with few branches; plants 40–130 cm tall \_\_\_\_\_ **F. floridana**
1. Fruiting spikes 1–3 cm long, 7–8 mm thick, appearing grayish when fresh; fruiting perianth usually 2–3.5 mm long, usually distinctly spiny; main stem bent at base or with several near-basal branches with lower internodes widely spreading or decumbent, 1–3 mm thick; plants 10–50 cm tall \_\_\_\_\_ **F. gracilis**

**Froelichia floridana** (Nutt.) Moq., (of Florida), FIELD SNAKE-COTTON. Fruiting perianth with narrow to broad, nearly entire to deeply dentate or lacerate wings or crests down the keels, and with one or few teeth or short spines on the faces at base or occasionally up to the middle. Loose sandy soils, often abundant on roadsides and disturbed sites; throughout TX. Jun–Oct. Virtually all of our plants would seem referable to var. *campestris* (Small) Fernald. However, while this variety is often recognized (e.g., Kartesz 1994; Jones et al. 1997), because of the lack of consistently recognizable differences, we are not formally recognizing varieties. [*F. campestris* Small, *F. floridana* var. *campestris* Small] Wind-pollinated and considered a cause of hay fever (Ajilvsgi 1984).

**Froelichia gracilis** (Hook.) Moq., (graceful), SLENDER SNAKE-COTTON. Fruiting perianth spinier than in *F. floridana*, with rows of distinct and rather sharp, separate or united, spiny teeth on keels and a tooth at base of each face. Sandy or gravelly ground; throughout much of TX except far e part. Jun–Oct. According to McGregor (1986), *F. floridana* and *F. gracilis* often grow together and “... putative hybrids between the two are all too frequent.”

*Froelichia drummondii* Moq., (for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), DRUMMOND’S SNAKE-COTTON, is cited by Reed (1969b) for Tarrant Co. based on a 1925 Ruth collection; this taxon, which is extremely similar to if not conspecific with *F. floridana*, is apparently otherwise unknown from nc TX. Reed (1969b) distinguished it from *F. floridana* (calyx crests deeply dentate) by its merely erose, crenulate or entire calyx crests. Waterfall (1972) lumped *F. drummondii* with *F. floridana*.

**GOMPHRENA** GLOBE-AMARANTH

☛ A genus of ca. 120 species of tropical and warm areas of the New World and Australia; a number are cultivated as ornamentals. (Modification of Pliny's *Gomphaena*, a species of amaranth)

REFERENCE: Mears 1980.

**Gomphrena globosa** L., (globose, spherical), COMMON GLOBE-AMARANTH. Annual; stems stout, usually much branched, sometimes simple, to 1 m tall; leaves opposite; leaf blades mostly oblong to ovate, entire; flowers perfect, in showy, pedunculate, subglobose heads 2–2.8 cm in diam.; heads variously colored, purple, orange, rose, white, or variegated; perianth usually woolly; filaments united into a slender tube. Widely cultivated ornamental that sometimes escapes; Cooke and Tarrant cos.; also s TX and Edwards Plateau. Jul–Sep. Native of s Asia. The flowering heads superficially resemble those of CLOVER species. 🌱

*Gomphrena haageana* Klotzsch, (for J.N. Haage, 1826–1878, a seed grower of Erfurt, Germany), HAAGE'S GLOBE-AMARANTH, a perennial with leaf blades oblanceolate to oblong-linear and heads light red with yellow florets, is sometimes cultivated in nc TX and might be expected to escape; it is native to the w Edwards Plateau.

**GOSSYPIANTHUS** COTTON-FLOWER

☛ A genus of 2 species, 1 from OK through TX to adjacent Mexico and in Hispanola, and the other restricted to Cuba (Henrickson 1987); it has often been included in *Guilleminea*. (Latin: *gossypion*, cotton, and Greek: *antheon*, flower, presumably in reference to the densely lanate tepals) REFERENCES: Mears 1967; Henrickson 1987.

**Gossypianthus lanuginosus** (Poir.) Moq., (woolly). Perennial herb; stems often procumbent, sometimes ascending; leaves opposite; rosette leaves with wide-winged petiole without chlorophyll; cauline leaves short-petioled, oval to obovate; inflorescence a spike of 6–12 axillary flowers; flowers sessile, 5-merous, perfect; tepals 3-nerved, green between nerves, densely lanate with silky hairs; stamens 5; style 1; stigmas capitate, bilobed; fruit a membranous, indehiscent utricle; seeds 1 mm long, brown, shiny. Dry soils, sandy, rocky, or disturbed areas. A highly variable species sometimes divided into several varieties; 2 are recognized here.

1. Leaves densely pilose or tomentose, especially beneath; rosette leaves lanceolate or oblanceolate to spatulate, 4–12 mm wide, obtuse to acute \_\_\_\_\_ var. **lanuginosus**

1. Leaves nearly glabrous; rosette leaves usually linear to lanceolate, 3–6 mm wide, acute \_\_\_\_\_ var. **tenuiflorus**

var. **lanuginosus**, WOOLLY COTTON-FLOWER. Throughout most of TX. [*Guilleminea lanuginosa* (Poir.) Hook. f., *Guilleminea lanuginosa* (Poir.) Hook. f. var. *rigidiflora* (Hook.) Mears, *Guilleminea lanuginosa* (Poir.) Hook. f. var. *sheldonii* (Uline & W.L. Bray) Mears]

var. **tenuiflorus** (Hook.) Mears ex Henr., (slender-flowered), LANCE-LEAF COTTON-FLOWER. Mainly parts of e 1/3 of TX. [*Guilleminea lanuginosa* (Poir.) Hook. f. var. *tenuiflora* (Hook.) Mears]

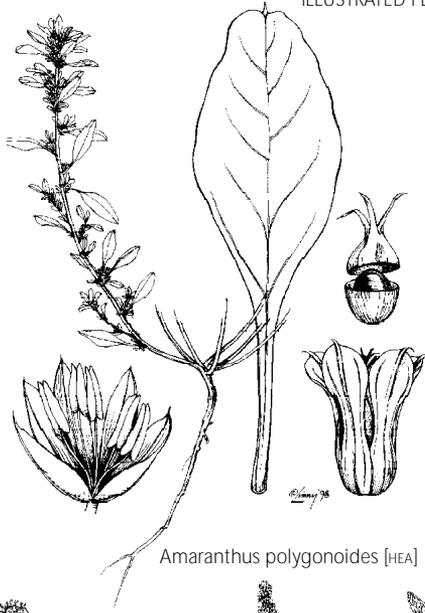
**IRESINE** BLOODLEAF

Ours monoecious or dioecious herbs; leaves opposite, petiolate; leaf blades thin, entire or serrulate; inflorescence a panicle of numerous, small flowers, often whitish to straw-colored due to bracts and perianths; perianth 5-parted; pistillate flowers subtended by conspicuous white wool; stamens 5; fruit an indehiscent utricle; seeds dark red, shiny.

☛ A genus of ca. 80 species of tropical and temperate areas, especially the Americas and Australia; some are used medicinally while others are cultivated for their ornamental foliage. (Greek: *eiresione*, a staff or branch wound with wool, from the calyx, often bearing long hairs)



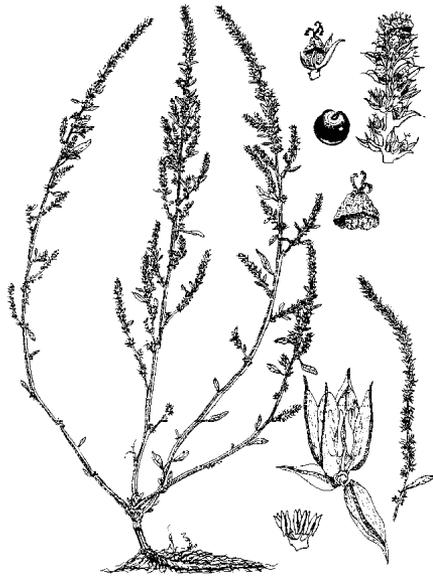
*Amaranthus palmeri* [COI]



*Amaranthus polygonoides* [HEA]



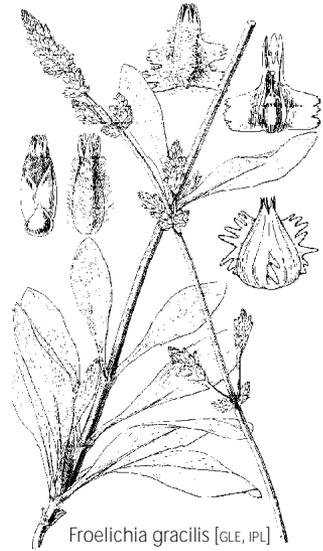
*Amaranthus retroflexus* [REE]



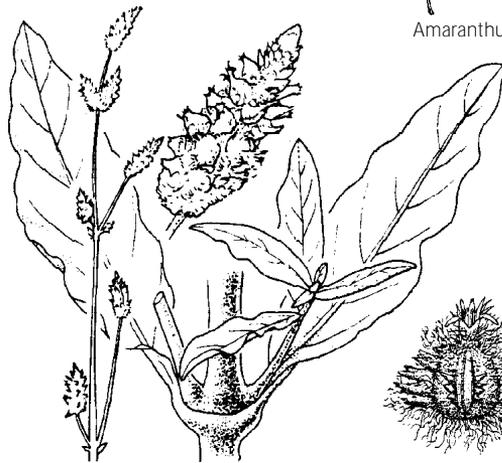
*Amaranthus rudis* [COI]



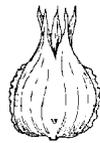
*Amaranthus spinosus* [GLE]



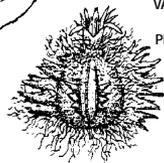
*Froelichia gracilis* [GLE, IPL]



*Froelichia floridana* [GLE, RAD]



VARIATION  
IN  
PERIANTH



*Gomphrena globosa* [NIC]

REFERENCE: Henrickson & Sundberg 1986.

1. Plants annual or perennial from a vertical root; stems usually much-branched; tepals of pistillate flowers 3-nerved, acute or obtuse, longer than the utricle; plants monoecious; rare in nc TX \_\_\_\_\_ **I. diffusa**
1. Plants perennial with horizontal rhizomes; stems usually unbranched up to the inflorescence; tepals of pistillate flowers (look inside of small tepal-like bracts) faintly 1-nerved, acute, equaling or usually shorter than the utricle; plants dioecious; widespread in nc TX \_\_\_\_\_ **I. rhizomatosa**

**Iresine diffusa** Humb. & Bonpl. ex Willd., (diffuse, spreading), JUBA'S-BUSH. Stems erect or spreading, sometimes clambering over adjacent plants, 0.4–3 m long; male and female flowers on the same plant; inflorescences white to straw-colored; tepals 1–1.5 mm long; seed broadly obovoid or suborbicular, ca. 1.5 mm in diam. Often in sandy moist areas; Tarrant and Williamson cos. (Reed 1969b); scattered in TX. Jul–Oct. [*I. celosia* L.]

**Iresine rhizomatosa** Standl., (very rooted), ROOTSTOCK BLOODLEAF, BLOODLEAF. Stems erect, 0.5–1.5 m tall; male and female flowers on separate plants, bracts and tepals silvery white; tepals 1.2–1.5 mm long; utricle 2–2.5 mm long; seed suborbicular, ca. 0.5 mm in diam., dark red, lustrous. Sandy soils, often moist areas; se and e TX w to East Cross Timbers, also Edwards Plateau. Aug–Oct.

## TIDESTROMIA

☛ A genus of 3 species of sw North America. (Named for Ivar T. Tidestrom, 1864–1956, Swedish-born botanist of sw U.S.)

**Tidestromia lanuginosa** (Nutt.) Standl., (woolly), WOOLLY TIDESTROMIA, ESPANTA VAQUEROS. Annual herb to 15 cm tall and 1 m across; stems usually prostrate to rarely ascending; stems and leaves gray-green to ashy-white, densely stellate-pubescent, glabrate with age; leaves opposite, obovate to rhombic-ovate, entire, 5–20(–30) mm long; petioles as long as blades or shorter; flowers in small axillary clusters, inconspicuous, yellowish, perfect; sepals 5, unequal, 1–3 mm long; stamens 5; utricle subglobose. Dry sandy, gravelly, or rock areas; Archer, Callahan, and Shackelford cos.; coastal, also extreme w part of nc TX w through w 1/2 of TX. Mar–Oct.

## ANACARDIACEAE SUMAC OR CASHEW FAMILY

Ours subshrubs, shrubs, small trees, or woody vines, often with somewhat milky juice; leaves alternate, with 3 leaflets or once pinnately compound (simple in 1 species possibly present in nc TX); leaflets entire, toothed, or lobed; flowers small, in terminal or lateral, head-like to loose open panicles, perfect or unisexual, 5-merous; petals white to cream, yellow, or green; stamens 5; pistil 1; fruit a drupe.

☛ A medium-sized (875 species in 70 genera) family of the tropics and subtropics with a few temperate species. Economically important taxa include food plants such as *Anacardium occidentale* L. (CASHEW), *Mangifera indica* L. (MANGO), and *Pistacia vera* L. (PISTACHIO), and ornamentals including *Cotinus* (SMOKETREE), *Rhus* (SUMACS), and *Schinus* (PEPPERTREE). ☛ A number of species cause contact dermatitis. *Pistacia chinensis* Bunge, (genus: Greek *pistake*, pistachio; sp.: of China), CHINESE PISTACHIO, native from Afghanistan to China and the Philippines, is widely planted in nc TX as an ornamental. It is a dioecious deciduous tree to 15(–25) m tall with even-pinnately compound leaves (leaflets 10–20, 1.2–2 cm wide, oblique, acuminate, entire), apetalous flowers, and small, reddish to purple, dry drupes 5–6 mm long in much-branched panicles. In the spring of 1998, a number of seedlings were observed in a woods in Fort Worth (R. O'Kennon, pers. obs.). It is not clear whether they will survive and whether this species will become naturalized. This small genus of 9 species includes the Old World *P. vera* L.,

PISTACHIO, cultivated for the edible nuts; one species, *P. texana* Swingle, is native to sw TX. Family name from *Anacardium*, a genus of 8 species of the New World tropics. (Greek: *ana*, up, and *cardia*, heart, possibly in reference to the large, swollen, fleshy, bright red or yellow, pear-like receptacle above the nut; the receptacle is edible and referred to as the cashew apple) (subclass Rosidae)  
FAMILY RECOGNITION IN THE FIELD: subshrubs, shrubs, small trees, or woody vines with alternate leaves that either have 3 leaflets or are pinnately compound (simple in 1 species possibly present in nc TX); flowers small, inconspicuous; fruit a small, red or white to yellowish gray drupe (light brown in 1 species possibly present in nc TX).

REFERENCES: Barkley 1957, 1961; Brizicky 1962d; Baer 1979.

1. Leaves simple; fruiting panicles with plumose sterile pedicels; styles lateral; fruits light brown; rare species of Edwards Plateau questionably present in nc TX \_\_\_\_\_ **Cotinus**
1. Leaves compound with 3–numerous leaflets; fruiting panicles without plumose sterile pedicels; styles terminal; fruits red or white to yellowish gray; including species widespread in nc TX.
  2. Fruits red, noticeably pubescent with glandular and eglandular hairs; leaves pinnately compound with > 3 leaflets OR palmately 3-foliate (= terminal leaflet sessile); inflorescences terminal (or in *R. aromatica* and *R. trilobata* sometimes appearing axillary); plants without contact poisons \_\_\_\_\_ **Rhus**
  2. Fruits white to yellowish gray, glabrous or sparingly pubescent with eglandular hairs; leaves usually pinnately 3-foliate (= terminal leaflet stalked), rarely 5-foliate OR in 1 species rare in nc TX the leaves pinnately compound with 5–17 leaflets; inflorescences axillary; plants with contact poisons \_\_\_\_\_ **Toxicodendron**

### COTINUS SMOKETREE, SMOKEWOOD

☛ A genus of 3 species, 1 ranging from s Europe to China, 1 in sw China, and 1 in the se U.S. The widespread Old World species, *C. coccinifera* Scop. (WIGTREE, EUROPEAN SMOKETREE), is widely cultivated and the wood yields a yellow dye; it can be distinguished from the native species by its smaller (ca. 4–9 cm long), glabrous, often ovate leaf blades. The smoke-like effect of the plumose fruiting pedicels gave rise to the common name. (Greek: *cotinus*, ancient name of the wild olive, used by Pliny for an unidentified shrub of the Apennines, but applied by some pre-Linnean botanists, such as Tournefort, to *C. coccinifera*—Brizicky 1962d)

**Cotinus obovatus** Raf., (obovate, inversely ovate), AMERICAN SMOKETREE, SMOKEBUSH, CHITTAMWOOD. Usually dioecious, shrub or small tree to ca. 12 m tall with strong-smelling sap; wood yellow; leaves simple; leaf blades obovate to elliptic-obovate, 6–17 cm long, 5–9 cm wide, strikingly yellow to orange, red, or scarlet in fall, apically usually obtuse, with lower surface pubescent; petioles 1.5–6 cm long, often purple or reddish; flowers small, numerous, yellowish white to greenish yellow, in terminal panicles ca. 10 cm long which can enlarge to ca. 30 cm in fruit; sterile pedicels plumose with pale purplish or brownish hairs (panicles thus with a pink “smoky” appearance but not as showy as in the introduced *C. coccinifera*); fruits flattened, kidney-shaped or oblique-oblong, ca. 4 mm long. Rocky woods, limestone outcrops; Cox and Leslie (1991) reported and mapped this species for nc TX; however, we have found no nc TX specimens or other literature reports and its presence in nc TX is questionable; mainly Edwards Plateau (Bandera, Kendall, Kerr, and Uvalde cos.—Stanford 1976; Simpson 1988). Apr–May. [*C. americanus* Nutt., *Rhus cotinoides* Nutt.] According to Simpson (1988), the TX occurrence of this tree is relictual with the TX populations more than 500 miles from the nearest locality in OK; the species has an extremely limited and scattered distribution in the e U.S. (Little 1970) and its distribution is considered relictual (Little 1983). The wood yields a yellow dye which was extensively used during the Civil War (Cox & Leslie 1991). The striking fall foliage suggests more widespread use as an ornamental.

**RHUS** SUMAC

Shrubs or rarely small trees often forming thickets; leaves palmately 3-foliolate or pinnately compound, often turning bright red in fall.

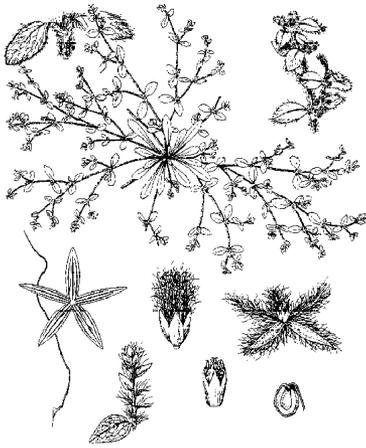
☛ A genus of ca. 200 species of temperate and warm areas; *Toxicodendron*, recognized here as a separate genus, is sometimes lumped into *Rhus* as a section or subgenus. According to J. Hennen (pers. comm.), there are rust fungi that attack only *Toxicodendron* (*Pileolaria brevipes* Berk. & Ravenel) and others that attack only *Rhus* (*Pileolaria patzcuarensis* (Holw.) Arthur). *Rhus* species often display very early fall foliage color (often strikingly red); this is considered to serve as a “foliar fruit flag” which attracts birds that act as dispersal agents for the fall-ripening fruits (Stiles 1984). In contrast to *Rhus* species, which are all non-poisonous, *Toxicodendron* species are poisonous and can cause contact dermatitis. Some species are a source of tannin. (Ancient Greek and Latin name for SUMAC)

REFERENCES: Barkley 1937; Brizicky 1963a.

1. Leaves palmately compound; leaflets 3.
  2. Terminal leaflet 25–60 mm long, ± narrowed and often pointed at apex; leaflets usually pubescent below, the margins usually ciliate \_\_\_\_\_ **R. aromatica**
  2. Terminal leaflet 15–33 mm long (rarely larger), abruptly narrowed to truncate at apex; leaflets usually glabrous below (or minutely puberulent when young), the margins not usually ciliate \_\_\_\_\_ **R. trilobata**
1. Leaves pinnately compound; leaflets 5 or more.
  3. Leaves with rachis completely unwinged and leaflets entire, 4–12 cm long \_\_\_\_\_ see **Toxicodendron vernix**
  3. Leaves with rachis winged OR leaflets toothed OR leaflets 4 cm or less long.
    4. Leaflets (3–)5–9, very small, < 2 cm long and < 6 mm wide; branches often ± spinescent \_\_\_\_\_ **R. microphylla**
    4. Leaflets 5–31, much > 2 cm long and usually much > 6 mm wide; branches not spinescent.
      5. Leaf rachis unwinged; leaflets sharply toothed or entire.
        6. Leaves deciduous, not coriaceous; leaflets mostly sharply and conspicuously toothed, glabrous and glaucous beneath, to 12 cm long \_\_\_\_\_ **R. glabra**
        6. Leaves evergreen, coriaceous; leaflets entire, pubescent beneath, soft to the touch, 4 cm or less long \_\_\_\_\_ **R. virens**
      5. Leaf rachis winged; leaflets mostly entire.
        7. Rachis and its wings on some leaves over 4 mm wide (total distance across rachis and its wings); leaflets 7–17, ovate-lanceolate, 2–4 times as long as wide, scarcely falcate \_\_\_\_\_ **R. copallinum**
        7. Rachis and its wings usually less than 3.5 mm wide; leaflets 13–19, linear-lanceolate, 4–9 times as long as wide, usually strongly falcate \_\_\_\_\_ **R. lanceolata**

**Rhus aromatica** Aiton var. **serotina** (Greene) Rehder, (sp.: fragrant; var.: late-flowering or -ripening), FRAGRANT SUMAC. Shrub to ca. 2 m tall with creeping stem-bases, forming loose clumps; foliage fragrant when bruised; flowers in terminal, head-like or irregular, dense clusters; petals yellow; flowering before leaves appear or with unfolding leaves. Sandy woods and ravines; se and e TX w to Dallas and Grayson cos., also Edwards Plateau. Mar.

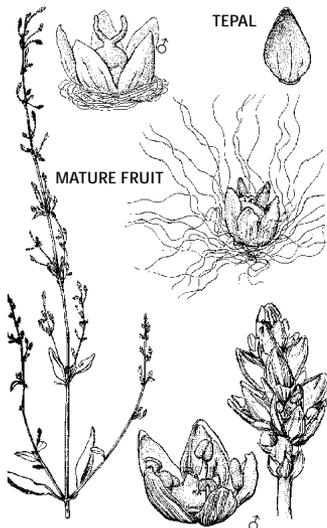
**Rhus copallinum** L. var. **latifolia** Engl., (sp.: gummy, resinous; var.: broad-leaved), WING-RIB SUMAC, FLAME-LEAF SUMAC, DWARF SUMAC, SHINING SUMAC. Shrub or small tree to 1.5–3(–10) m tall; leaflets soft-pubescent to nearly glabrous beneath; flowers in dense, sessile, pyramidal panicles. Sandy woods, hills, and open areas; se and e TX w to East Cross Timbers, also Coryell Co. in Lampasas Cut Plain (Little 1976 [1977]). Jun–Jul. We are following Jones et al. (1997) and J. Kartesz (pers. comm. 1997) in treating all TX examples of this species as var. *latifolia*. According



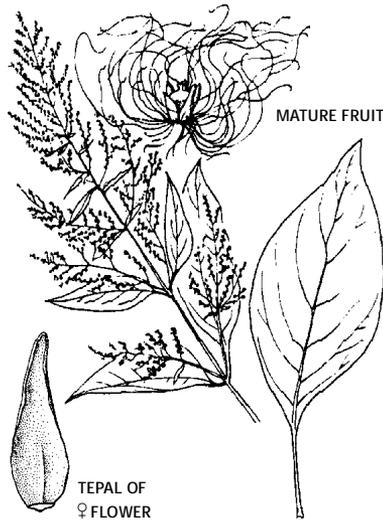
*Gossypianthus lanuginosus* var. *lanuginosus* [sib]



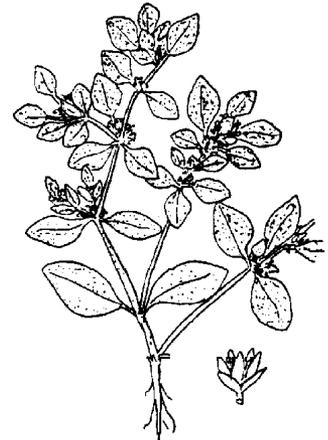
*Gossypianthus lanuginosus* var. *tenuiflorus* [PL]



*Iresine diffusa* [JAA]



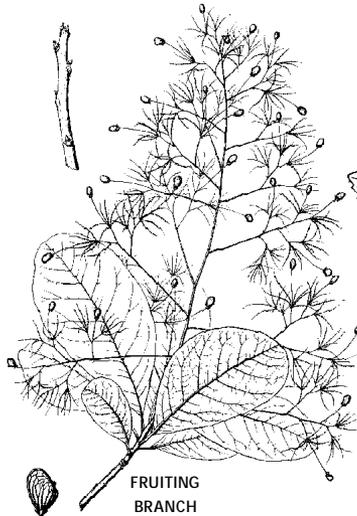
*Iresine rhizomatosa* [JAA, RAD]



*Tidestromia lanuginosa* [RVD]



*Cotinus obovatus* [SA3]



FRUITING  
BRANCH



*Rhus aromatica* [BB1]

to Crosswhite (1980), before lemons were readily available, the small fruits of *R. copallinum* were crushed in water to make a tart drink called sumac-ade.

**Rhus glabra** L., (glabrous, smooth, hairless), SMOOTH SUMAC, SCARLET SUMAC. Tree-shaped shrub (rarely a small tree) to ca. 3 m tall, the leaves and few branches crowded toward summit of stem; leaflets 9–23, short-oblong to narrowly lanceolate, glabrous, glaucous beneath; flowers in dense, sessile, pyramidal panicles. Sandy or rocky soils, hillside woods, stream banks, and fencerows; e TX w to Rolling Plains and Edwards Plateau. May.

**Rhus lanceolata** (A. Gray) Britton, (lanceolate, lance-shaped), PRAIRIE SUMAC, PRAIRIE FLAME-LEAF SUMAC. Large shrub or small tree to 10 m tall; leaflets usually glabrous, narrow; flowers in dense, sessile, pyramidal panicles. On limestone; Hood and McLennan cos., also Brown, Coryell, Hamilton, and Mills cos. (HPC), also Dallas, Palo Pinto, Parker, and Tarrant cos. s to the Edwards Plateau (Little 1976); mainly c and w parts of nc TX and Edwards Plateau; scattered elsewhere in the state. Jul–Aug. [*R. copallinum* L. var. *lanceolata* A. Gray]

**Rhus microphylla** Engelm. ex A. Gray, (small-leaved), LITTLE-LEAF SUMAC, DESERT SUMAC, SCRUB SUMAC, SMALL-LEAF SUMAC, CORREOSA SODA-POP-BUSH. Much-branched, shrub (rarely a small tree) to ca. 5 m tall (usually much smaller); leaflets sessile, pilose; rachis winged; flowers appearing before (rarely with) the leaves. Dry open areas; Brown and Clay cos. (Little 1976); w part of nc TX s and w to w TX. Apr(–May). According to Crosswhite (1980), before lemons were readily available, the small fruits were crushed in water to make a tart drink called sumac-ade.

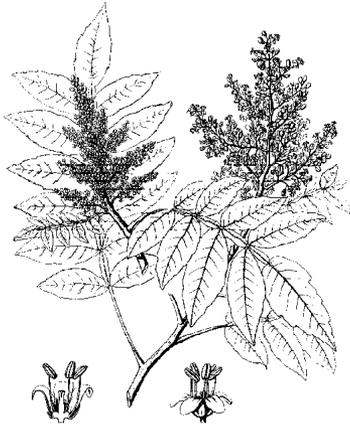
**Rhus trilobata** Nutt., (three-lobed), SKUNKBUSH. Similar to *R. aromatica*; usually flowering before leaves appear or with unfolding leaves. Limestone outcrops, rocky slopes, prairies, fencerows, woods margins, and sandy woods; Blackland Prairie and Edwards Plateau w to w TX. This taxon is distinguished in some instances with difficulty from *R. aromatica* and is possibly only a variety of that species. [*R. aromatica* Aiton var. *flabelliformis* Shinnery]

**Rhus virens** Lindh. ex A. Gray, (green), EVERGREEN SUMAC, TOBACCO SUMAC, LENTISCO. Shrub or small tree to 3 m or more tall; leaflets 4 cm or less long, 2 cm or less wide. Limestone bluffs overlooking the Brazos River, Johnson Co., otherwise known in nc TX only from Bell, Coryell (J. Stanford, pers. comm. and Sanchez 1997), and Brown (Stanford 1976) cos.; mainly Edwards Plateau w to Trans-Pecos. Aug–Oct. The Johnson Co. record is well to the n of any other known localities of this species.

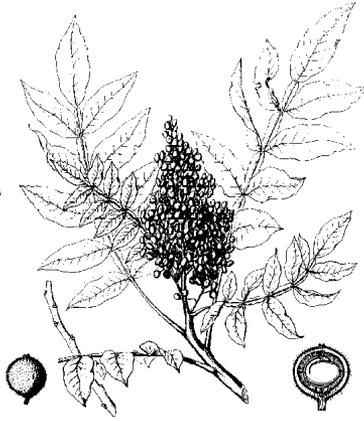
## TOXICODENDRON POISON-OAK, POISON-IVY

Poisonous woody vines, shrubs, subshrubs, or small trees; leaves pinnately 3-foliolate or pinnately compound, often turning bright red in fall.

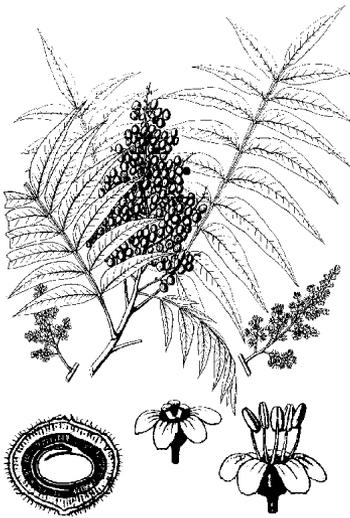
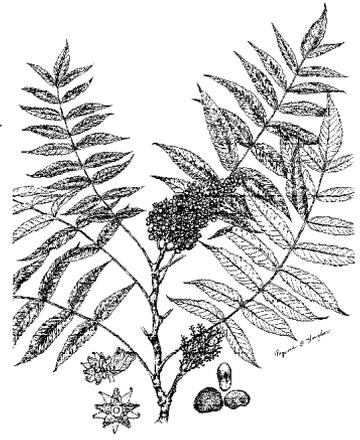
☛ A genus of 15+ species of North and South America and e Asia; often included in the genus *Rhus* but rather clearly distinguished (Barkley 1937; Gillis 1971). ☛ These species are **toxic**, causing severe allergic contact dermatitis in some individuals. Physical contact with any part of the plant, exposure to fumes/smoke from burning plants, or contact with pets having touched the plants are common means of exposure. Following a latent period of 12–24+ hours after exposure, there is reddening of the skin, sometimes accompanied by edematous swelling. This can be followed by the formation of fluid-filled blisters; this fluid cannot spread the dermatitis. Instead, additional spread is from unwashed skin, clothing, or other objects (Lampe 1986). Eating the leaves can result in an internal reaction occasionally known to be fatal (Gillis 1975). According to Gillis (1975), “The poisons may be effective for an indefinite period of time in causing dermatitis. Several hundred year-old herbarium specimens have been known to affect a sensitive person who has handled them!” These reactions are caused by resinous phenolic compounds commonly known as urushiols (chemically pentadecylcatechols). Because the



*Rhus copallinum* [SA3]



*Rhus glabra* [REE]



*Rhus lanceolata* [SA3]



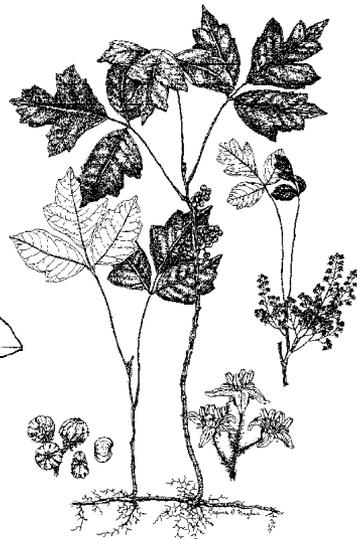
*Rhus microphylla* [POW]



*Rhus trilobata* [BB1]



*Rhus virens* [LYN, POW]



*Toxicodendron pubescens* [REE]

compounds are insoluble in water, washing with a strong soap as soon as possible after contact is recommended. Gillis (1975) and Frankel (1991) discussed *Toxicodendron* dermatitis. Gillis (1975) also gave several citations documenting the use of POISON-IVY in Native American arrow poisons. The sap of an Asian species, *T. vernicifluum* (Stokes) F.A. Barkley (ORIENTAL LACQUER TREE), is a major source of lacquer; furniture treated with the lacquer can cause dermatitis in sensitive individuals. *Toxicodendron* species, like those in the genus *Rhus*, often display very early fall foliage color (often strikingly red); this is considered to serve as a “foliar fruit flag” which attracts birds that act as dispersal agents for the fall-ripening fruits (Stiles 1984). (Latin: *toxicum*, poison, and Greek: *dendron*, tree)

REFERENCES: McNair 1925; Barkley 1937; Brizicky 1963a; Gillis 1971, 1975; Brooks 1977; Baer 1979; Reveal 1990b.

1. Leaflets 5–17; large shrub or small tree; usually in swamps or wet areas; mainly e TX \_\_\_\_\_ **T. vernix**
1. Leaflets usually 3(–5); vines, subshrubs, or shrubs; usually in habitats of moderate to dry moisture conditions; extremely abundant in nc TX.
  2. Leaflets often with broad, blunt apex, sometimes with narrowed apex; leaflets entire or with usually shallow rounded lobes or broad blunt teeth (can be deeply lobed), pubescent underneath; fruits pubescent or papillose; plants not climbing \_\_\_\_\_ **T. pubescens**
  2. Leaflets with narrowed apex; usually some leaflets deeply lobed or sharply toothed, glabrous or pubescent underneath; fruits glabrous (or with occasional hairs); plants varying from not climbing to high-climbing \_\_\_\_\_ **T. radicans**

**Toxicodendron pubescens** Mill., (pubescent, downy), EASTERN POISON-OAK. Low, creeping shrub or subshrub; leaflet lobes usually shallow but sometimes ± deep. Sandy woods; Montague Co., also Dallas, Grayson, Lamar, and Tarrant cos. (Gillis 1971); widespread in TX. [*Rhus toxicarium* Salisb., *Rhus toxicodendron* L.] Apr–May. Jones et al. (1997) treated this taxon as [*T. diversilobum* (Torr. & A. Gray) Greene var. *pubescens* Mill.]. Causes contact dermatitis. ☣

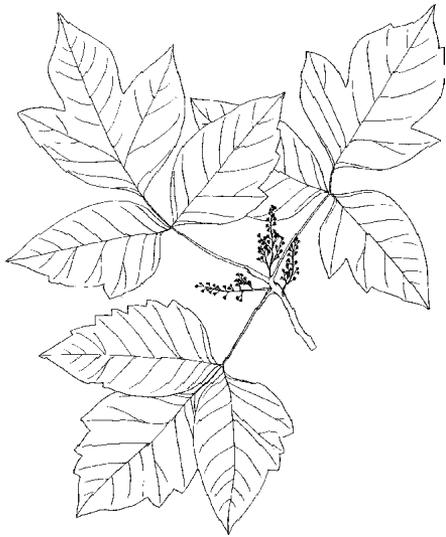
**Toxicodendron radicans** (L.) Kuntze, (rooting), POISON-OAK, POISON-IVY, HIEDRA. Low, creeping shrub with aerial roots to erect shrub or low- to high-climbing vine. In a variety of habitats from low woods to forest margins and disturbed areas. Mid-Apr–May(–later). The subspecies of *T. radicans* seem to overlap morphologically and are often difficult to distinguish. In addition to the subspecies below, Hatch et al. (1990) cited subsp. *eximum* (Greene) Gillis for vegetational area 5 (Fig. 2) and subsp. *radicans* for vegetational areas 4 and 5. We have seen no material for nc TX and according to Gillis (1971), these subspecies do not occur in nc TX. Reveal (1990b) believed the variation within this species is better treated at the varietal rank than the subspecific. Causes contact dermatitis. ☣

1. Leaflets usually clearly and sharply lobed or with deeply cut margins \_\_\_\_\_ subsp. **verrucosum**
1. Leaflets with entire, undulate, notched, or serrate margins.
  2. Leaflets usually glabrous or with sparse pubescence both below and above, the pubescence, if any, appressed; terminal leaflet usually ovate to elliptic \_\_\_\_\_ subsp. **negundo**
  2. Leaflets with pubescence on lower leaf surfaces, often pilose, velvety, the pubescence erect; upper leaf surface usually pubescent; terminal leaflet broadly ovate \_\_\_\_\_ subsp. **pubens**

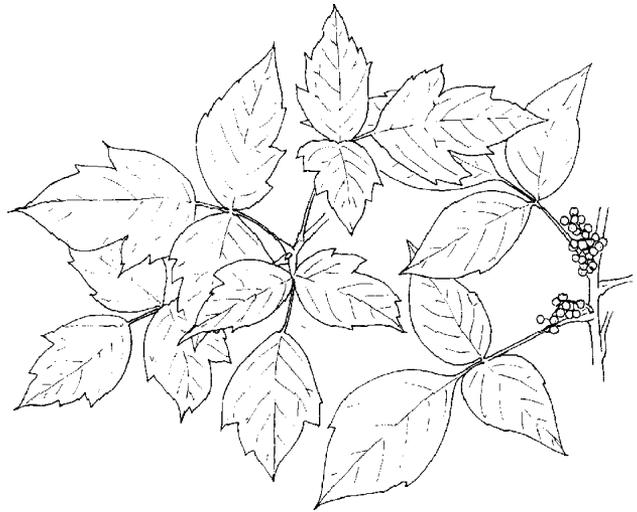
subsp. **negundo** (Greene) Gillis, (the native name of *Vitex negundo*), POISON-IVY. Hunt Co., also Cooke, Dallas, and Kaufman cos. (Gillis 1971); se and e TX w to Rolling Plains and e Edwards Plateau. [*T. radicans* var. *negundo* (Greene) Reveal]

subsp. **pubens** (Engelm. ex S. Watson) Gillis, (downy), POISON-IVY. Cooke and Dallas cos.; se and e TX w to nc TX and e Edwards Plateau.

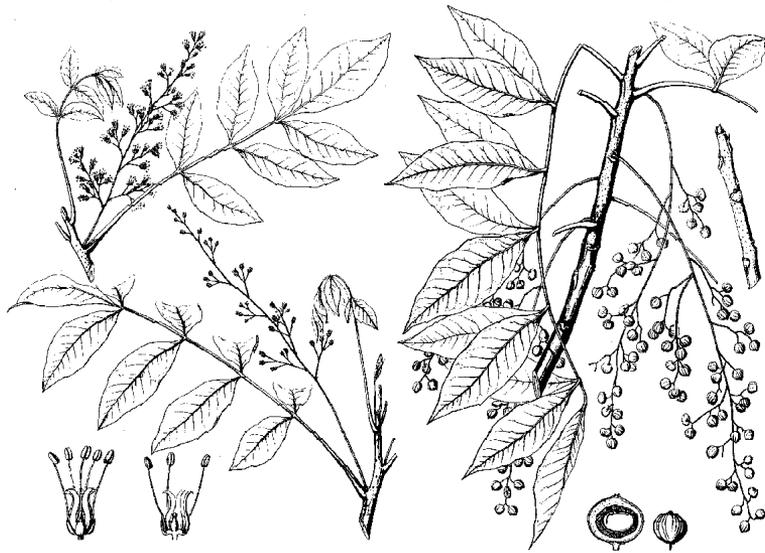
subsp. **verrucosum** (Scheele) Gillis, (verrucose, warted), POISON-IVY. Bosque, Dallas, Hill, Johnson,



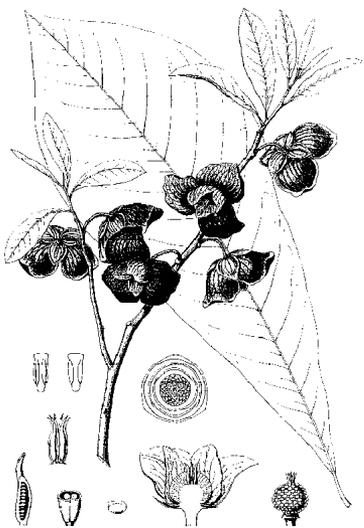
*Toxicodendron radicans* subsp. *pubens* [LVN]



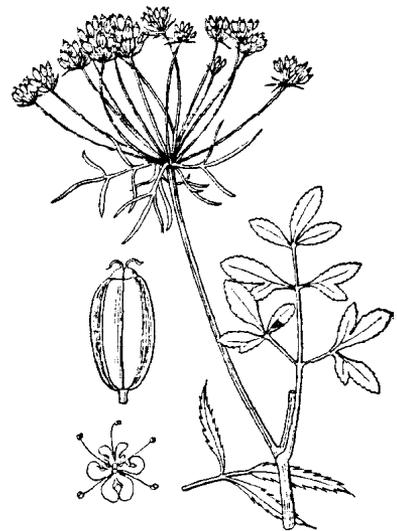
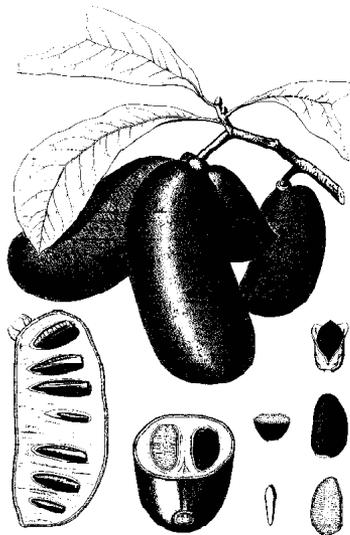
*Toxicodendron radicans* subsp. *verrucosum* [LVN]



*Toxicodendron vernix* [SA3]



*Asimina triloba* [SA3]



*Ammi majus* [BR2]

McLennan, Palo Pinto, and Tarrant cos., also Grayson Co. (Gillis 1971); se and e TX w to nc TX and Edwards Plateau.

**Toxicodendron vernix** (L.) Kuntze, (varnish), POISON SUMAC, POISON-ELDER, POISON-DOGWOOD. Branchlets glabrous; leaflets 4–12 cm long, 2–5 cm wide, entire; flowers in axillary panicles, greenish. Swamps or wet areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly e TX. Apr–Jun. [*Rhus vernix* L.] Vegetatively this species resembles many non-toxic *Rhus* species. It can, however, be easily distinguished by its leaves having entire leaflets and lacking any wing along the rachis; all nc TX *Rhus* species with pinnately compound leaves have either toothed leaflets or a winged rachis or in the case of the locally rare *R. virens*, small leaflets 4 cm or less long. This species causes contact dermatitis. ☠

## ANNONACEAE CUSTARD-APPLE OR ANNONA FAMILY

☞The Annonaceae is a large family of ca. 2,150 species in 112 genera (Kral 1997); it is mainly in tropical areas with *Asimina* extending n to Michigan. The family consists of aromatic (due to ethereal oils) trees, shrubs, and lianas, usually with alkaloids, and with 3-merous flowers (unusual among dicots); they share with the related Magnoliaceae a number of unspecialized flower characters such as numerous free stamens and carpels, laminar stamens, and monocolpate pollen. Many are important economically with tropical species variously used medicinally or for perfumes or cosmetics (Baumgardt 1982); a number are valued for their edible fruits including *Annona* species (e.g., CUSTARD-APPLE, CHERIMOYA, SOURSOP, and SWEETSOP). Family name from *Annona*, a genus of ca. 100 species of tropical America and Africa. (Name either from Haitian, *anon*, the native name for the widely cultivated *A. reticulata* L.—custard-apple, or from Latin: *annona*, yearly produce, crop, grain, food) (subclass Magnoliidae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is a large shrub or tree with large, alternate, entire leaves, hairy *naked buds*, 3-merous flowers, and large banana-like fruits.

REFERENCES: Wood 1958; Kessler 1993a; Kral 1997.

### ASIMINA AMERICAN PAWPAW

☞An e U.S. genus of 8 species; this is one of only 11 genera of trees endemic to the e U.S. (only three of these, *Asimina*, *Maclura*, and *Taxodium*, occur in nc TX) (Little 1983). It is also the northernmost and only extra-tropical genus of a large and otherwise tropical family (Little 1970). (Name through *asiminier* of the French colonists, from the Native American name, *assimin*)

REFERENCES: Nash 1896; Kral 1960a; Wilbur 1970.

***Asimina triloba*** (L.) Dunal, (three-lobed), PAWPAW, COMMON PAWPAW. Large shrub or tree to 12 m tall; young twigs rusty pubescent; buds naked (= without scales) but protected by pubescence; leaves alternate; leaf blades obovate to elliptic-ovate, to 25(–30) cm long and 7(–15) cm wide, apically abruptly acuminate, basally cuneate, marginally entire; petioles 5–10 mm long; sepals 3; petals dull purple, 6, in 2 series, the inner and outer series very unequal; stamens numerous in a mass; carpels 3–15, separate; ovaries superior; fruits to 12 cm long, 3–4 cm thick, green to dark brown when ripe (in fall), the flesh sweet and edible; seeds somewhat flattened, 1.5–2 cm long. Rich woods and banks of streams; Grayson Co. along the Red River near the mouth of Pawpaw Creek; with the exception of the Grayson collection, this species is known in the state only from extreme ne TX. Apr–May. The fruits are edible (and delicious) but can cause gastrointestinal problems for some; the seeds are reported to contain a toxic alkaloid; the plant causes contact dermatitis in a small percentage of people (Peattie 1948; Kingsbury 1964). ☠

## APIACEAE (UMBELLIFERAE)

### CARROT OR PARSLEY FAMILY

Annual or perennial herbs; leaves basal, alternate, or (in *Bowlesia*) opposite; petioles in nearly all species with enlarged, clasping base; leaf blades simple or compound, entire, toothed, lobed, or finely dissected; flowers axillary or terminal, small, in umbels (varying from loose and open to compact and head-like) or whorls; calyx tube cylindrical to shallowly cup-like, with entire or 5-toothed summit; petals 5, attached at summit of calyx tube, equal or occasionally unequal; stamens 5, attached around a fleshy disk; pistil 2-carpellate; ovary inferior; styles and stigmas 2; fruit a schizocarp that splits into 2 one-seeded segments.

☛ A large (3,540 species in 446 genera), nearly cosmopolitan but more commonly in temperate and tropical mountain family of mainly herbs or less commonly shrubs or even trees. The family yields many important spices and foods including *Anethum* (DILL), *Apium* (CELERY), *Carum* (CARAWAY), *Coriandrum* (CORIANDER, CILANTRO), *Cuminum* (CUMIN), *Daucus* (CARROT), *Foeniculum* (FENNEL), *Pastinaca* (PARSNIP), *Petroselinum* (PARSLEY), and *Pimpinella* (ANISE); ☛ it also includes some extremely poisonous plants. To avoid possibly **fatal** poisoning, no wild member of the family should be eaten without absolute certainty of identification. Many species of Apiaceae are used as food by caterpillars of the black swallowtail butterfly (*Papilio polyxenes*); numerous native species (*Berula erecta*, *Cicuta maculata*, *Cryptotaenia canadensis*, *Osmorhiza longistylis*, *Polytaenia nuttallii*, *Ptilimnium capillaceum*, *Sium suave*, *Spermolepis divaricata*, and *Zizia aurea*) are utilized as well as introduced taxa (DILL, FENNEL, PARSLEY, QUEEN-ANNE'S-LACE, POISON-HEMLOCK). Apiaceae typically produce toxic psoralins (furanocoumarins) to protect themselves from herbivore damage; however, black swallowtail larvae are resistant and actually grow faster in the presence of the chemicals (Scott 1986; Tveten & Tveten 1993). The Apiaceae are closely related to the Araliaceae and appear to be a polyphyletic group derived from within a paraphyletic Araliaceae. From a cladistic standpoint the two families should be lumped to form a more inclusive monophyletic family, which based on nomenclatural rules should be called Apiaceae (Judd et al. 1994). *Tauschia texana* A. Gray, an acaulescent perennial with yellow flowers, oval fruits 3–4 mm long, and the seed face deeply sulcate, is cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2); it apparently occurs well to the south of TX. Family name from *Apium*, a temperate genus of 20 species including *A. graveolens* L., CELERY, valued for its edible petioles and fruits (celery “seed”). (Classical Latin name for celery and parsnip) (Rosidae)

FAMILY RECOGNITION IN THE FIELD: often aromatic herbs with small, frequently white to green, yellow, or pink flowers usually in *umbels*; leaves alternate and often pinnately compound, sometimes finely dissected, with sheathing petioles; internodes hollow; fruits small, splitting into 2 one-seeded parts.

REFERENCES: Coulter & Rose 1900; Mathias & Constance 1944–1945, 1961; Mathias 1965; Hiroe 1979; Pimenov & Leonov 1993; Judd et al. 1994; Plunkett et al. 1996 [1997].

1. Leaves simple or apparently so; leaf blades round to reniform, ovate, lanceolate, or linear, either unlobed OR palmately divided 2/3 to base or less, with few, wide lobes.
  2. Leaves reduced to elongate, filiform or linear, entire, hollow, septate phyllodes, the upper bract-like, normal blade tissue absent (leaves rush-like in appearance) \_\_\_\_\_ **Oxypolis**
  2. Leaves with normal blade tissue.
    3. Leaves perfoliate (= completely surrounding the stem) \_\_\_\_\_ **Bupleurum**
    3. Leaves not perfoliate.
      4. Leaf blades (at least upper) linear to oblong-lanceolate; flowers sessile, numerous, in very dense, ovoid to globose, whitish to bluish heads 5–25 mm in diam. \_\_\_\_\_ **Eryngium**
      4. Leaf blades round to reniform, broadly ovate, or ovate; flowers not arranged as above.

5. Inflorescences usually long-peduncled; plants glabrous or with simple pubescence; stipules absent; leaf blades peltate OR not so; leaves basal or solitary at the nodes; creeping perennials, rhizomatous or stems rooting at the nodes.

6. Involucre subtending inflorescence much reduced or absent; leaf blades round to reniform, either peltate OR lobed to about the middle; petioles not sheathing; wide-spread in nc TX \_\_\_\_\_ **Hydrocotyle**

6. Involucre of 2 conspicuous ovate to suborbicular bracts 2–4 mm long; leaf blades ovate to broadly ovate, neither peltate nor lobed; petioles sheathing; rare in nc TX \_\_\_\_\_ **Centella**

5. Inflorescences sessile or nearly so; plants with ± gray, stellate pubescence; stipules present, scarious, lacerate; leaf blades not peltate; leaves opposite; prostrate to suberect annuals from slender taproot \_\_\_\_\_ **Bowlesia**

1. Leaves compound or at least the largest deeply lobed; leaf blades triangular-ovate to lanceolate or linear in outline.

7. Inflorescence a dense "head," globose to elongated and usually with spiny leaves exerted apically \_\_\_\_\_ **Eryngium**

7. Inflorescence open, loose, not dense, without spiny leaves exerted apically.

8. Ovaries and fruits bristly or prickly.

9. Leaves palmately compound with 3–5 leaflets, the leaflets toothed and lanceolate, the largest > 1 cm wide, usually much wider \_\_\_\_\_ **Sanicula**

9. Leaves pinnately compound or decompound, with numerous segments; ultimate leaf segments < 1 cm wide, often much less.

10. Umbels with simple, entire basal bracts or bracts absent.

11. Segments of upper leaves narrowly linear or thread-like; plants glabrous; mature fruits 1.5–2 mm long \_\_\_\_\_ **Spermolepis**

11. Segments of upper leaves lanceolate; plants hispid; mature fruits 3–5 mm long \_\_\_\_\_ **Torilis**

10. Umbels with toothed or lobed basal bracts \_\_\_\_\_ **Daucus**

8. Ovaries and fruits glabrous or pubescent, but neither bristly nor prickly.

12. Petals yellow or green.

13. Leaves all basal \_\_\_\_\_ **Lomatium**

13. Leaves distributed up the stem.

14. Ultimate leaf segments long and thread-like (< 0.5 mm wide); bracts absent below both umbels and umbellets (= secondary or ultimate umbels); plants with strong anise or dill odor.

15. Plants with strong anise odor; mature fruits with the lateral ribs wingless, all the ribs ± the same in appearance \_\_\_\_\_ **Anethum**

15. Plants with strong dill odor; mature fruits with lateral ribs winged, distinctly different from other ribs \_\_\_\_\_ **Foeniculum**

14. Ultimate leaf segments not long and thread-like (> 1 mm wide, often much greater); bracts absent below umbels but present below umbellets (sometimes inconspicuous); plants without strong anise or dill odor.

16. Ultimate segments of upper leaves sharply toothed around the margins, not lobed; fruits 2–4 mm long \_\_\_\_\_ **Zizia**

16. Ultimate segments of upper leaves toothed at apex or entire, conspicuously lobed; fruits 2–11 mm long.

17. Leaves divided into numerous segments, but not parsley-like in appearance (the segments too large), the ultimate segments or their lobes often > 5 mm wide; small calyx teeth present; fruits 5–11 mm long, 4–7 mm wide; widespread native species \_\_\_\_\_ **Polytaenia**

17. Leaves parsley-like in appearance, the ultimate segments or their lobes usually < 5 mm wide; calyx teeth absent; fruits 2–4 mm long, 1.5–3 mm wide; rarely escaped introduced cultivar \_\_\_\_\_ **Petroselinum**
12. Petals white, pink, or lavender.
18. Fruits linear with long differentiated beak 20–70 mm long; ovary pubescent \_\_\_\_\_ **Scandix**
18. Fruits beakless or nearly so; ovary pubescent OR glabrous.
19. Pedicels 0.3–2 times as long as the ovary when petals have expanded (up to 3 times in fruit).
20. Umbels small, simple or compound with 2–5 rays (= main branches of umbel).
21. Small bracts below umbellets linear or narrowly lanceolate, acute OR small bracts absent.
22. Segments of middle and upper leaves obtuse or subacute; plants 2–30 cm tall, branching from base; fruits 2.5–6 mm long \_\_\_\_\_ **Ammoselinum**
22. Segments of middle and upper leaves sharply acute; plants 20–90 cm tall, branching in upper part; fruits 8–10 mm long \_\_\_\_\_ **Trepocarpus**
21. Small bracts below umbellets oblong-elliptic, obtuse or subacute \_\_\_\_\_ **Chaerophyllum**
20. Umbels large, compound with 14–17 rays \_\_\_\_\_ **Daucosma**
19. Pedicels 2–many times as long as the ovary when petals have expanded.
23. Umbels mostly lateral or axillary and short-peduncled; fruits ovoid, 1–2(–3) mm long \_\_\_\_\_ **Cyclosporum**
23. Umbels mostly or all terminal, short- or long-peduncled; fruits various.
24. Small bracts below umbellets oblong-elliptic, obtuse, scarious; flowers pinkish; fruits broadly winged; leaves mostly near base of plant \_\_\_\_\_ **Cymopterus**
24. Small bracts below umbellets absent OR slender, acute, not scarious; flowers various; fruits winged OR not winged; leaves along stem and/or basal.
25. Upper leaves with lanceolate or oblanceolate, usually toothed segments or leaflets.
26. Umbels with 2–8 primary rays; ovary elongating, the fruit elongate subcylindrical.
27. Leaves mostly once compound; small bracts below umbellets linear-lanceolate, erect, inconspicuous; pedicels very unequal \_\_\_\_\_ **Cryptotaenia**
27. Leaves 2–3 times compound; small bracts below umbellets lanceolate, reflexed, prominent; pedicels about equal \_\_\_\_\_ **Osmorhiza**
26. Umbels with many (6–30+) primary rays; ovary remaining short, the fruit subglobose.
28. Leaf blades much-dissected, almost parsley-like in appearance; small bracts below umbellets ovate-lanceolate with wide clasping base, abruptly tapered to ± narrow tips \_\_\_\_\_ **Conium**
28. Leaf blades 1–3 times pinnately compound but not much-dissected, not at all parsley-like in appearance; small bracts below umbellets linear to lanceolate, scarcely if at all clasping, not abruptly tapered.
29. Leaf blades 1–3 times pinnately compound, the lateral leaflets or lateral leaf segments with distinct stalks; widespread in nc TX.

30. Involucres subtending main umbels absent OR of 1–4 entire, inconspicuous bracts: ribs of fruit prominent, corky, obtuse, covering half or more of the fruit surface \_\_\_\_\_ **Cicuta**
30. Involucres subtending main umbels of numerous usually pinnately divided bracts with filiform segments: ribs of fruit narrow, acute, covering much less than half of the fruit surface \_\_\_\_\_ **Ammi**
29. Leaf blades once pinnately compound (but leaflets can be deeply lobed), the lateral leaflets sessile or nearly so: rare in nc TX.
31. Leaflets not only toothed but also some often deeply lobed: fruits 1.5–2 mm long, with ribs obscure \_\_\_\_\_ **Berula**
31. Leaflets finely to coarsely toothed (rarely entire), but not lobed: fruits 2–7 mm long, with ribs prominent.
32. Leaflets often coarsely toothed (teeth to 4 mm or more tall): fruits 4–8 mm long: stems not conspicuously corrugated \_\_\_\_\_ **Oxypolis**
32. Leaflets finely toothed (teeth < 1 mm tall): fruits 2–3 mm long: stems conspicuously corrugated \_\_\_\_\_ **Sium**
25. Upper leaves with thread-like to linear-lanceolate, mostly entire segments OR some leaves undivided, slender, entire.
33. Leaves once compound (some can be simple), with linear-lanceolate, entire lobes or leaflets.
34. Stem leaves palmately compound: fruits with a small beak \_\_\_\_\_ **Cynosciadium**
34. Stem leaves pinnately compound or pinnatifid OR some simple and entire: fruits beakless \_\_\_\_\_ **Limnosciadium**
33. Leaves 1–3 times compound, the upper with linear-lanceolate to thread-like segments.
35. Petals obtuse or subacute (a few sometimes bilobed), oblong or elliptic, longer than wide: fruits neither constricted into 2 parts nor conspicuously flattened.
36. Petals 0.5–1.3 mm long, white: fruits minutely tuberculate to smooth, 1.5–2 mm in diam.: native species wide spread in nc TX \_\_\_\_\_ **Spermolepis**
36. Petals (of outer flowers in umbels) 2.2–4 mm long, white, often tinged pink or lavender: fruits smooth, (1.5)2.5–3(–5) mm in diam; introduced cultivated species rarely escaped in nc TX \_\_\_\_\_ **Coriandrum**
35. Petals with indented or notched apex, obovate or suborbicular, shorter to slightly longer than wide: fruits constricted into 2 parts OR conspicuously flattened OR neither.
37. Segments of middle and lower leaves linear-lanceolate to thread-like, entire or nearly so: fruits not conspicuously flattened.
38. Petals (of outer flowers in umbels) 0.5–1 mm long: fruits not constricted into 2 parts: calyx tube of

outer flowers cup-shaped, slightly shorter to much longer than its lobes or teeth \_\_\_\_\_ **Ptilimnium**

38. Petals (of outer flowers in umbels) 1.6–2.1 mm long; fruits conspicuously constricted into 2 parts; calyx tube of outer flowers sub-rotate, much shorter than its lobes \_\_\_\_\_ **Bifora**

37. Segments of middle and lower leaves lanceolate, sharply toothed; fruits conspicuously flattened \_\_\_\_\_ **Eurytaenia**

### AMMI BISHOP'S-WEED

☞ An Old World genus of 3–4 species; *A. visnaga* (L.) Lam. has been cultivated since the time of the Assyrians for medical uses, especially in treating angina and asthma. (ancient Greek name)

**Ammi majus** L., (bigger, larger), GREATER AMMI, BISHOP'S-WEED. Erect, glabrous, branching annual 0.2–0.8 m tall; superficially resembling *Cicuta*; leaves ternately or pinnately compound or decomposed, the ultimate segments narrowly lanceolate, serrate; inflorescences of compound umbels; involucre bracts numerous, usually pinnately divided, the segments filiform; rays 50–60; flowers white; fruits oblong, 1.5–2 mm long, 1 mm or less wide, the ribs narrow, acute, covering much less than half of the fruit surface. Waste areas, roadsides; Limestone and Tarrant cos., also Hamilton Co. (Stanford 1971); se and e TX w to nc TX and Edwards Plateau. Mar–Jun. Native of the Mediterranean. Cultivated for the cut-flower trade (Mabberley 1987). 🌱

### AMMOSELINUM SAND-PARSLEY

Glabrous small annuals branching from base; leaves ternately or ternate-pinnately decomposed, the ultimate segments linear to spatulate; flowers inconspicuous, white, in small compound umbels; fruit with prominent ribs.

☞ A genus of 3 species of the North America and temperate South America. (Greek: *am mo*, sand, and *selinum*, parsley, presumably from the habitat)

1. Umbels in the axils of stem leaves, ± sessile; fruits 2.5–3 mm long, 1–1.5 mm wide; plants 4–5 (–12) cm tall \_\_\_\_\_ **A. butleri**
1. Umbels axillary or seemingly terminal, on peduncles (0.5–)1.5–4 cm long; fruits 3–6 mm long, to ca. 3 mm wide; plants 10–35 cm tall \_\_\_\_\_ **A. popei**

**Ammoselinum butleri** (Engelm. ex S. Watson) J.M. Coult. & Rose, (for George Dexter Butler, 1850–1910, lawyer, teacher, botanist, correspondent of George Engelmann, and one of the early collectors of this species), BUTLER'S SAND-PARSLEY. Fruits ovoid. Sandy or disturbed ground, fairly common but inconspicuous and overlooked; se and e TX w to e Rolling Plains and Edwards Plateau. Mar–Apr.

**Ammoselinum popei** Torr. & A. Gray, (for Clara Maria Pope, active 1760s–1838, British flower painter), PLAINS SAND-PARSLEY. Fruits oblong-ovoid. Sandy or gravelly ground; Grand Prairie s and w to w TX. Mar–May.

### ANETHUM DILL

☞ A monotypic genus of sw Asia. (From *Anethon*, ancient Greek name of dill, thought to come from *aithein*, blaze, in allusion to the pungent seeds)

**Anethum graveolens** L., (heavy-scented), DILL. Glabrous, strong-scented annual, 0.5–1.5 m tall; leaves pinnately decomposed; rays 25 or more; petals yellow; fruits 3–4 mm long; similar to *Foeniculum* and reported to hybridize with it. Widely cultivated in TX and reseeds in open

ground; Grayson Co. May–Summer. Native of sw Asia. This species has been cultivated since at least 400 BC.; the leaves and fruits are widely used in pickling and as a flavoring (Mabberley 1987). Duke (1985) indicated that insects exposed to the insecticide parathion alone suffered only 8% mortality; those exposed to the same doses of parathion plus d-carvone or other DILL components showed 99% mortality; he raised the question of whether certain naturally occurring plant products can synergistically react with pesticides to produce harmful effects in humans. ☠️ 🌿

### BERULA WATER-PARSNIP

☞ A monotypic genus of wet areas of the n temperate zone and e and s Africa. (Latin name of some aquatic plant)

**Berula erecta** (Huds.) Coville, (erect, upright), STALKY BERULA, WATER-PARSNIP. Erect or reclining, glabrous perennial; stems 0.2–1 m tall; leaves once pinnately compound; leaflets toothed to deeply lobed; small bracts below umbellets linear to lanceolate; flowers white; calyx teeth minute, subulate; fruits oval to orbicular, 1.5–2 mm long. Wet areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); also Edwards Plateau, Plains Country, and Trans-Pecos. May–Nov. Reported to be extremely poisonous and capable of causing death in cattle (Lewis & Elvin-Lewis 1977). ☠️

### BIFORA

☞ A genus of 3 species of the Mediterranean to c Asia and North America; resembles *Ptilimnium*. (Possibly from Latin: *bi*, two, in reference to the two-parted fruit )

**Bifora americana** Benth. & Hook. f. ex S. Watson, (of America), PRAIRIE-BISHOP. Low, glabrous annual 25–75 cm tall; leaves ternate-pinnately decomposed; flowers white; fruits subglobose and didymous, 2–3 mm long, 4–5 mm wide, the two nearly spherical segments separating from one another at maturity. Prairies, rocky slopes, and roadsides, limestone areas; se and e TX w to e Rolling Plains and Edwards Plateau. May–Jun.

### BOWLESIA

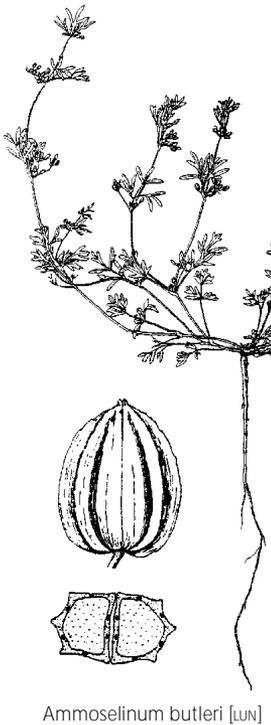
☞ A mainly South American genus of 15 species. (Named for William Bowles, 1705–1780, Irish writer on Spanish natural history)

REFERENCE: Mathias & Constance 1965.

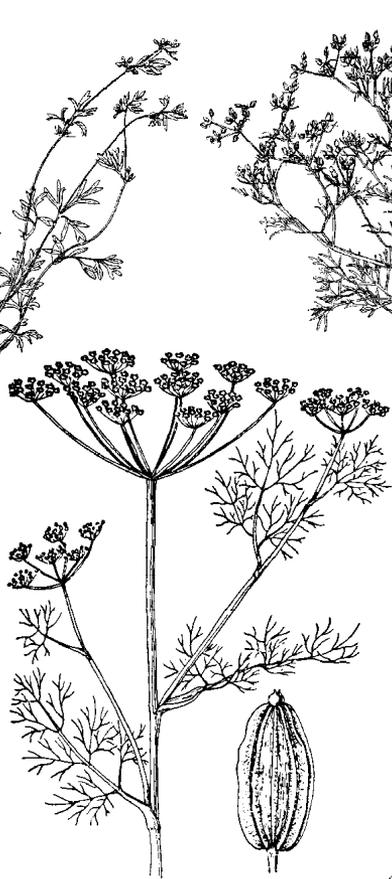
**Bowlesia incana** Ruiz & Pav., (hoary, quite gray), HOARY BOWLESIA. Low, prostrate to suberect annual, ± gray with stellate pubescence; leaves opposite; leaf blades suborbicular in outline, 5–7-lobed, to 3 cm long and 4.5 cm wide, usually much smaller; petioles to 7 cm long; flowers minute, white or purplish; fruits sessile to subsessile, ovate to round, 1–2 mm long. Lawn weed, rarely collected but spreading rapidly in nc TX; Bell, Dallas, Denton, Johnson, Parker, and Tarrant cos., also Brown Co. (HPC); s and se TX n to nc TX and w to Edwards Plateau. Feb–Jun. Native of South America and possibly also s North America; the geographic origin of this species is problematic; it is found in South America and also in the sw U.S. and adjacent Mexico. It was collected in TX in 1828 by Berlandier, but Mathias and Constance (1965) concluded that its North American distribution is probably the result of naturalization from South America; however, Constance (1993) considered it native to California and the sw US.

### BUPLEURUM THOROUGHWAX

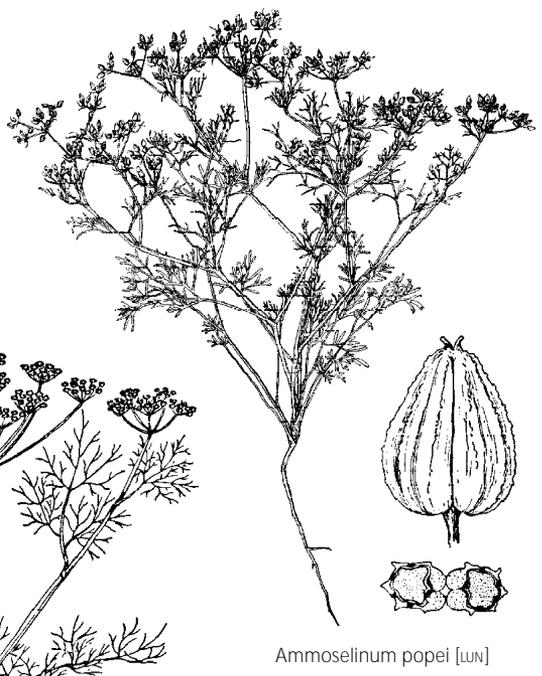
☞ A genus of ca. 180–190 species of Eurasia, n Africa, Canary Islands, arctic North America, and s Africa. (Greek: *bous*, an ox, and *pleuron*, a rib, referring to another plant)



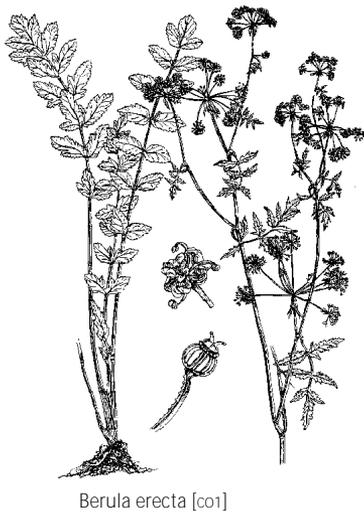
*Ammoselinum butleri* [LUN]



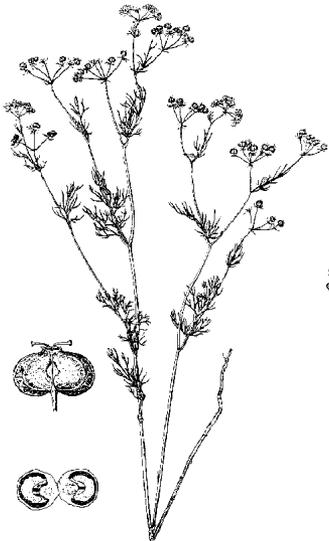
*Anethum graveolens* [GLE]



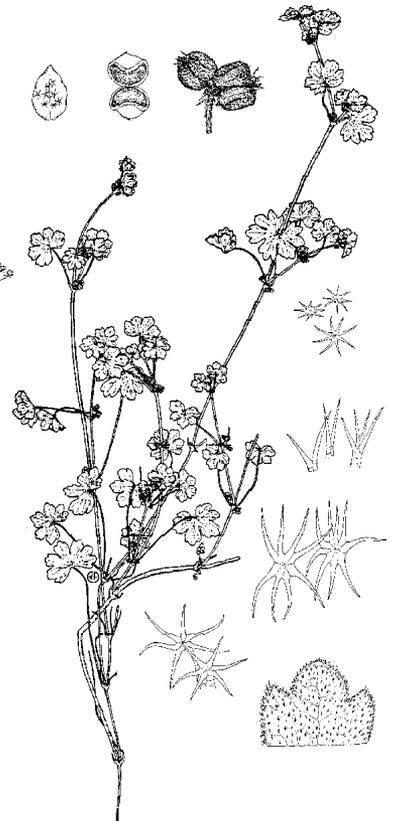
*Ammoselinum popei* [LUN]



*Berula erecta* [cot]



*Bifora americana* [LUN]



*Bowlesia incana* [MAT]

**Bupleurum rotundifolium** L., (round-leaved), ROUND-LEAF THOROUGHWAX. Annual to 60 cm tall; leaves simple, entire; basal and lower leaves oblong- to obovate-lanceolate, subpetiolate to perfoliate basally; upper leaves ovate, perfoliate; rays of inflorescence 4-10; involucre (bractlets below umbellets) of 5-6 conspicuous, broadly ovate to obovate, acuminate bractlets; flowers yellow; fruits oblong-oval, 2.5-3 mm long, purplish brown, smooth. Open, weedy areas; Dallas, Erath, Grayson, Parker, and Tarrant cos.; se and e TX w to nc TX. Apr-Jun. Native of the Mediterranean region. ☞

*Bupleurum lancifolium* Hornem., (lance-leaved), cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), apparently occurs only to the se of nc TX. It can be distinguished by its ovoid-globose, tuberculate to rugose fruits and by having only 2-5 rays. A Mediterranean species, possibly introduced in bird-seed (Correll & Johnston 1970). ☞

## CENTELLA

☞ A mainly s African genus of 40 species with 1 species widespread. (Possibly diminutive of *centem*, a hundred, from the rounded, coin-like leaf blades of some species)

REFERENCES: Fernald 1940a; Schubert & van Wyk 1995.

**Centella erecta** (L.f.) Fernald, (upright, erect), SPADELEAF. Acaulescent perennial with creeping rhizomes; leaves simple; leaf blades ovate to broadly ovate, basally cordate to truncate, petiolate; umbels simple; flowers white or rose-tinged; fruits with 3 primary and 2 secondary ribs, reticulate. Edges of streams and other wet places; Tarrant Co.; in parts of e 1/2 of TX. May-Sep. [*C. repanda* (pers.) Small] In Texas this species has long gone under the name *C. asiatica* (L.) Urb. (e.g., Correll & Johnston 1970; Hatch et al. 1990; Jones et al. 1997). However, according to J. Kartesz (pers. comm. 1998), *C. asiatica* is a similar but distinct species which is introduced in the U.S. only in the Pacific Northwest and Hawaii. While *C. asiatica* is sometimes eaten or taken as a tea, it is also said to be used as a fish poison and to contain potentially carcinogenic glucosides and an alkaloid, hydrocotylin; it has been used in folk medicine to treat leprosy and apparently shows activity against the bacterium responsible for tuberculosis (Duke 1985; Mabberley 1997); because *C. erecta* is similar enough to have been lumped with *C. asiatica* by many authorities, *C. erecta* should also be assumed to be toxic. ☞

## CHAEROPHYLLUM CHERVIL, WILD CHERVIL

☞ A n temperate genus of ca. 35 species. (Greek: *chaero*, delight or rejoice, and *phyllon*, a leaf, alluding to the agreeable odor of the foliage)

**Chaerophyllum tainturieri** Hook., (for L.F. Tainturier des Essarts, who sent plants from Louisiana to Sir William Hooker from 1824-1836). Moderately to densely pubescent, erect annual 15-90 cm tall; leaves ternate-pinnately dissected; flowers white; fruits narrowly oblong, 4.5-7 mm long, slightly beaked or narrowed toward the apex. Stream bottoms, woods, roadsides, and waste areas. Mid-Mar-Apr.

1. Ovary and fruit pubescent \_\_\_\_\_ var. **dasycarpum**

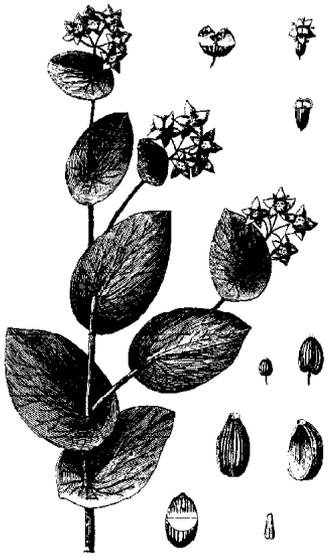
1. Ovary and fruit glabrous or nearly so \_\_\_\_\_ var. **tainturieri**

var. **dasycarpum** Hook. ex S. Watson, (thick-fruited), HAIRY-FRUIT CHERVIL. Widespread in TX but more commonly in e 1/2.

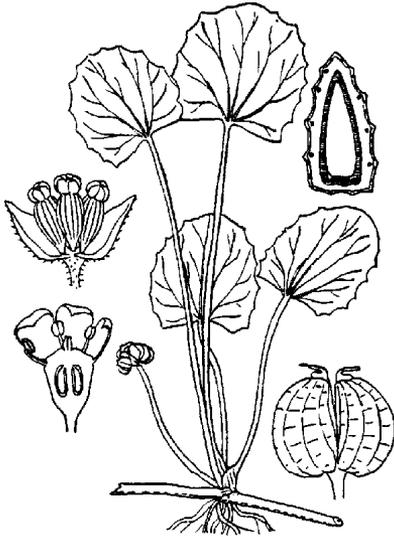
var. **tainturieri**. Widespread in TX but more commonly in e 1/2.

## CICUTA WATER-HEMLOCK

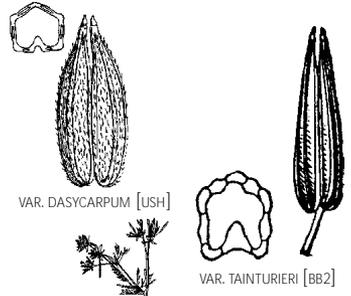
☞ A n temperate genus of 8 species; ☞ all are extremely toxic. (Latin: *cicuta*, name of *Conium*



*Bupleurum rotundifolium* [LAM]

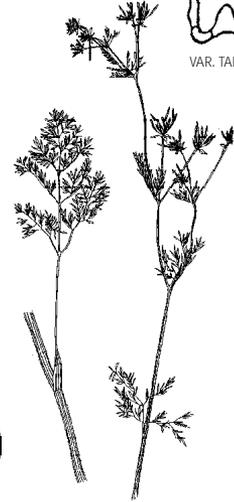


*Centella erecta* [BR2]



VAR. DASYCARPUM [USH]

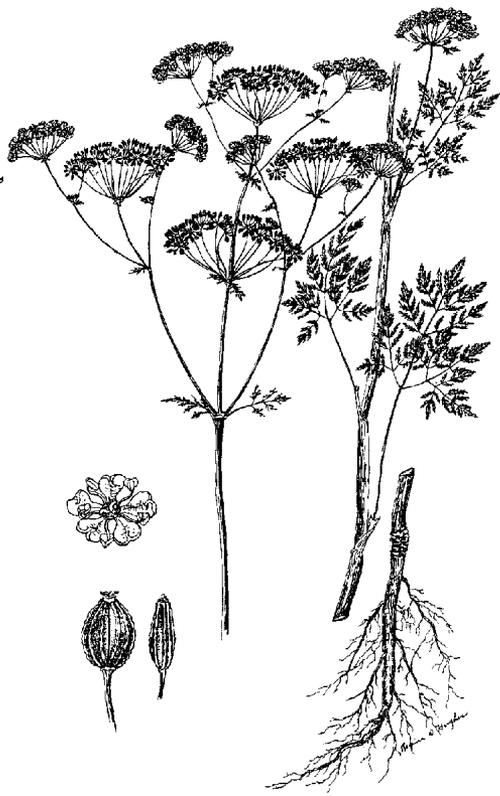
VAR. TAINTURIERI [BB2]



*Chaerophyllum tainturieri* [BT3]



*Cicuta maculata* [REE]



*Conium maculatum* [REE]

*maculatum*—poison-hemlock, a deadly herb native to the Old World; the name was transferred to this genus)

REFERENCES: Mathias & Constance 1942; Mulligan 1980.

**Cicuta maculata** L., (spotted), COMMON WATER-HEMLOCK, SPOTTED COWBANE, COWBANE, BEAVER-POISON, SPOTTED WATER-HEMLOCK, MUSQUATROOT, MUSKRAT-WEED. Glabrous and glaucous, usually tall perennial to 2 m tall (occasionally flowering when much smaller); roots fleshy and fascicled; leaves 2–3 times pinnately compound; flowers white; fruits oval to orbicular, 2–4 mm long, with ribs prominent. Low or wet ground; Bell, Dallas, Henderson, and Lamar cos., also Collin Co. (G. Diggs, pers. obs.); se and e TX w to Rolling Plains and Edwards Plateau. Late May–Jul. [*C. mexicana* J.M. Coult. & Rose] **Virulently poisonous** due to cicutoxin, a resinoid which affects the nervous system; a single bite is reported to be sufficient to kill a human; children have even been poisoned by whistles made from the stems; in extreme cases death may occur in less than an hour; some authorities consider this to be the most poisonous plant of the North Temperate zone; fatalities are also known in browsing livestock (Stephens 1980; Turner & Szczawinski 1991; Hardin & Brownie 1993). ☠

### CONIUM POISON-HEMLOCK

☞ A temperate Eurasian and s African genus of 6 species; ☠ some are very poisonous. (Greek: *coneion*, the hemlock, by which Socrates and various criminals were put to death at Athens)

**Conium maculatum** L., POISON-HEMLOCK, POISON-PARSLEY. Glabrous biennial to 3 m tall with distinctive unpleasant odor; root a carrot- or parsnip-like taproot; stems hollow, usually purplish-spotted; leaves pinnately decompose; umbels compound, many-flowered; flowers white; fruits broadly ovoid, 2–4 mm long. Stream bottoms; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990), apparently from Travis Co. just beyond s margin of nc TX s and sw through the s 1/2 of TX. May–Jun. Native of Europe and Asia. All parts of the plant are **extremely poisonous** to humans and livestock due to coniine and other toxic alkaloids; often fatal if eaten due to paralysis of respiratory muscles. The leaves can be mistaken for parsley, the roots for parsnips, or the seeds for anise. It has been recognized as poisonous since ancient times and is supposedly the source of the poison used to kill the Greek philosopher Socrates in 399 B.C.; it was apparently widely used as a means of execution by the early Greeks (Muenscher 1951; Kingsbury 1964, 1965; Hardin & Arena 1974; Mabberley 1987; Schmutz & Hamilton 1979; Turner & Szczawinski 1991). Significant skin contact with the foliage can result in symptoms of toxicity such as nausea or blurred vision. ☠ 🌿

### CORIANDRUM CORIANDER

☞ A genus of 3 species native to sw Asia. (From the Greek name, *koriandron*, from *koris*, bug, alluding to the aromatic leaves)

**Coriandrum sativum** L., (cultivated or sown), CILANTRO, CORIANDER, CHINESE-PARSLEY. Low glabrous annual 20–70 cm tall; basal leaves simple and lobed or pinnate, much less finely divided than stem leaves; stem leaves pinnately dissected; outer flowers with rather large petals, some bilobed; inner flowers with smaller petals; petals white, often tinged pink; fruits orbicular, (1.5–) 2.5–3(–5) mm in diam. Escapes cultivation, waste places; Dallas and McLennan cos., also Grayson Co. (G. Diggs, pers. obs.); scattered in TX. Apr–May. Native of Mediterranean region. Long cultivated for the fruits (e.g., seeds were found in the tomb of Tutankhamun—Hepper 1990); the foliage of this plant provides the flavoring so widely used in Mexican salsas and other Latin American cuisines. 🌿

**CRYPTOTAENIA** WILD CHERVIL, HONEWORT

☞ A genus 6 species of the n temperate region and tropical African mountains. (Greek: *crypto*, hidden, and *taenia*, band or ribbon, referring to the concealed oil tubes)

**Cryptotaenia canadensis** (L.) DC., (of Canada). Largely glabrous perennial to 1 m tall; leaflets 3 or 5, thin, broadly lanceolate, sharply double-toothed, sometimes lobed; rays of umbel few; pedicels very unequal; flowers white; fruits 3.5–8 mm broad. Woods; collected by Reverchon in Dallas (Mahler 1988); recent collections in Dallas, Grayson, and Lamar cos.; also e TX. May.

**CYCLOSPERMUM** SLIM-LOBE CELERY

☞ A monotypic genus native to warm areas of the Americas; related to the genus *Apium* which includes *A. graveolens* L. (CELERY). (Greek: *cycla*, circle, and *spermum*, seed)

**CyclospERMUM leptophyllum** (Pers.) Sprague ex Britton & P. Wilson, (slender-leaved), SLIM-LOBE CELERY. Low glabrous annual 5–60 cm tall; leaves highly variable, the lowest with wide segments, the uppermost with almost thread-like segments; umbels axillary and terminal, sessile or short-peduncled, typically with 3–5 rays (= main branches of umbel); flowers minute, white; fruits ovoid, 1–2(–3) mm long. Ditches or low areas, disturbed sites; s TX nw to nc TX and w to Trans-Pecos. Apr–Jun, sporadically later. [*Apium leptophyllum* (Pers.) F. Müll. ex Benth.] The name of this genus is sometimes spelled *Ciclospermum*, however, the accepted spelling is *CyclospERMUM* (Greuter et al. 1993). Native from s US to South America. Reported to be poisonous (Burlage 1968). ☞

**CYMOPTERUS** WAVEWING

☞ A w North American genus of 32 species including several eaten by Native Americans. (Greek: *cyma* a wave, and *pteron*, a wing, referring to the often undulate wings)  
REFERENCE: Mathias 1930.

**Cymopterus macrorhizus** Buckley, (large-rooted), BIG-ROOT WAVEWING. Glabrous, glaucous, dwarf perennial to 35 cm tall; from a thick, soft-woody, fusiform to subglobose root; leaves few, crowded at base of plant, pinnate or bipinnate; flowers pink or nearly white; anthers purple-black, prominent; fruits ovoid to ovoid-oblong, 4–9 mm long, 3–8 mm wide, the wings obvious. Rocky limestone prairies; Blackland Prairie and Edwards Plateau w through Plains country; endemic to TX and OK. Mar–Apr.

**CYNOSCIADIUM**

☞ A North American genus of 2 species. (Greek: *kyon* or *cyna*, dog, and *skiados*, an umbel)

**Cynosciadium digitatum** DC., (finger- or hand-like), FINGER DOGSHADE. Glabrous annual; stems to 65 cm tall; basal leaves linear-lanceolate, entire; stem leaves palmately compound or parted, with 3–5 long narrow segments; flowers rather few, not conspicuous, white; fruits ovoid, 2–3 mm long. Wet places; Hunt and Lamar cos.; also Coastal Prairies. May.

**DAUCOSMA**

☞ A monotypic genus endemic to TX. (Possibly from *Daucus*, the genus including carrots, and Greek: *osma* smell or odor)

**Daucosma laciniatum** Engelm. & A. Gray, (laciniate, torn), MEADOW DAUCOSMA. Annual to 1.2 m tall; crushed leaves very aromatic; umbels compound, the rays 2–5 cm long; peduncles to 10 cm long; involucre and involucel equaling or longer than rays and pedicels; flowers white; fruits

ovoid, 3–4 mm long, glabrous. Low disturbed areas; Bell Co. (Mathias & Constance 1961); mainly s TX and Edwards Plateau; endemic to TX. May–Aug. 🌿

### DAUCUS CARROT

Hispid-pubescent annuals or biennials; leaf blades finely cut, the ultimate divisions narrowly lanceolate; umbels compound, the outer rays becoming longer in age, the umbels then hollow in center; fruits bristly.

☞ A genus of ca. 22 species of Europe, the Mediterranean, sw and c Asia, tropical Africa, Australia, New Zealand, and the Americas. (From *daukos*, the classical Greek name)

1. Petals white to yellowish, except those of central flower in umbel usually pink or purple; rays 15–50 mm long in flower, up to 75 mm in fruit; involucre bracts shorter than umbel in flower, divided into filiform divisions; bristles of fruit without prominent apical barbs \_\_\_\_\_ **D. carota**
1. Petals white (withering yellowish), including those of central flower in umbel; rays 3–30 mm long in flower, up to 40 mm in fruit; involucre bracts ± equal to or exceeding the umbel in flower, divided into linear or lanceolate divisions; bristles of fruit with apical barbs \_\_\_\_\_ **D. pusillum**

**Daucus carota** L., (carrot), WILD CARROT, QUEEN-ANNE'S-LACE. Biennial 0.4–1.5(–2) m tall; involucre bracts usually reflexed; fruits 3–4 mm long. Roadsides or railroads, disturbed areas; Ellis, Grayson, and Tarrant cos., also Lamar (Carr 1994) and Dallas (Moss Park—Ruth May, pers. comm.) cos.; still spreading rapidly in e part of TX w to nc TX and Edwards Plateau. First observed in Tarrant Co. (in Keller) in 1996. May–Jul. Native of Europe. This species is an aggressive invader capable of crowding out native vegetation. Handling the wet foliage of cultivated CARROT (*D. carota* subsp. *sativus* (Hoffm.) Arcang.) can apparently cause skin irritation in sensitive individuals; photosensitization may be involved (Tampion 1977; Duke 1985); care should thus be taken with both cultivated CARROT and WILD CARROT. 🌿 🌿

**Daucus pusillum** Michx., (very small), RATTLESNAKE-WEED, SOUTHWESTERN CARROT, SEEDTICKS. Annual to ca. 0.9 m tall; fruits 3–5 mm long. Stream banks, roadsides, and waste areas; throughout TX. Apr–Jun.

### ERYNGIUM ERYNGO

Plants creeping to erect; essentially glabrous; leaves entire to pinnately or palmately lobed to divided, often spinose; inflorescences conspicuously head-like, globose to cylindrical, sometimes with a coma of bracts from apex of head; flowers white to purple; fruits variously covered with scales or tubercles.

☞ A genus of 230–250 species of tropical and temperate areas of the world; a number are edible or cultivated as ornamentals. (From *eryngion*, the Greek name for *E. campestræ* L.)

REFERENCES: Bell 1963; Mathias & Constance 1941b.

1. Leaves parallel-veined, broadly linear, completely unlobed and undivided, the margin entire except for remote bristles, to 1 m long; plants monocot-like in appearance \_\_\_\_\_ **E. yuccifolium**
1. Leaves reticulate-veined, not linear, broader in shape, unlobed to usually palmately lobed or divided, to only 9 cm long, often much shorter; plants not monocot-like.
  2. Stem leaves conspicuously sharp-spinulose, palmately lobed or divided; bracts (including teeth) subtending heads > 2 mm wide (often much greater), usually spinulose; throughout nc TX.
  3. Heads 20–35 mm long, purplish to reddish; coma of 4–8 spinescent bracts 1–2 cm long projecting from apex of heads \_\_\_\_\_ **E. leavenworthii**
  3. Heads 8–15 mm long, bluish to purplish; coma bracts absent or inconspicuous, nearly entire.
  4. Plants erect, the stems solitary, branched above; basal leaves serrate or dentate, petioled; fruits 1–2 mm long; plants of limestone soils \_\_\_\_\_ **E. hookeri**



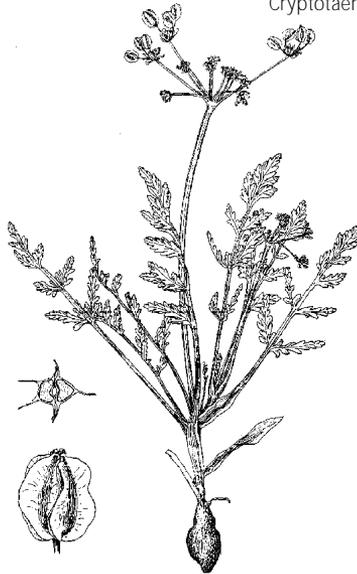
*Coriandrum sativum* [BL1]



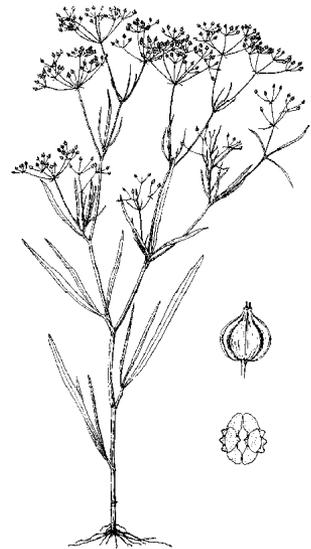
*Cryptotaenia canadensis* [BB1]



*Cyclospermum leptophyllum* [CO1]



*Cymopterus macrorhizus* [LUN]



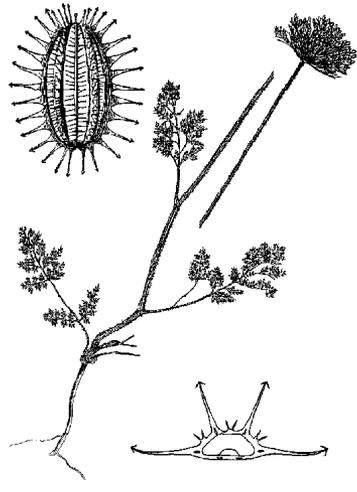
*Cynosciadium digitatum* [LUN]



*Daucosma laciniatum* [LUN]



*Daucus carota* [BL1]



*Daucus pusillus* [BT3, USH]

4. Plants low, much-branched; basal leaves deeply palmately parted, sessile or subsessile; fruits 2.5–3 mm long; plants of sandy soils \_\_\_\_\_ **E. diffusum**
2. Stem leaves not sharp-spinulose or only slightly so, unlobed to palmately lobed or divided; bracts (including teeth if present) subtending heads very narrow, usually < 2 mm wide, entire or with 3–5 spinulose teeth; extreme e portion of nc TX.
5. Plants erect; bracts subtending heads usually with 3–5 teeth (rarely entire); stem leaves not palmately lobed, usually serrate to lacinate or subtire; heads 5–15 mm wide, few–numerous in a cymose inflorescence terminating the stem \_\_\_\_\_ **E. integrifolium**
5. Plants prostrate or weakly ascending; bracts subtending heads without teeth or nearly so; stem leaves entire to irregularly toothed, at least some palmately lobed; heads 2–4 mm wide, usually solitary in the leaf axils \_\_\_\_\_ **E. prostratum**

**Eryngium diffusum** Torr., (diffuse, spreading), BUSHY ERYNGO, DIFFUSE ERYNGO. Annual or biennial 10–40 cm tall; prostrate to erect; stem leaves deeply palmately parted, the divisions spinulose-dentate or lobed; heads bluish; coma of bracts absent from apex of heads; fruits 2.5–3 mm long. Sandy soils; Montague and Shackelford cos.; nearly throughout TX. May–Aug.

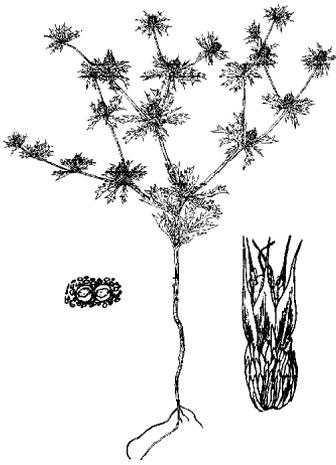
**Eryngium hookeri** Walp., (for William Jackson Hooker, 1785–1865, director of Kew Gardens), HOOKER'S ERYNGO. Erect annual 30–60 cm tall; lower stem leaves nearly sessile, lanceolate, laciniately toothed, spinulose; upper stem leaves ovate, palmately divided into 5–7 oblong, lacinate or pinnatifid lobes; heads purplish; coma of a few bracts at apex of heads or coma absent; fruits 1–2 mm long. Moist limestone soils; Bell, Dallas, Denton, Ellis, Grayson, and McLennan cos.; Blackland and Coastal prairies. Jul–Sep.

**Eryngium integrifolium** Walter, (entire-leaved), SIMPLE-LEAF ERYNGO. Erect perennial 30–80 cm tall; stem leaves simple; heads ovoid to globose, 5–15 mm in diam., bluish, subtended by 6–10 linear bracts, the bracts 10–20 mm long; coma of bracts absent from apex of heads. Moist wooded areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); se and e TX w to at least Henderson Co. Aug–Oct.

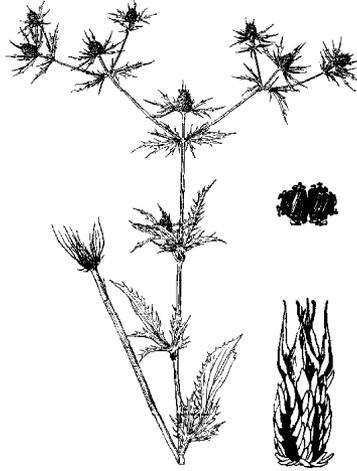
**Eryngium leavenworthii** Torr. & A. Gray, (for its discoverer, Melines Conklin Leavenworth, 1796–1862, s U.S. botanist, explorer, and army surgeon), LEAVENWORTH'S ERYNGO. Erect annual to 100 cm tall; vegetative tissues often purplish; upper stem leaves sessile, orbicular, deeply palmately parted, the divisions pinnatifid, spiny; heads purplish to reddish; coma of 4–8 conspicuous spinescent bracts projecting from apex of heads; sepals spinescent; stamens bluish; fruits 2–4 mm long, conspicuously covered with white scales. Prairies and weedy areas; nearly throughout TX. Jul–Sep. This strikingly colored plant is often common and conspicuous. ☒/89

**Eryngium prostratum** Nutt. ex DC., (prostrate, flat to the ground). Creeping, prostrate, mat-forming, or ascending perennial; stems 10–70 cm long, slender, 0.5–1 mm in diam.; basal leaves 2–4(–5.5) cm long, entire to irregularly toothed, often palmately lobed; stem leaves reduced; heads very small, to 5–9 mm long, short cylindrical, often pale to dark blue or purple-blue, subtended by 5–10 linear bracts to 12 mm long; coma of bracts absent from apex of heads. Lake margins and other moist areas; Henderson, Limestone, and Milam cos. on e margin of nc TX, also Lamar Co. in Red River drainage; mostly se and e TX. May–Sep.

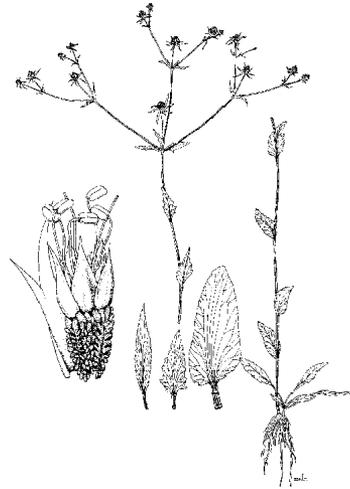
**Eryngium yuccifolium** Michx., (with leaves like *Yucca*), RATTLESNAKE-MASTER, BUTTON SNAKE-ROOT, BRISTLE-LEAF ERYNGO. Plant glabrous; perennial from tuberous root; stems 30–180 cm tall; basal leaves broadly linear, to 1 m long; stem leaves like the basal but reduced upward; heads globose-ovoid, 10–25 mm in diam.; coma of bracts absent from apex of heads. Prairies; Dallas, Denton, and Grayson cos.; also Hunt, Kaufman, and Lamar cos. (R. O'Kennon, pers. obs.); se and e TX w to nc TX. May–Aug. We are following McGregor (1986) and Jones et al. (1997) in lumping var. *synchaetum* [*E. yuccifolium* var. *synchaetum* A. Gray ex J.M. Coult. & Rose, *E. synchaetum*



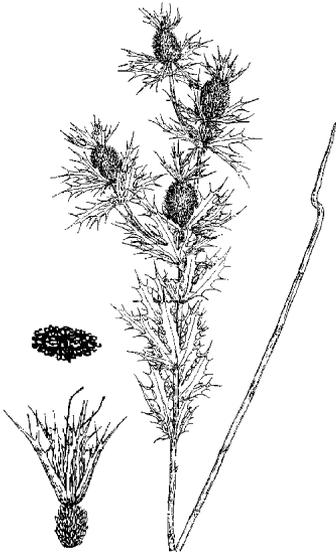
*Eryngium diffusum* [LUN]



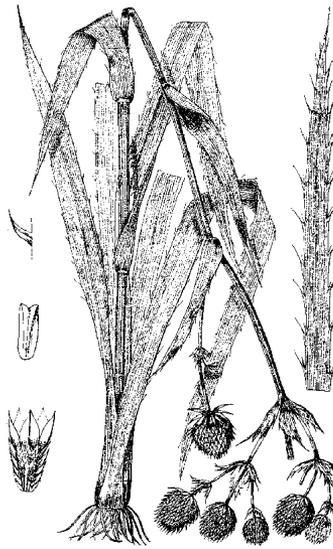
*Eryngium hookeri* [LUN]



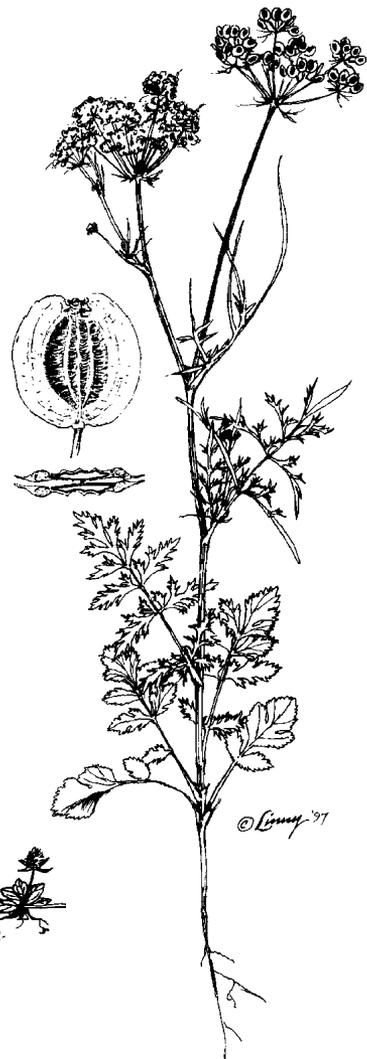
*Eryngium integrifolium* [GWO]



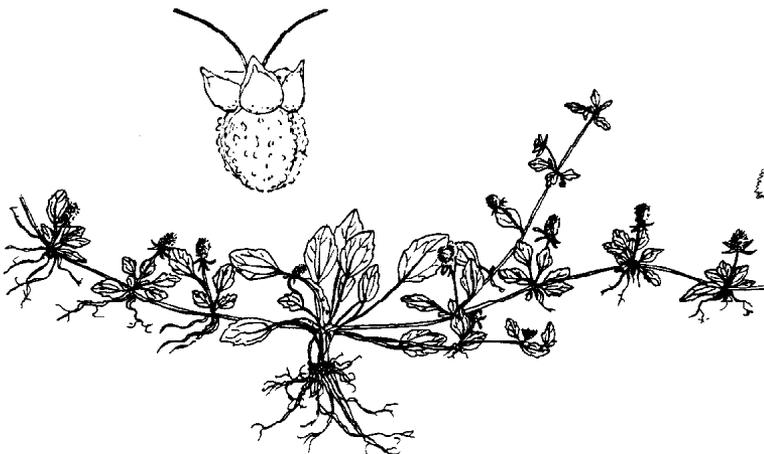
*Eryngium leavenworthii* [LUN]



*Eryngium yuccifolium* [EN1]



*Eurytaenia texana* [HEA, LUN]



*Eryngium prostratum* [BB2, CO1]

(A. Gray ex J.M. Coult. & Rose) J.M. Coult. & Rose] The common names refer to Native American and early settler use of poultices from the roots to treat snakebite (Tveten & Tveten 1993). This species is an indicator of native prairie. ☒/89

### EURYTAENIA TEXAS SPREADWING

☞ A genus of 2 species native to TX and OK. (Greek: *eury*, wide, and *taeni*, ribbon or band)

**Eurytaenia texana** Torr. & A. Gray, (of Texas), TEXAS SPREADWING. Largely glabrous annual 30–120 cm tall; basal leaves lobed or pinnatifid; stem leaves pinnately or ternate-pinnately dissected; inflorescence of loose compound umbels; rays 8–16; involucre usually of ca. 5 three-cleft bracts 5–10 mm long; involucre bractlets similar to bracts or entire; pedicels 5–8 mm long; petals white; fruits 4–6 mm long and broad. Rocky or sandy ground; Montague and Tarrant cos.; widespread in TX except far w part; endemic to TX and OK. May–Jun.

### FOENICULUM FENNEL

☞ A mainly Asian genus of 4–5 species, widely naturalized; some authorities consider the genus monotypic (e.g., Mabberley 1987). (Latin: *foenum*, hay, presumably from the abundant straw-like leaf segments; classical name for fennel)

**Foeniculum vulgare** Mill., (common), COMMON FENNEL. Glabrous strong-scented biennial or perennial; stems 0.9–2+ m tall; leaves pinnately decomposed; rays 15–40; petals yellow; fruits 3–4 mm long. Widely cultivated and escapes, low areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); also s TX and Edwards Plateau. Spring–summer. Native of the Mediterranean region. Cultivated for its fruits and essential oils used as flavoring and medicine since the 13th century BC. (Mabberley 1987); however, distilled oil of fennel, even in small quantities can be toxic and can cause symptoms including pulmonary edema, respiratory problems, and seizures (Duke 1985). ☒ ☞

### HYDROCOTYLE WATER-PENNYWORT, NICKELS-AND-DIMES

Ours glabrous creeping perennials of damp ground or shallow water, rooting at the nodes; leaves peltate or not so; leaf blades shiny above, sometimes ± round; umbels simple, branched or verticillate; flowers inconspicuous, yellow-green or white; fruits without secondary ribs, not reticulate.

☞ A cosmopolitan genus of ca. 130 species often with peltate leaves; some are cultivated as ornamental ground covers. Some workers have suggested that if Araliaceae and Apiaceae are recognized as separate families (as done here), then the Hydrocotylaceae should be recognized as well (e.g., Thorne 1992); however, the traditional approach of including *Hydrocotyle* in the Apiaceae is followed here. (Greek: *hydor*, water, and *kotyle*, cup, alluding to the hollows in the center of the leaves of some species)

1. Leaves peltate (= petiole attached to middle of lower surface of leaf blade); leaf blades shallowly lobed or toothed.
  2. Flowers in a simple umbel (= all attached at the same point) \_\_\_\_\_ **H. umbellata**
  2. Flowers in whorls (= verticils) forming an interrupted spike or spike-like raceme or rarely a branched spike \_\_\_\_\_ **H. verticillata**
1. Leaves not peltate, the petiole attached at base of a deep, narrow notch; leaf blades 5–6-lobed to about the middle \_\_\_\_\_ **H. ranunculoides**

**Hydrocotyle ranunculoides** L.f., (resembling *Ranunculus*—buttercup), FLOATING WATER-PENNYWORT. Leaf blades roundish reniform, to 8 cm long and wide; petioles to ca. 35 cm long; umbels simple, 5–10-flowered. Wet places; Dallas and Henderson cos.; e TX w to nc TX. Apr–Oct.

**Hydrocotyle umbellata** L., (with umbels), UMBRELLA WATER-PENNYWORT, OMBILIGO DE VENUS. Leaf blades to 7.5 cm in diam.; petioles to ca. 40 cm long; umbels many-flowered. Wet places; Burnet, Denton and Milam cos.; much of e 1/2 of TX. May–Oct.

**Hydrocotyle verticillata** Thunb., (verticillate, whorled). Leaf blades to ca. 6 cm in diam., with 8–14 shallow lobes; petioles to 35 cm long; inflorescences interrupted, with 2–15-flowered whorls. Wet places. May–Oct.

1. Fruits sessile or subsessile; inflorescences often bifurcate (= 2-branched) \_\_\_\_\_ var. **verticillata**

1. Fruits pedicellate, the pedicels 1–10 mm long; inflorescences rarely bifurcate \_\_\_\_\_ var. **triradiata**

var. **triradiata** (A. Rich.) Fernald, (three-rayed). Inflorescences with few 4–15-flowered verticils. Dallas, Grayson, Parker, and Tarrant cos.; se and e TX w to nc TX and Edwards Plateau, also Trans-Pecos.

var. **verticillata**. WHORLED WATER-PENNYWORT. Inflorescences with 2–7 few-flowered verticils. Bell, Dallas, and Tarrant cos.; se and e TX w to nc TX and Edwards Plateau.

## LIMNOSCIADIUM

☞ A genus of 2 species of the sc United States; sometimes treated as part of the genus *Cynosciadium*. (Greek: *limne*, a marsh, and *skiados*, an umbel)

REFERENCE: Mathias & Constance 1941a.

**Limnoscium pinnatum** (DC.) Mathias & Constance, (pinnate, feather-like), ARKANSAS DOGSHADE. Glabrous erect or ascending annual 10–80 cm tall; stem leaves pinnately compound with 2–9 linear to linear-lanceolate divisions 3–10 cm long or the lowest and uppermost leaves entire; flowers small but numerous and rather showy; petals white; calyx teeth in fruit shorter than the stylopodium, 0.5 mm or less long; fruits oblong-oval, 2–4 mm long, 1–2 mm long. Ditches or low ground; se and e TX w to East Cross Timbers, also Edwards Plateau. May–Jun. [*Cynosciadium pinnatum* DC.]

*Limnoscium pumilum* (DC.) Mathias & Constance, (dwarf), is cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2) but apparently occurs only to the s of nc TX. It can be distinguished by its low and diffuse habit (plant 5–40 cm high or long), the oval to orbicular fruits 2–3 mm long and 2 mm wide, and its calyx teeth in fruit equal in length to the stylopodium (to 1.5 mm long).

## LOMATIUM

☞ A w North American genus of 74 species. (Greek, *lomatium*, a little border, in reference to the winged fruit)

REFERENCE: Schlessman 1984.

**Lomatium foeniculaceum** (Nutt.) J.M. Coult. & Rose subsp. **daucifolium** (Torr. & A. Gray) Theobald, (sp.: like *Foeniculum*—fennel; subsp.: leaves like *Daucus*, carrot), CARROT-LEAF LOMATIUM. Pubescent, dwarf, acaulescent perennial to 45 cm tall, from a thick taproot; leaf segments linear or linear-lanceolate; petals yellow; fruits ovate-oblong, 6–9 mm long, 3–6 mm broad. Prairies, in calcareous clay; Collin, Dallas, Ellis, Grayson, and Montague cos.; also Nolan Co. to the w of nc TX. Mar–Apr. [*Lomatium daucifolium* (Nutt. ex Torr. & A. Gray) J.M. Coult. & Rose] ☒/96

## OSMORHIZA SWEET-CICELY, ANISEROOT

☞ A genus of 10 species native to the Americas and e Asia. (Greek: *osme*, a scent, and *rhiza*, a root, in reference to the odor of the root)

REFERENCES: Constance & Shan 1948; Lowry & Jones 1984.

**Osmorhiza longistylis** (Torr.) DC., (long-styled), ANISEROOT, LONG-STYLE SWEETROOT. Pubescent perennial 0.6–1 m tall; leaflets thin, sharply toothed; rays of umbel few; petals white; fruits 15–20 mm long, with some hairs on the ribs, terminated by appendages 2–3(–6) mm long. Woods, along streams; Dallas, Grayson, and Tarrant cos., also Collin Co. (R. O'Kennon, pers. obs.); apparently in TX only in the nc part of the state.

### OXYPOLIS HOG-FENNEL, COWBANE

Erect perennials; leaves reduced to phyllodes or once pinnately compound; involucre of linear to lanceolate bracts; petals white; calyx teeth present; fruits with lateral wings.

☛ A North American genus of 7 species. (Greek: *oxys*, sharp, and *polios*, white)  
REFERENCE: Tucker et al. 1983.

1. Leaves reduced to elongate, linear, entire, hollow, septate phyllodes; leaflets absent (leaves rush-like in appearance); principal rays of umbels 6–14(–17) \_\_\_\_\_ **O. filiformis**
1. Leaves once pinnately compound, with distinct leaflets; principal rays of umbels 15–45 \_\_\_\_\_ **O. rigidor**

**Oxyopolis filiformis** (Walter) Britton, (thread-like), LEAF-LESS COWBANE. Stems to 1.4 m tall; the reduced leaves (phyllodes) 20–60 cm long are unique among nc TX Apiaceae; fruits 5–8 mm long, 3–5 mm wide. Wet areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly e TX. Jul–Sep.

**Oxyopolis rigidor** (L.) Raf., (rigid, stiff), COWBANE, WATER DROPWORT, WATER DROPWORT COWBANE. Stems 0.6–1.5 m tall; leaflets 5–9, lanceolate to linear, toothed or entire; fruits 4–7 mm long, 2.5–4 mm wide. Along streams, wet areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly e TX. Aug–Oct. Reported to be poisonous to cattle (Burlage 1968). ☛ ☞

### PETROSELINUM PARSLEY

☛ A genus of 2 species of Europe and the Mediterranean region. (Greek: *petros*, rock, and genus name *Selinum* from *selinon*, celery)

**Petroselinum crispum** (Mill.) Nyman ex A.W. Hill, (crisped, curled), PARSLEY, GARDEN PARSLEY, CURLY PARSLEY. Glabrous, erect, pungent-scented biennial; stems 0.2–1.3 m tall; leaves ternately-pinnately or pinnately decomposed, 3–25 cm long, the ultimate segments 2–5 mm wide or wider and divided into narrow lobes (usually < 5 mm wide), flat or curled and crisped; flowers yellow or greenish yellow. Cultivated and possibly escapes in weedy areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990). Summer. Native of Europe and w Asia. Extensive contact has been reported to cause skin inflammation (Duke 1985). ☛ ☞

### POLYTAENIA PRAIRIE-PARSLEY, PRAIRIE-PARSNIP

☛ A North American genus of 1–2 species. (Greek: *poly*, many, and *taenia*, a ribbon or band, which refers to the numerous oil tubes in the fruits)

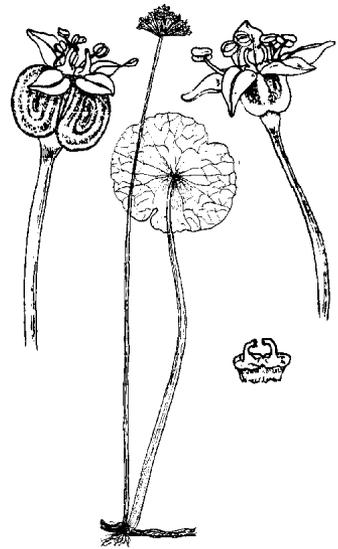
**Polytaenia nuttallii** DC., (for Sir Thomas Nuttall, 1786–1859, English-American botanist), PRAIRIE-PARSLEY, TEXAS-PARSLEY, WILD DILL. Stout glabrous biennial to 1 m tall; leaves bipinnately or ternate-pinnately compound; leaflets large, crenate to incised or lobed, ovate to oblong; flowers yellow; fruits 5–11 mm long, 4–7 mm wide, with wings. Common and conspicuous in prairies and open woods, various soils; se and e TX w to nc TX, also Edwards Plateau. Apr–May. While a number of authors recognize two species in this genus (e.g., Kartesz 1994; Jones et al. 1997), because of apparent overlap and inconsistency in fruit characters and because no means of distinguishing flowering material exist, we are following Shinnors (1958a) and Mahler (1988) in



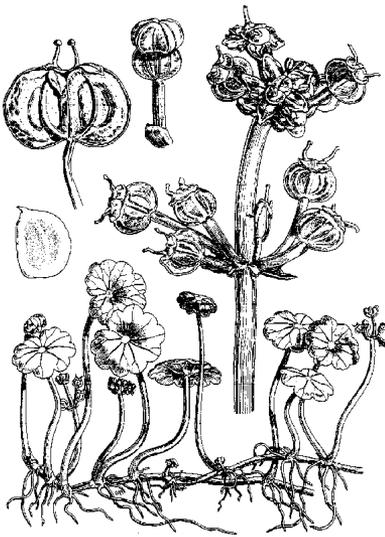
*Foeniculum vulgare* [co1]



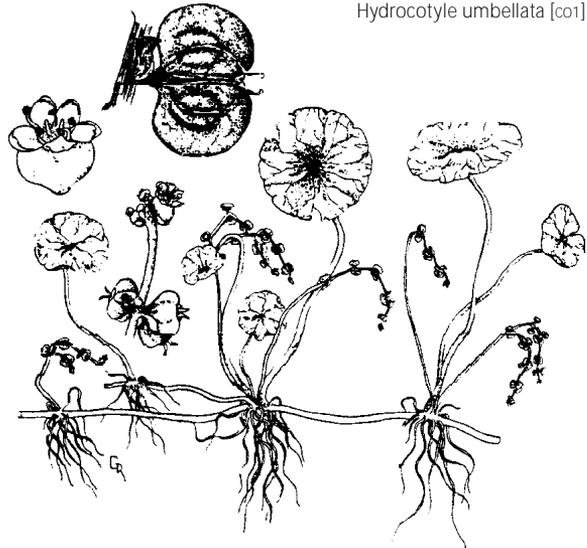
*Hydrocotyle ranunculoides* [mas]



*Hydrocotyle umbellata* [co1]



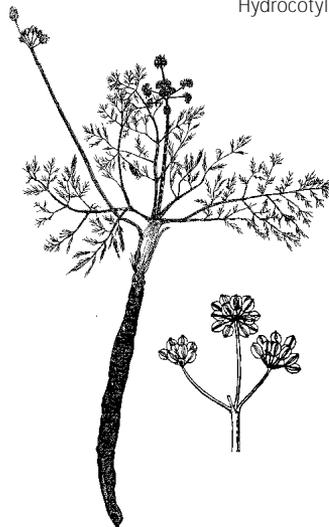
*Hydrocotyle verticillata* var. *triradiata* [mas]



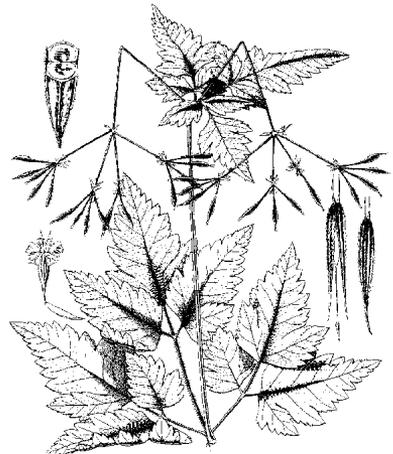
*Hydrocotyle verticillata* var. *verticillata* [cwo]



*Limnoscium pinnatum* [wn]



*Lomatium foeniculaceum* subsp. *daucifolium* [bb2, bt3]



*Osmorhiza longistylis* [ho1]

including [*P. texana* (J.M. Coult. & Rose) Mathias & Constance, *P. nuttallii* var. *texana* J.M. Coult. & Rose] in *P. nuttallii*. Mathias and Constance (1970) separated the 2 as follows:

1. Fruits 5–11 mm long, 4–7 mm broad, the lateral wings narrower and thicker than the body; oil several in the tubes indistinct, intervals \_\_\_\_\_ *P. nuttallii*
1. Fruits 9–11 mm long, 6–7 mm broad, the lateral wings broader and thinner than the body; oil tubes distinct, solitary in the intervals \_\_\_\_\_ *P. texana*

### PTILIMNIUM MOCK BISHOP'S-WEED, MOCK BISHOP

Rather low, glabrous annuals of sandy or boggy ground; leaves pinnately decomposed with the ultimate divisions filiform; petals white, rarely pink.

☛ A genus of 5 species endemic to e North America. (Greek: *ptilon*, feather or down, and *limne*, mud, in allusion to the finely divided leaves and the habitat)

REFERENCE: Easterly 1957.

1. Upper stem leaves with petioles 1–7 mm long (measure to attachment of 1st leaf segment), the blades 7–15 times as long as the petioles; leaf segments not crowded; plants smaller, to 85 cm tall; styles 0.2–1.5 mm long.
2. Upper leaves with 5–9 primary segments, these mostly again divided, the terminal primary segment 0.5–2 cm long, shorter or slightly longer than the rachis, the primary segments usually 3 per node on the rachis; involucre bracts usually branched; styles not strongly recurved, 0.2–0.5 mm long \_\_\_\_\_ ***P. capillaceum***
2. Upper leaves with 3–5 or rarely 7 primary segments, these all or mostly undivided, the terminal one 1–5 cm long, much longer than the rachis, the primary segments usually 2 per node on the rachis; involucre bracts usually entire; styles strongly recurved, 0.5–1.5 mm long \_\_\_\_\_ ***P. nuttallii***
1. Upper stem leaves with petioles 6–25 mm long, the blades less than 4 times as long as the petioles; leaf segments crowded; plants robust, 80–160 cm tall; styles ca. 1–3 mm long \_\_\_\_\_ ***P. costatum***

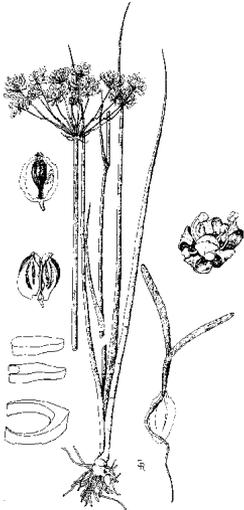
***Ptilimnium capillaceum*** (Michx.) Raf., (with fine hairs), THREAD-LEAF MOCK BISHOP'S-WEED. Plant 10–85 cm tall; flowers relatively few and small, not very showy; fruits broadly ovoid, 1.5–3 mm long. Wet places; Bell, Henderson, and Milam cos., once collected in Tarrant Co. (Mahler 1988); se and e TX w to nc TX, also Edwards Plateau. Late May–Aug.

***Ptilimnium costatum*** (Elliott) Raf., (ribbed). Plant with few, widely spaced leaves; involucre bracts usually entire; flowers numerous and prominent; fruits ovoid, 2–4 mm long. Wet places; Grayson and Henderson cos.; e TX w to e part of nc TX; also Edwards Plateau. Jun–Oct.

***Ptilimnium nuttallii*** (DC.) Britton, (for its discoverer, Sir Thomas Nuttall, 1786–1859, English-American botanist), NUTTALL'S MOCK BISHOP'S-WEED. Resembling *Bifora americana* but usually taller, with longer leaf segments, and smaller but rather showy flowers; fruits ovoid, 1–1.5 mm long. Moist prairies, sandy or silty open ground, often abundant on roadsides; Denton, Hopkins, Hunt, Kaufman, Limestone, and Tarrant cos.; se and e TX w to East Cross Timbers, also Edwards Plateau. Apr–Jul. We are following Easterly (1957) in treating *Ptilimnium* × *texense* J.M. Coult. & Rose [*P. capillaceum* × *P. nuttallii*, recognized by some authorities as a distinct species, as a hybrid.

### SANICULA BLACK SNAKEROOT, SANICLE

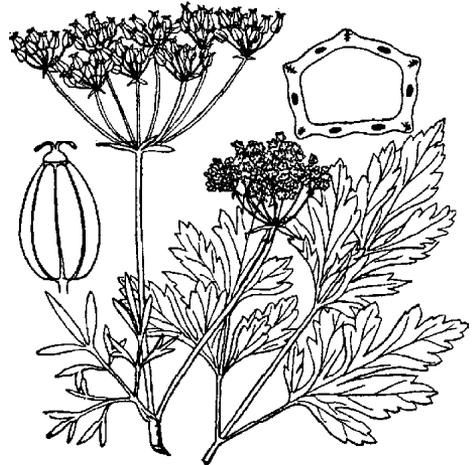
Largely glabrous biennials or perennials; leaves petiolate below to subsessile above, palmately compound with 3–5 leaflets, the leaflets toothed and lanceolate, the largest > 1 cm wide, usually much wider; inflorescences at first short, barely exceeding the leaves, later elongating;



*Oxypolis filiformis* [cwo]



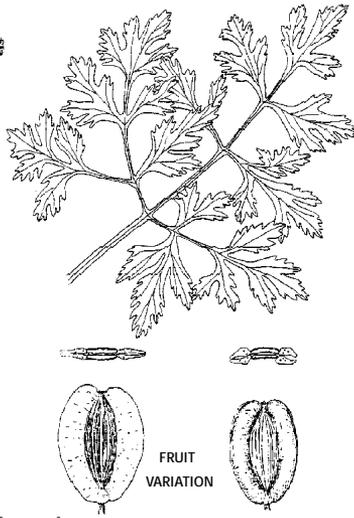
*Oxypolis rigidior* [co1]



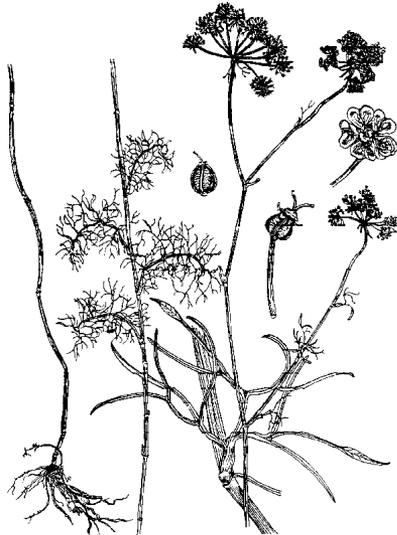
*Petroselinum crispum* [bb2]



*Polytaenia nuttallii* [br3, lun]



*Ptilimnium capillaceum* [co1]



*Ptilimnium costatum* [co1]



*Ptilimnium nuttallii* [bb2]

flowers relatively few per ultimate umbel (= umbellet); perfect flowers subsessile, usually three per umbellet; staminate flowers pedicellate, (0-)2-15 or more per umbellet; petals inconspicuous, white to yellow-green; fruits bur-like, with numerous bristles.

☛ A nearly cosmopolitan genus of 39 species. (Latin: *sanare*, to heal, in reference to former medicinal use of some species)

REFERENCES: Bicknell 1895; Shan & Constance 1951.

1. Petals white, shorter than or equaling the narrow, stiff, spine-tipped calyx lobes; styles not exserted, shorter than bristles of fruit; widespread in nc TX \_\_\_\_\_ **S. canadensis**

1. Petals yellow-green, exceeding the ovate-lanceolate, herbaceous calyx lobes; styles long-exserted in fruit, longer than bristles of fruit; rare in nc TX \_\_\_\_\_ **S. odorata**

**Sanicula canadensis** L., (of Canada), CANADA SANICLE. Ultimate umbels with (0-)2-4 staminate flowers; fruit bristles swollen at base. Woods and thickets; se and e TX w to e Rolling Plains (to Taylor Co.—Mahler 1988), also Edwards Plateau. Apr-Jun.

**Sanicula odorata** (Raf.) Pryer & Phillippe, (fragrant), CLUSTER SANICLE. Ultimate umbels with up to 15 or more staminate flowers; fruit bristles not bulbous at base. Woods, thickets; Dallas and Grayson cos.; e TX w to nc TX, also Edwards Plateau. Apr-May. [*S. gregaria* E.P. Bicknell]

## SCANDIX

☛ A genus of 15-20 species of Europe and the Mediterranean region. (Greek name for chervil, another member of the carrot family)

**Scandix pecten-veneris** L., (comb of Venus), VENUS'-COMB, CROW-NEEDLES, SHEPHERD'S-NEEDLE, LADY'S-COMB. Hispid annual; leaves pinnately decomposed; ultimate leaf divisions short and linear; petals white; fruits linear or narrowly oblong, 6-15 mm long, 1-2 mm broad, ciliate; beak of fruit linear, 20-70 mm long, compressed laterally. Low moist areas; Dallas (Kidd Spring Park—Mahler 1988), also Coastal Prairie. Mar-Apr. Native of Eurasia. ☛

## SIUM WATER-PARSNIP

☛ A n hemisphere and African genus of 14 species. (Greek: *sion*, the name of some wet area plant)

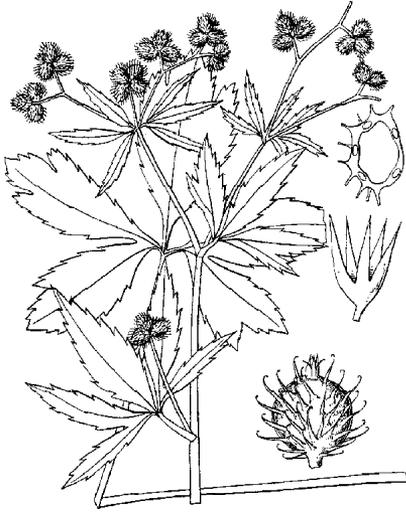
**Sium suave** Walter, (sweet), WATER-PARSNIP, HEMLOCK. Perennial; stems erect, 0.5-1.2 m tall; superficially very similar to *Cicuta*; leaves only once pinnate, rarely simple (submerged leaves can be decomposed); leaflets lanceolate to linear, 10-40(-60) mm long, serrate or incised; petals white; fruits oval to orbicular, 2-3 mm long, the ribs prominent. Swamps, wet areas; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); mainly sc TX. May-Sep. [*S. cicutifolium* Schrank] There are reports of this species causing livestock poisoning (Kingsbury 1964). ☛

## SPERMOLEPIS SCALESEED

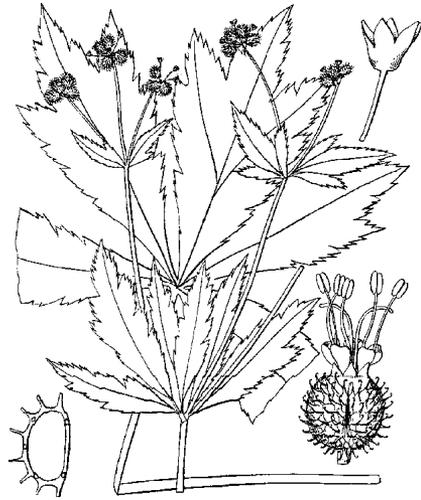
Low, glabrous annuals; leaves ternately or ternate-pinnately decomposed, the ultimate divisions linear to filiform; inflorescence of loose compound umbels; petals white; fruits 1.5-2 mm long, with or without bristles.

☛ A genus of 5 species in North America, Argentina, and Hawaii. (Greek: *sperma*, seed, and *lepis*, scale, alluding to the scruffy or bristly fruits of some species)

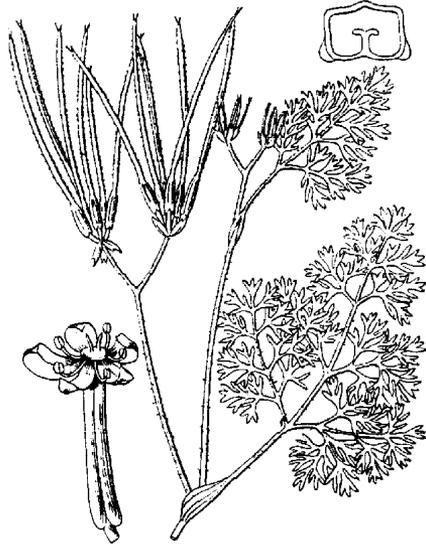
1. Ovaries and fruits with hooked short bristles \_\_\_\_\_ **S. echinata**



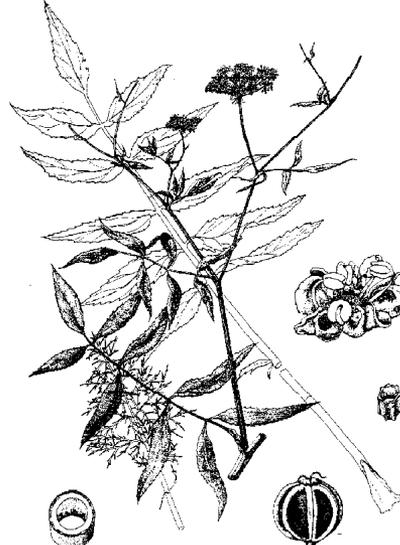
*Sanicula canadensis* [TOR]



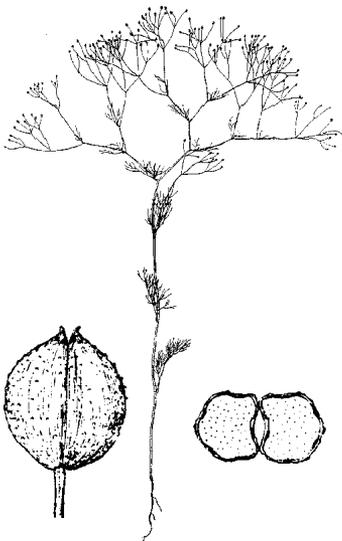
*Sanicula odorata* [TOR]



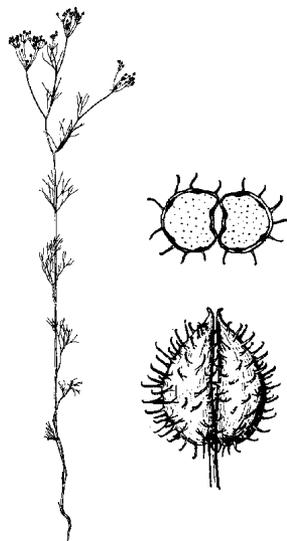
*Scandix pecten-veneris* [BB1]



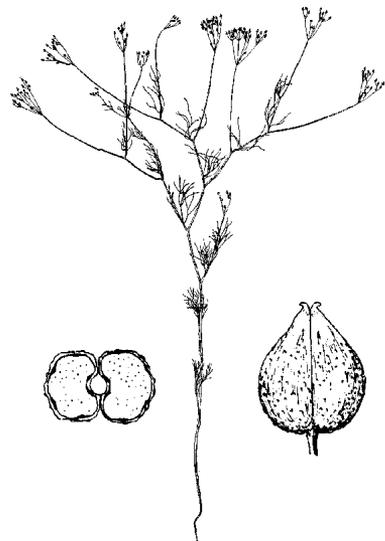
*Sium suave* [CO1]



*Spermolepis divaricata* [LUN]



*Spermolepis echinata* [LUN]



*Spermolepis inermis* [LUN]

1. Ovaries and fruits smooth or roughened with minute tubercles, but without bristles.

2. Umbels with (2-)5-9(-11) rays; rays very unequal, 2-5 mm long in flower, up to 20 mm in age; fruiting pedicels very unequal, 6 mm long or less \_\_\_\_\_ **S. inermis**

2. Umbels with 2-4(-7) rays; rays nearly equal, 5-20 mm long in flower, up to 35 mm in age; fruiting pedicels about equal, usually much longer than 6 mm \_\_\_\_\_ **S. divaricata**

**Spermolepis divaricata** (Walter) Raf. ex Ser., (spreading, widely divergent), FORKED SCALESEED. Plant erect, 10-70 cm tall. Open sandy areas, open woodlands; Bosque, Callahan, Grayson, Henderson, Denton, Parker, and Tarrant cos.; se and e TX w to West Cross Timbers, also Edwards Plateau. Apr-Jun.

**Spermolepis echinata** (Nutt. ex DC.) A. Heller, (prickly), BEGGAR'S-LICE, BRISTLY SCALESEED. Plant erect, often spreading, to 40 cm tall. Sandy soils; widespread in TX, but mainly East Cross Timbers w through w part of state. Mar-May.

**Spermolepis inermis** (Nutt. ex DC.) Mathias & Constance, (unarmed), SPREADING SCALESEED. Plant erect, 10-60 cm tall. Sandy or gravelly soils; Blackland Prairie to s and w TX. Apr-May.

### TORILIS HEDGE-PARSLEY

Hispid annuals; leaves once pinnate or pinnately decomposed; petals white; fruits in ours 3-5 mm long, bristly.

☛ A genus of 15 species native to the Canary Islands, the Mediterranean region to e Asia, and tropical and s Africa. (Name used by Adanson in 1763; possibly from Latin: *torus*, cushion)

1. Flowers pedicelled, in terminal, peduncled, open umbels; plants erect \_\_\_\_\_ **T. arvensis**

1. Flowers subsessile, in axillary, sessile or short-peduncled, head-like umbels; plants reclining to suberect \_\_\_\_\_ **T. nodosa**

**Torilis arvensis** (Huds.) Link, (pertaining to cultivated fields), HEDGE-PARSLEY. Plant 30-100 cm tall; fruit bristles with microscopic barbs. Waste or disturbed ground, especially low or shady places, chiefly in limestone areas; se and e TX w to West Cross Timbers and Lampasas Cut Plain, also Edwards Plateau. May-Jun. Native of Mediterranean region. A problematic weed in some areas. The mericarps of this species were used in the successful prosecution of a kidnapping/child molestation case in Fort Worth in 1995. A 2 year old girl was pulled from the window of her apartment, kidnapped, sexually molested, and then left in a weedy area ca. 100 meters from where she was abducted. Law enforcement officials found plant fragments on the suspect's shoes and also collected assorted plant material from the crime scene. Botanists at BRIT identified the material from both the shoes and the crime scene as mericarps of *Torilis arvensis*, thus linking the suspect with the scene of the crime. This forensic botanical evidence, in combination with various other types of evidence, led to a conviction and a 99 year jail term (Lipscomb & Diggs 1998). ☛

**Torilis nodosa** (L.) Gaertn., (with nodes), KNOTTED HEDGE-PARSLEY. Plant to 60(-100) cm tall; ultimate leaf divisions filiform. Waste or disturbed ground, especially low or shady places, chiefly in limestone areas, can become a pest in lawns; se and e TX w to West Cross Timbers, also Edwards Plateau. Apr-Jun. Native of Mediterranean region. ☛

### TREPOCARPUS

☛ A monotypic genus of the s United States. (Greek: *trep*, turn, and *karpos*, fruit)

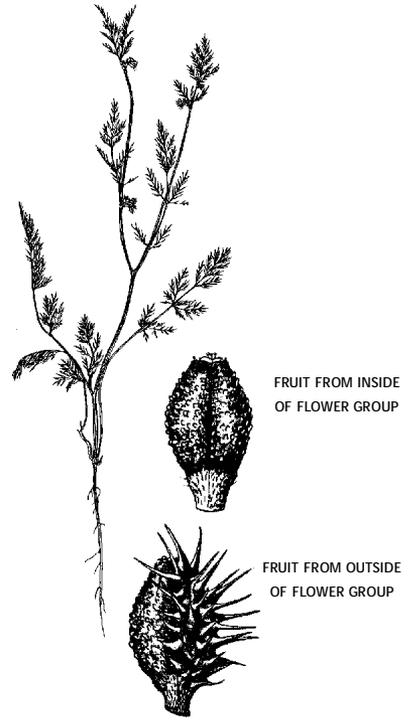
**Treopocarpus aethusae** Nutt. ex DC., (presumably referring to resemblance to *Aethusa*-fool's parsley, another genus of Apiaceae). Glabrous erect annual 35-50 cm tall; leaves pinnately de-



*Torilis arvensis* [HEA]



*Zizia aurea* [BB1]



FRUIT FROM INSIDE OF FLOWER GROUP

FRUIT FROM OUTSIDE OF FLOWER GROUP

*Torilis nodosa* [BT3, ROB]



*Trepocarpus aethusae* [LUN]

compound, the ultimate divisions linear; petals white; fruits oblong or broadly oblong-linear, 8–10 mm long. Woods and thickets, especially in low ground; Collin, Dallas, Grayson, and Hunt cos., also Lamar (Carr 1994) and Tarrant (R. O'Kennon, pers. obs.) cos.; se and e TX w to East Cross Timbers. May–Jun.

### ZIZIA

☛ A North American genus of 4 species. (Named for Johann Baptist Ziz, 1779–1829, a Rhenish (= of the Rhine region) botanist)

**Zizia aurea** (L.) W.D.J. Koch, (golden), GOLDEN-ALEXANDERS, GOLDEN ZIZIA. Glabrous perennial 40–100 cm tall; leaves once or twice compound; ultimate leaflets ovate- or oblong-lanceolate, sharply toothed; petals yellow; fruits 2–4 mm long. Low woods; Grayson and Lamar cos., also Dallas Co. (Mahler 1988); mainly e TX. Apr–May.

## APOCYNACEAE OLEANDER OR DOGBANE FAMILY

Ours perennial herbs or vines with milky juice; leaves opposite or whorled (except alternate in *Amsonia*), sessile or very short-petioled, simple, entire, deciduous or evergreen; flowers axillary or terminal, solitary or in cymes; sepals 5, barely united at base; corollas salverform, funnellform, campanulate, cylindric, or urceolate, with 5 lobes, the throat or summit of tube usually with a constriction, crown, or dense zone of hairs; stamens 5, separate; pollen not in pollinia; pistils 2, united by styles and/or stigmas only (superficially flowers can appear to have 2 separate pistils); ovaries superior; fruit of 2 (or 1 by abortion) follicles (or in other areas berries or drupes).

☛ A medium-large (1,900 species in 165 genera), pantropical family with some temperate species; vegetatively it includes mainly lianas, trees, shrubs, and a few temperate herbs; they have ubiquitous laticifer systems, glycosides, and alkaloids. The family contains many ornamental, poisonous, and medicinal species including the beautiful *Plumeria rubra* L. (FRANGIPANI), the widely planted but very poisonous *Nerium oleander* L. (OLEANDER), *Rauvolfia serpentina* (L.) Kurz, the source of the medicinal alkaloid reserpine, *Acokanthera* species, from which deadly arrow poisons (cardiac glycosides including ouabain with an effect like digitalin) are obtained in Africa, *Strophanthus*, an Old World genus yielding arrow poisons and the cardiac drug strophanthin, and *Catharanthus*, the source of alkaloids used in cancer treatments (see below). ☛ OLEANDER, a commonly used ornamental, contains extremely poisonous cardiac glycosides (e.g., neriin and oleandrin) resembling digitalin in action; a single leaf can kill an adult; children have been poisoned by sucking nectar or chewing leaves; poisoning may result from using twigs as skewers for food or even inhaling the smoke; even water in which flowers have been placed is toxic (Schmutz & Hamilton 1979; Morton 1982; Powell 1988). The sap of all species should be avoided. Apocynaceae are closely related to Asclepiadaceae (MILKWEED family) and considered paraphyletic when treated separately (Judd et al. 1994); Liede (1997), for example, treated the asclepiads as subfamily Asclepiadoideae in the Apocynaceae. From a cladistic standpoint the two should be lumped to form a more inclusive monophyletic Apocynaceae (Judd et al. 1994). (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: herbs or vines with simple, entire, often opposite leaves, *milky sap*, sympetalous corollas usually with a distinct *tube*, and 2 pistils united only by their styles and/or stigmas. Similar to Asclepiadaceae (e.g., herbs or vines with milky sap) but that family has flowers with a distinctive corona and a gynostegium (= combined structure composed of stamens and pistils).

REFERENCES: Woodson 1938; Rosatti 1989; Judd et al. 1994.

1. Plant a trailing and climbing vine; corollas cream or yellowish white to pale yellow \_\_\_\_\_ **Trachelospermum**

1. Plant erect or a trailing vine with ascending branches, not climbing; corollas blue to lavender-blue, purple-red, white, green, or yellow; native and introduced species.
2. Leaves alternate; flowers blue to lavender-blue (rarely white), in many-flowered cymes usually terminating the stems \_\_\_\_\_ **Amsonia**
2. Leaves opposite or whorled; flowers either 1–2 in leaf axils OR if in cymes then white to green or yellow.
3. Corollas salverform to funnellform, blue to lavender-blue, lavender, purple-red, or white, large, > 15 mm broad; seeds without a coma of hairs.
4. Perennial trailing vines with ascending branches; corollas blue to lavender-blue (rarely white); peduncles (=flower stalks) 10–40 mm long \_\_\_\_\_ **Vinca**
4. Erect, tender perennial grown as an annual; corollas purple-red to lavender or white, often with a dark eye; peduncles 2–4 mm long \_\_\_\_\_ **Catharanthus**
3. Corollas campanulate to cylindric or urceolate, white to green or yellow, small, 2–4 mm broad; seeds with a coma of hairs \_\_\_\_\_ **Apocynum**

### AMSONIA BLUESTAR, SLIMPOD

Largely glabrous perennials from woody rootstocks; leaves numerous, alternate, filiform to lanceolate or elliptic; flowers in compact terminal cymes; corollas salverform, light to deep blue or lavender, rarely white, with narrow lobes; follicles erect to pendulous, slender; seeds numerous, without a coma.

☛ A genus of 20 species native to North America and Japan; a number have alkaloids and some are cultivated as ornamentals. (Named for Charles Amson, 18th century Gloucester, Virginia physician and friend of John Clayton)

REFERENCES: Woodson 1928, 1929; McLaughlin 1982.

1. Corollas sharply constricted at orifice, with tube 25–40 mm long; leaf blades filiform to linear-lanceolate, to only ca. 4 mm wide; sw part of nc TX \_\_\_\_\_ **A. longiflora**
1. Corollas not constricted at orifice, with tube 6–10 mm long; leaf blades filiform to lanceolate or elliptic, to 30 mm wide; widespread in nc TX.
2. Corollas glabrous outside; leaf blades 0.5–17 mm wide, usually lanceolate to linear or filiform (rarely elliptic), usually 5(–8) cm or less long \_\_\_\_\_ **A. ciliata**
2. Corollas pubescent outside, at least in bud; leaf blades 8–30 mm wide, narrowly lanceolate to elliptic, often > 5 cm long \_\_\_\_\_ **A. tabernaemontana**

**Amsonia ciliata** Walter var. **texana** (A. Gray) J.M. Coult., (sp.: ciliate, fringed; var.: of Texas), TEXAS SLIMPOD, TEXAS AMSONIA. Plant usually 15–70 cm tall, forming loose clumps or patches from creeping rootstocks; corolla tube 6–10 mm long, ca. 1 mm in diam. at base; corolla lobes 3.5–11 mm long; follicles 6–11 cm long; seeds 5–11 mm long. Chiefly gravelly limestone soils, less commonly sandy ground; Blackland Prairie w to Rolling Plains, also Edwards Plateau. Apr–early May. [*A. texana* (A. Gray) A. Heller]

*Amsonia ciliata* var. *tenuifolia* (Raf.) Woodson, (slender-leaved), [*A. ciliata* Walter var. *filifolia* Woodson], is cited by Hatch et al. (1990) for vegetational areas 4 and 5 (Fig. 2). According to Justin Williams (pers. comm.), who is doing revisionary work on the genus, this is a taxon of the e U.S. that does not reach TX.

**Amsonia longiflora** Torr. var. **salpignantha** (Woodson) S.P. McLaughlin, (sp.: long-flowered; var.: trumpet flower), TRUMPET SLIMPOD. Plant 20–35 cm tall; stems usually clustered from base; leaves 2–5 cm long; corolla tube ca. 1.5 mm in diam. at base, inflated at insertion of stamens and then constricted at orifice; corolla lobes 5–10 mm long; follicles 7–9 cm long; seeds 5–12 mm long. Limestone hills and rocky prairies; Hamilton Co. (the type locality is on Cowhouse

Creek—Woodson 1928), also Bell Co. (further downstream on Cowhouse Creek on Fort Hood—Sanchez 1997); sw part of nc TX through the Edwards Plateau to the Trans-Pecos. Mar–May. [*A. salpignanthe* Woodson]

**Amsonia tabernaemontana** Walter, (for Jacob Theodore von Bergzabern, (d. 1590), Heidelberg botany professor who Latinized his name as Tabernaemontanus), WILLOW SLIMPOD, CREEPING SLIMPOD. Plant to 120 cm tall; leaves to 12 cm long; corolla tube 6–8 mm long, ca. 1 mm in diam. at base; corolla lobes 5–10 mm long; follicles 8–14 cm long. Stream bottom thickets; se and e TX w to East Cross Timbers. April. Texas material of this species has traditionally gone under the names *A. illustris* Woodson and *A. repens* Shinners. According to J. Williams (pers. comm.), *A. illustris*, which occurs only to the n of TX, should be put into synonymy with *A. tabernaemontana* var. *gattereri* Woodson. A manuscript in preparation by Williams will name a new variety of *A. tabernaemontana* for the material of this species that occurs in TX; in the interim we are simply recognizing the TX material as *A. tabernaemontana*. [*A. repens* Shinners]

### APOCYNUM DOGBANE, INDIAN-HEMP

☛ A genus of ca. 12 species of s Russia to China and temperate America. (Greek: *apo*, far from, and *kyon* or *cyona* dog, from ancient use as dog poison and ancient name of the Old World dogbane)

REFERENCES: Woodson 1930; McGregor 1984b.

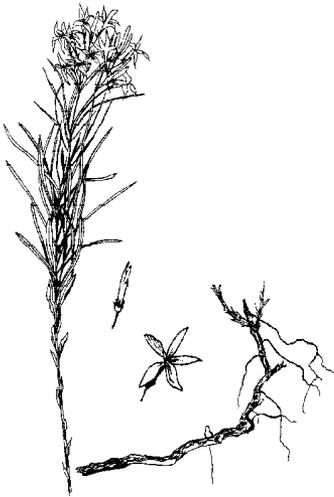
**Apocynum cannabinum** L., (resembling *Cannabis*-hemp), INDIAN-HEMP, HEMP DOGBANE, PRAIRIE DOGBANE, HAIRY DOGBANE, SMOOTH DOGBANE, WILLOW DOGBANE, CHOCTAWROOT. Herbaceous perennial with deep root, glabrous to pubescent; stems erect to ascending, to 1 m tall; leaves usually opposite, the blades variable in shape, linear-lanceolate to oval, sessile or short petiolate, narrowed to rounded or cordate and clasping basally; flowers in small usually terminal cymes, 5-merous; corollas white, yellow, or greenish, 3–6 mm long; follicles 4–22 cm long, pendulous at maturity, glabrous; seeds numerous, each terminated by a coma of long, silky hairs. Open or disturbed, often moist ground, sandy or less often gravelly or eroding clayey soils; nearly throughout TX. Apr–Jul. [*A. cannabinum* L. var. *glaberrimum* A. DC., *A. cannabinum* L. var. *pubescens* (J. Mitch. ex R. Br.) Woodson, *A. sibiricum* Jacq.] The bark has been used as a source of fiber and the root as an emetic and cardiac stimulant (Mabberley 1987); however, it is poisonous to animals such as cats, dogs, and livestock due to the presence of the cardiac glycoside apocynamarin, resins, and other toxins; sickness and death have been reported in humans from medicinal use (Kingsbury 1964; Schmutz & Hamilton 1979; Fuller & McClintock 1986; Mulligan & Munro 1990). We are following Kartesz (1994) and J. Kartesz (pers. comm. 1997) in treating this as a single variable species; several previously recognized taxa (including *A. sibiricum*) that intergrade with *A. cannabinum* have been lumped into this species; Jones et al. (1997) recognized *A. sibiricum* at the specific level. Mahler (1988) separated the two as follows: ☛

1. Leaves narrowed to broadly rounded basally, petiolate; floral bracts scarious, aristate \_\_\_\_\_ *A. cannabinum*
1. Leaves cordate, sessile, usually some clasping; floral bracts foliaceous \_\_\_\_\_ *A. sibiricum*

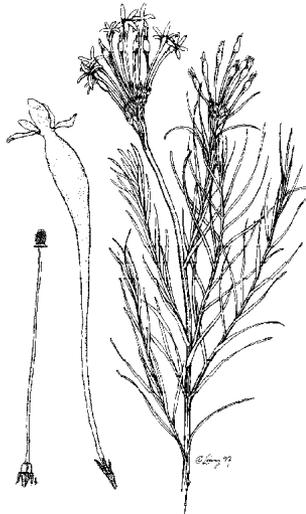
### CATHARANTHUS

☛ A tropical genus of 6 species, 5 endemic to Madagascar, 1 India and Sri Lanka; previously recognized in *Vinca*. (Greek: *katharos*, pure, and *anthos*, flower)

**Catharanthus roseus** (L.) G. Don, (rose-colored), MADAGASCAR PERIWINKLE, ROSE PERIWINKLE, OLD-MAID, CAYENNE-JASMINE, CAPE PERIWINKLE. Erect herb 20–60 cm tall; leaves obovate or oblanceolate, apiculate, 3–7 cm long; flowers 1–2 in upper leaf axils; peduncles 2–4 mm long; corollas showy, salverform, the tube 20–25 mm long; follicles erect, puberulent, striately ridged.



*Amsonia ciliata* var. *texana* [SHI]



*Amsonia longiflora* var. *salpignantha* [AMB, HEA]



*Amsonia tabernaemontana* [HEA]



*Apocynum cannabinum* [REE]



*Catharanthus roseus* [BT3, NIC]



*Trachelospermum asiaticum* [HEA]



*Trachelospermum difforme* [CO1]

Commonly grown in flower beds in summer, and sometimes appearing spontaneously in landscapes; not frost-resistant; Tarrant Co., also included for nc TX by Mahler (1988). Jun–Oct. Native of Madagascar, now pantropical. [*Vinca rosea* L.] Widely cultivated as an ornamental and also produces at least 80 alkaloids including vinblastine, vincristine, and others useful in the treatment of certain cancers including Hodgkin's disease and leukemia; this species is considered the most important plant to date in terms of cancer treatment; if misused the alkaloids are potentially toxic; they can act as an abortifacient (Duke 1985; Mabberley 1987; McGuffin et al. 1997). ☘ 🌿

### TRACHELOSPERMUM CLIMBING-DOGBANE

Vines; leaves opposite, entire, short-petioled; flowers in loose cymes; corollas salverform or subfunnelform with cylindrical tube and oblong lobes overlapping to the right; corolla tube slightly inflated above insertion of stamens; stamens inserted near middle to upper part of corolla tube; fruit of 2 elongate, slender, terete follicles.

☘ A genus of 20 species of climbing or clambering vines with milky sap native from India to Japan with 1 in the se United States; a number are cultivated as ornamentals. (Greek: *trachelos*, a neck, and *sperma*, seed, referring to the narrow seeds)

1. Leaves thinly membranous, deciduous, 4–14 cm long; native species in moist and weedy areas in ne part of nc TX \_\_\_\_\_ **T. difforme**
1. Leaves coriaceous, evergreen, 2–8(–10) cm long; introduced species spreading or persisting from cultivation.
  2. Calyx lobes erect, usually shorter than or ca. equal to narrow part of corolla tube; anthers slightly exerted \_\_\_\_\_ **T. asiaticum**
  2. Calyx lobes strongly recurved, longer than narrow part of corolla tube; anthers included \_\_\_\_\_ **T. jasminoides**

**Trachelospermum asiaticum** (Siebold & Zucc.) Nakai, (of Asia), ASIAN-JASMINE, JAPANESE STAR-JASMINE. Plant trailing and climbing; leaves evergreen, coriaceous, deep green in color, elliptic to ovate or elliptic-oblong, 2–6.5 cm long (usually towards lower end of this range); flowers fragrant; corollas yellowish white. Generally not flowering in nc TX. One of the most widely planted ground covers in nc TX, including in full sun; persists and spreads from cultivation; Tarrant Co. (R. O'Kennon, pers. obs). Early summer. Native of Korea and Japan. 🌿

**Trachelospermum difforme** (Walter) A. Gray, (of unusual or differing forms), AMERICAN STAR-JASMINE, CLIMBING-DOGBANE. Twining vine climbing on trees; leaves variable in shape, lanceolate to elliptic, ovate, or even suborbicular, to 14 cm long and 8 cm wide but mostly to only slightly more than half that size; corollas creamy white to pale yellow; anthers not exerted. Along streams, forest margins, weedy areas; Lamar Co. in Red River drainage (*Correll & Correll* 35922, TEX); se and e TX w to ne corner of nc TX. Apr–Jun.

**Trachelospermum jasminoides** (Lindl.) Lem., (resembling *Jasminum*—jasmine), STAR-JASMINE, CONFEDERATE-JASMINE. Plant climbing and trailing; leaves evergreen, coriaceous, deep green in color, elliptic to ovate or obovate, 4–8(–10) cm long; flowers fragrant; corollas white, or with yellowish tinge near tube. Cultivated and spreading, climbing up sides of buildings; Grayson Co. (Austin College campus). May–early Jun. Native of China. 🌿

### VINCA PERIWINKLE

Ours creeping or trailing perennials; leaves opposite, evergreen; flowers axillary, usually solitary; corollas salverform to funnelform with cylindrical tube and 5 equal lobes widely spread-

ing, twisted to the left, thickened or hairy at throat, blue to lavender-blue, rarely white; paired follicles erect, glabrous, smooth; seeds without a coma.

☛ A genus of 7 species native from Europe to n Africa and c Asia including cultivated ornamentals; some species contain alkaloids. (Name abbreviated from Latin: *vinca pervinca*, from *vincio*, to bind, alluding to the use of the foliage in wreaths; the ancient name reflected in the colloquial Italian *pervinca*, French *pervenche*, Middle English *per wynke*, and English *periwinkle*)

1. Leaves short petiolate (1–2 mm long) or sessile; leaf blades usually not narrowed at base, rounded to truncate or subcordate; calyx lobes ca. 10 mm long; corolla tube ca. 15 mm long \_\_\_\_\_ **V. major**

1. Leaves petiolate, the petioles usually much more than 2 mm long; leaf blades usually narrowed at base; calyx lobes to 3 mm long; corolla tube 3–6 mm long \_\_\_\_\_ **V. minor**

**Vinca major** L., (large), BIG-LEAF PERIWINKLE. Leaves to 7 cm long, to 5 cm wide. Cultivated, especially in limestone areas; readily spreads in woods and along streams and can overcome native herbaceous vegetation; Bell, Dallas, Grayson, and Williamson cos., also Tarrant Co. (R. O'Kennon, pers. obs.); scattered in e 1/2 of TX. Mainly Mar–Apr (but year round; observed in cultivation in Sherman flowering virtually every month of the year). Native of se Europe and sw Asia. ☞

**Vinca minor** L., (little), COMMON PERIWINKLE. Leaves elliptic, 2–4.5(–6) cm long, 1–1.5(–2.5) cm wide. Cultivated, wooded areas; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); however, we have seen no nc TX material; supposedly naturalized throughout TX (vegetational areas 1–10—Hatch et al. 1990). Native of s Europe. Mar–May. ☞

## AQUIFOLIACEAE HOLLY FAMILY

☛ A medium-sized (420 species in 4 genera), almost cosmopolitan family of usually evergreen trees and shrubs. *Ilex* is economically important for its hard white wood, as an ornamental, and as a source of Christmas decorations. Family name conserved from *Aquifolium*, a genus now treated as *Ilex* (the name *Ilex* was published earlier and thus has priority in terms of nomenclature). (Classical Latin name for holly) (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: shrubs or small trees with alternate simple leaves and small, inconspicuous, axillary, often 4-merous, frequently unisexual flowers; fruit a small, drupe-like, red or orange berry.

REFERENCES: Lundell 1961; Brizicky 1964a.

### ILEX HOLLY

Ours shrubs or small trees with mostly smooth, light gray bark; leaves alternate, short-petioled, simple; leaf blades nearly entire to crenulate or serrulate (spinose-dentate in species outside nc TX), evergreen and leathery or deciduous; stipules minute, falling early; flowers small, axillary, solitary or in sessile or peduncled, umbel-like or cymose clusters, usually unisexual (plants dioecious, often with some perfect flowers); calyces rotate or shallowly funnelform, 4–5-lobed; petals 4–5, oblong-elliptic, white, exceeding the calyces; stamens (or staminodes) 4–5; pistil 1; ovary superior; fruit a small drupaceous berry, globose or nearly so, usually with 4 stones.

☛ A genus of ca. 400 species, cosmopolitan, especially tropical and temperate Asia and America; various species are used as ornamentals, for timber, or as a source of stimulants (contain alkaloids including caffeine and theobromine). *Ilex paraguariensis* A. St.-Hil. (YERBA MATÉ) is used as a tea in South America. Apparently the Roman use of holly for Saturnalia was taken over by Christians for Christmas. ☛ The fruits of *Ilex* species, while an important source of food for native birds, are considered somewhat poisonous due to the presence of saponins; they

cause vomiting, diarrhea, and stupor if eaten in quantity (Hardin & Arena 1974; Lampe & McCann 1985). (Ancient Latin name of the holly-oak, rather than of the holly)

1. Larger leaf blades on flowering branches spatulate, oblanceolate, or obovate, with long-tapering base, pubescent beneath along midrib; leaves deciduous \_\_\_\_\_ **I. decidua**
1. Larger leaf blades on flowering branches oblong-lanceolate or oblong-elliptic, abruptly narrowed or rounded-truncate basally, glabrous beneath; leaves evergreen \_\_\_\_\_ **I. vomitoria**

**Ilex decidua** Walter, (deciduous), DECIDUOUS HOLLY, POSSUMHAW, WINTERBERRY, BEARBERRY, HOLLY, MEADOW HOLLY, PRAIRIE HOLLY, WELK HOLLY. Petioles 2–11 mm long, leaf blades to 80 mm long and 45 mm wide; fruits bright red or orange, to ca. 7.5 mm in diam. Rock outcrops, ravines, and disturbed areas; se and e TX w to Bell, Dallas (Lundell 1961), and Grayson cos., also Comanche (Little 1976 [1977]), Parker (R. O'Kennon, pers. obs.), and Tarrant (Lundell 1961) cos.; also to Edwards Plateau. Mar–May. The persistent, red or orange fruits are often conspicuous during the winter on the otherwise bare branches. Fruits poisonous (Lampe & McCann 1985). ☠

**Ilex vomitoria** Sol. in Aiton, (emetic), YAUPON, YAUPON HOLLY, CASSINE, CASSENA, CASSIO-BERRY BUSH, CHOCOLATE DEL INDIO, EMETIC HOLLY, EVERGREEN CASSENA, EVERGREEN HOLLY, INDIAN BLACKDRINK, SOUTH-SEA-TEA. Petioles 1–3 mm long, leaf blades to 55 mm long and 28 mm wide; fruits bright red, to ca. 6.5 mm in diam. Commonly cultivated, low woods, sandy areas; Fannin Co. (Talbot property) in Red River drainage and Limestone Co., also Lamar Co. (Carr 1994), also naturalized in Dallas and Tarrant cos. (R. O'Kennon, pers. obs.); mainly se, e, and sc Texas. Mid-late Apr. This species is one of the most widely used evergreen landscape shrubs in nc TX. The leaves contain caffeine and were used by Native Americans to make a ceremonial drink (known as “black drink”); during religious festivals they drank large amounts of a strong preparation which caused vomiting—thus the specific epithet (Havard 1896; Alston & Schultes 1951; Correll & Johnston 1970; Cox & Leslie 1991). The authority for this species is often given as Aiton (Kartesz 1994; Jones et al. 1997). However, Hatch et al. (1990) gave Solander in Aiton. Stafleu and Cowen (1976) indicated the botanical descriptions in *Hortus Kewensis* were not made by the Aitons but instead by Solander, Dryander, and Robert Brown based on material from Kew (Stafleu & Cowen 1976). On this basis, authorities for a number of taxa may have to be reexamined. Fruits poisonous (Lampe & McCann 1985). ☠

*Ilex opaca* Aiton, (opaque, shaded), (AMERICAN HOLLY, WHITE HOLLY), occurs in se and e TX just to the e of nc TX. It has large (to 12 cm long and 6 cm wide), evergreen, coriaceous leaves that are usually conspicuously spinose-dentate (sometimes entire or nearly so) and painful to the touch. The species is valued for its strikingly white wood, used for veneer and decorative inlays (Tyril et al. 1994). Fruits poisonous (Lampe & McCann 1985). ☠

## ARALIACEAE GINSENG OR ARALIA FAMILY

☞ A medium-sized (1,325 species in 47 genera), mainly tropical family with a few in temperate regions. It contains trees, shrubs, lianas, woody epiphytes, or rarely herbs; leaves are often large and compound. The family includes a number of ornamentals (e.g., *Hedera*, *Schefflera*) as well as the economically important *Panax quinquefolius* L. (GINSENG), which supposedly acts as a stimulant and aphrodisiac. The Araliaceae are closely related to the Apiaceae and probably paraphyletic when treated separately. From a cladistic standpoint they should be lumped to form a more inclusive monophyletic family, which based on nomenclatural rules should be called Apiaceae (Judd et al. 1994). Family name from *Aralia*, a genus of 36+ species of North America, e Asia, and Malaysia; some are edible or used medicinally. *Aralia spinosa* L. (spiny), HERCULES'-CLUB, DEVIL'S-WALKINGSTICK, occurs in se and e TX just e of nc TX and would not be unexpected on the e margin of nc TX. It is a shrub or tree to 12 m or more tall, with alternate



*Trachelospermum jasminoides* [HEA]



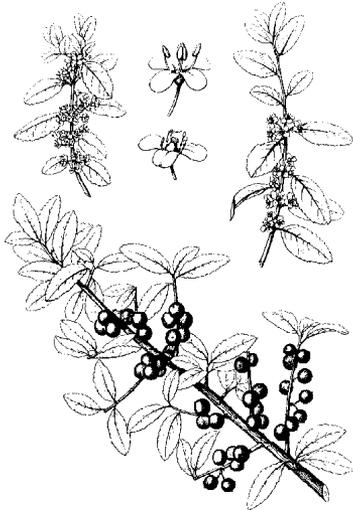
*Vinca major* [BEN]



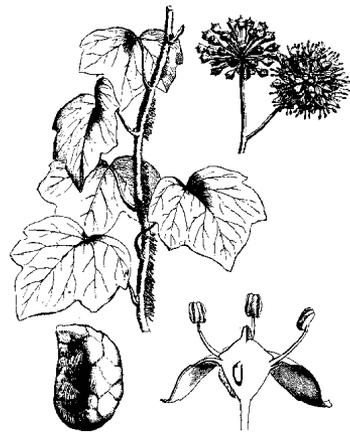
*Vinca minor* [ORA]



*Ilex decidua* [SA3]



*Ilex vomitoria* [SA3]



*Hedera helix* [BL1]

decompound leaves to 1(+) m long, coarsely prickly stems and petioles, umbels in a large, terminal, compound panicle, white petals, 2–3 mm long, and black berries 4–6 mm in diam. The leaves and fruits are reported as potentially poisonous (Hardin & Brownie 1993). ☠ (From the French-Canadian name, *aralie*) (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is an introduced, woody, evergreen vine with alternate leaves exhibiting leaf dimorphism—at least some leaves are 3–5 palmately lobed; flowers small in solitary or racemose umbels; fruit a small drupe. The similar Apiaceae (e.g., small flowers in umbels; inferior ovary) are herbaceous and have schizocarp fruits while Araliaceae are usually woody with drupes or berries.

REFERENCES: Smith 1944; Graham 1966; Eyde & Tseng 1971; Judd et al. 1994.

## HEDERA IVY

☞ A genus of 4–11 species of vines native to Europe, the Mediterranean region, and e Asia; thought to be related to *Schefflera* a widely used ornamental. (The ancient Latin name)

**Hedera helix** L., (Greek for a twining plant), ENGLISH-IVY. Woody, evergreen, trailing or high-climbing vine with 4–10-rayed stellate pubescence; leaves alternate, dimorphic, the adult and juvenile differently shaped, 3–5 palmately lobed or ovate to lanceolate, dark green, often with paler markings; flowers small, in terminal, solitary or racemose umbels; ovary inferior; fruit a small, black, 3–5-seeded berry 7–8 mm in diam. Widely cultivated ornamental that long persists around old homesites and occasionally spreads to adjacent vegetation, wooded areas; Grayson Co., also Tarrant Co. (R. O'Kennon, pers. obs.). Native of Europe, w Asia, and n Africa. This species can potentially damage trees by overtopping the foliage and stealing light, thus reducing the tree's photosynthetic output. There are numerous cultivars including variegated forms. The juvenile stems bear lobed leaves in a single plane while the adult flowering stems have unlobed leaves circling the stem (Graham 1966). The leaves and fruits contain the saponic glycoside, hederagenin, which if ingested can cause breathing difficulties and coma; the sap can cause dermatitis with blistering and inflammation—this is apparently due to polyacetylene compounds which are also present; gloves should be used when trimming the plant (Schmutz & Hamilton 1979; Spoerke & Smolinske 1990; Turner & Szczawinski 1991). ☠ 🌿

## ARISTOLOCHIACEAE PIPEVINE OR BIRTHWORT FAMILY

☞ A medium-sized family of ca. 600 species in 5 genera (Barringer & Whittemore 1997); it consists of herbs, shrubs, and lianas (= woody vines) and extends from the tropics to temperate areas, especially in the Americas; they are usually aromatic and contain alkaloids or aristolochic acid; a number are cultivated for their unusual flower shapes. Some taxonomists refer to the Aristolochiaceae as “paleoherbs” (a group including Aristolochiales, Piperales, and Nymphaeales) and believe them to be an early branch off the evolutionary line leading to monocots; this view is supported by characters such as the 3-merous flowers (Zomlefer 1994) and molecular data which place the paleoherbs as the immediate sister group of the monocots (Chase et al. (1993) (see Fig. 41 in Appendix 6). (subclass Magnolidae)

FAMILY RECOGNITION IN THE FIELD: herbs or woody vines with alternate, simple, palmately veined leaves often basally cordate to hastate or sagittate and apetalous flowers with a curved, *pipe-like*, 3-merous calyx; fruit a capsule.

REFERENCES: Gregory 1956; Huber 1993; Barringer & Whittemore 1997.

### ARISTOLOCHIA PIPEVINE, BIRTHWORT, TACOPATE

Herbs or woody vines; leaves alternate, simple; leaf blades entire, palmately veined, often cordate to hastate or sagittate at base; flowers in ours solitary in the leaf axils or in racemose inflo-

rescences from near the base of the plant, bisexual; calyces petaloid, curved, strikingly pipe-like in shape; corollas absent; stamens in ours 6; fruit a capsule.

☛ A genus of ca. 300 (Barringer 1997) species of vines, scramblers, or herbs of tropical and warm areas, especially the Americas; some flowers trap insects which then pollinate them; ☛ all species contain alkaloids or aristolochic acid (carcinogenic and nephrotoxic—McGuffin et al. 1997); some are used medicinally, in treating snakebites, or as an arrow poison. According to Crosswhite and Crosswhite (1985), “*Aristolochia* was the source of the active ingredient in ‘snakeroot oil’ sold by itinerant snakeroot doctors who staged medicine shows in the western United States in the Nineteenth Century.” The leaves of a number of species are eaten by larvae of pipe-vine swallowtail butterflies such as *Battus philenor*; the aristolochic acid thus obtained is sequestered and presumably makes them unpalatable to birds (Howe 1975; Barringer & Whittimore 1997). (Greek, *aristos*, best, and *lochia*, delivery, from supposed value in aiding childbirth; apparently derived through the ancient Doctrine of Signatures from the fancied resemblance of the flower bud to a fetus; the plants were used as a source of medicine to alleviate the pain of childbirth—Pfeifer 1966)

REFERENCES: Pfeifer 1966; Barringer 1997.

1. High-climbing, twining, woody vines to 25 m long; flowers from leaf axils on upper part of the stem; leaves large, 8–15(–20) cm wide; seeds ca. 10 mm long \_\_\_\_\_ **A. tomentosa**
1. Erect to sprawling herbs to 60 cm tall; flowers on peduncles borne mostly at the base of the stems; leaf blades ca. 7 cm or less wide; seeds 5 mm or less long.
  2. Leaves subsessile, conspicuously clasping; leaf blades subcoriaceous, prominently reticulate veined beneath, obtuse to subacute at apex; stems with conspicuous spreading hairs \_\_\_\_\_ **A. reticulata**
  2. Leaves with distinct petioles, not clasping; leaf blades thin, delicate, not prominently reticulate veined beneath, apically acuminate to acute; stems glabrous to with inconspicuous pubescence \_\_\_\_\_ **A. serpentaria**

***Aristolochia reticulata*** Jacq., (netted, in reference to the leaf venation), TEXAS DUTCHMAN’S-PIPE. Perennial herb; stems to ca. 40 cm tall, ± zigzag; leaves few, subsessile, the petioles only 0.1–0.8 cm long; leaf blades oblong to broadly ovate, 7–12 cm long and 3–7 cm wide; inflorescences racemose, several-flowered, arising from near base of plant (often covered by fallen leaves); perianth brownish purple; capsules subglobose, ca. 10–30 mm in diam. Wooded areas, sandy soils; Young Co. (Pfeifer 1966) on w edge of nc TX; mainly e TX. May–Jul. The dried rhizome has been sold as a serpentary (= treatment for snakebite); it is also used as a tonic; however, the active ingredient is aristolochic acid, a gastric irritant that in large doses can cause respiratory paralysis (Barringer 1997). ☛

***Aristolochia serpentaria*** L., (referring to medicinal use for snakebite), VIRGINIA DUTCHMAN’S-PIPE, VIRGINIA SNAKEROOT, NASH DUTCHMAN’S-PIPE. Perennial herb; stems to 60 cm tall; leaf blades quite variable, ovate to narrowly lanceolate, cordate to hastate, sagittate, or truncate at base, 5–15 cm long, 1–5 cm wide; petioles 0.5–3.5 cm long; flowers solitary, at the ends of scaly branches arising from the lowest nodes of the stem; perianth purplish brown; capsules subglobose, 8–20 mm in diam. Moist wooded areas; Fort Hood (Bell or Coryell cos.—Sanchez 1997), also mapped for e part of nc TX by Cheatham and Johnston (1995); also e TX and Edwards Plateau, and in s OK just n of the Red River. [*A. serpentaria* var. *hastata* (Nutt.) Duch.] Even though it has distinctive leaves, this is a small, easily overlooked plant of the forest floor. According to Barringer (1997), closed, apparently cleistogamous flowers are often present. Also, this species exhibits a great deal of variation in leaf shape; this variability is apparently related to the fact that eastern pipe-vine swallowtail butterflies use leaf shape as a search image when looking for *Aristolochia* leaves on which to lay their eggs (Barringer 1997). This species, which contains a number of physiologically active components including aristolochine and aristolochic acid,

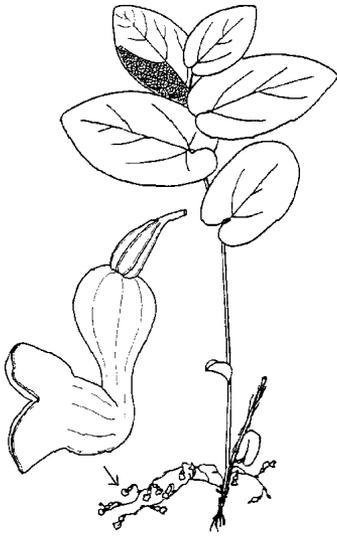
was long used by Native Americans and early settlers for a variety of medicinal applications including snakebite; it has been rather popular recently as an herbal medicine; however, it can irritate the gastrointestinal tract and kidneys, and potentially cause coma and death due to respiratory paralysis (Duke 1985; Cheatham & Johnston 1995); aristolochic acid is carcinogenic and nephrotoxic (McGuffin et al. 1997). ☘

***Aristolochia tomentosa*** Sims, (densely woolly, with matted hairs), WOOLLY DUTCHMAN'S-PIPE, PIPEVINE. Vine to 25 m long, densely pubescent except on old growth; leaf blades cordate, 3-ribbed from base; petioles 1-5.5(-9) cm long; flowers solitary (rarely paired), axillary; perianth green or yellowish green with brown or purplish stripes inside, with curved, funnellform tube abruptly inflated above the ovary, and flaring limb; stamens 6, united with style; anthers sessile; pistil 1; ovary appearing inferior (tightly enclosed by base of perianth tube); fruit a cylindrical capsule to 8 cm long and 3 cm in diam.; seeds flat, triangular. Thickets and woods, sandy or silty soils, frequent, but not often found in flower; Denton, Grayson, Hood, Somervell, Tarrant, and Wise cos., also Dallas Co. (Pfeifer 1966); se and e TX w to West Cross Timbers Apr. Presumably contains aristolochic acid. ☘

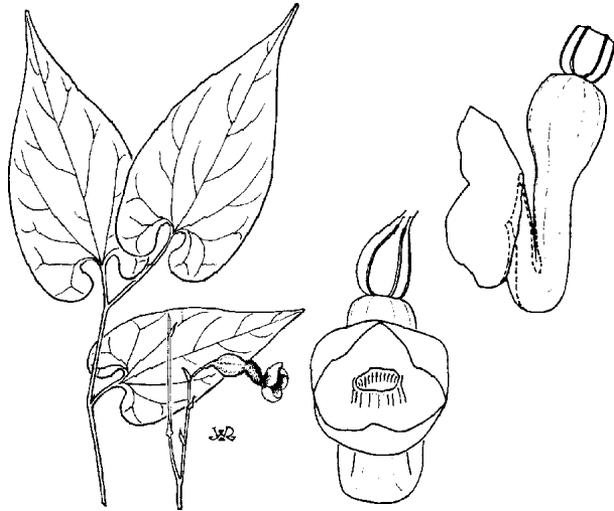
## ASCLEPIADACEAE MILKWEED FAMILY

Ours perennial herbs or twining vines, usually with milky juice; leaves usually opposite or whorled or alternate, simple, entire or undulate; flowers axillary or terminal, solitary, in umbels, or umbel-like racemes; calyces deeply 5-lobed; corollas deeply 5-lobed; crown (= corona) of various sorts (e.g., disk-like, inflated, flat, stamen-like—often called hoods; sometimes very conspicuous) present around base of the short stamen-tube; stamens 5, the filaments united (except in *Periploca*), the anthers large, united to form an anther head enclosing the two pistils (the combined column-like or disk-like structure made up of the stamens and pistils is called the gynostegium); anthers usually with a terminal outgrowth of the connective called an anther appendage and with lateral wing-like margins (= anther wings); anther wings from adjacent anthers are positioned close together and thus form a slit-like opening or groove between them (through which the legs or other appendages of pollinators can fit); pollen grains coherent in a mass (= pollinium) (except in *Periploca*); the 2 pollinia from adjacent anthers connected by a wishbone-shaped structure (= translator); clip-like portion (= corpusculum) of translator attaches the pair of pollinia to the pollinator's appendage as it is pulled out of the groove between adjacent anthers (pollinia from other flowers can enter the groove and thus be brought into contact with the enclosed stigmatic surfaces); pistils 2, united only by styles and/or stigmas; fruit of follicles; seeds numerous, usually comose.

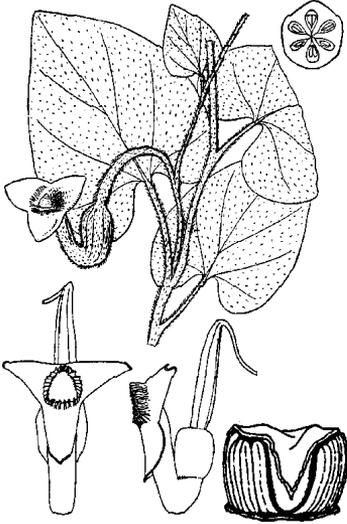
☘—A large (2,900 species in 315 genera), mainly tropical and warm area family with a few in temperate regions; it consists of herbs to shrubs, trees, vines, and cactus-like succulents; the family contains a number of ornamentals including *Hoya* (WAX PLANT) and *Stapelia* (CARRION-FLOWER—with flesh-like, foul-smelling flowers that attract carrion flies which serve as pollinators). ☘ There are laticifers throughout and the milky sap often contains alkaloids or other toxins such as glycosides; as a result they are avoided by most animals. However, members of the Danaidae (milkweed butterflies such as the monarch) as larvae feed primarily on members of the Asclepiadaceae and as a result are distasteful to predators (Howe 1975) due to the sequestered toxins. Asclepiadaceae typically have a specialized insect pollination mechanism in which the pollinia become attached to the legs of insects which have been guided into position by grooves or slits in the gynostegium (Macior 1965; Bookman 1981); some species have extremely unpleasant odors (carrion smells) and are pollinated by flesh-flies. The MILKWEEDS are closely related to the Apocynaceae and appear to represent a clade within that family (the relationship can be seen in the shared milky sap and pistils united only by styles and/or stigmas). From a cladistic standpoint the two families should be lumped to form a more inclusive mono-



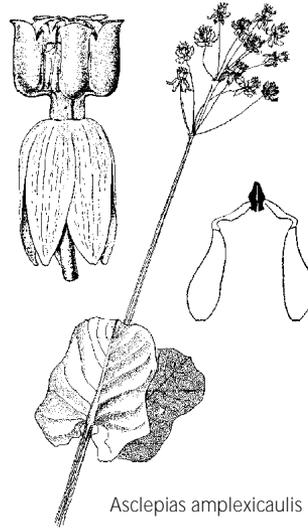
*Aristolochia reticulata* [AMB, ST2]



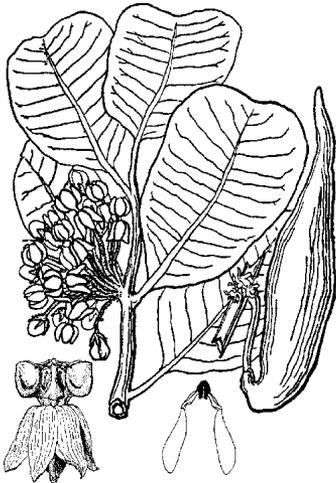
*Aristolochia serpentaria* [AMB, ST2]



*Aristolochia tomentosa* [AMB, BB2]



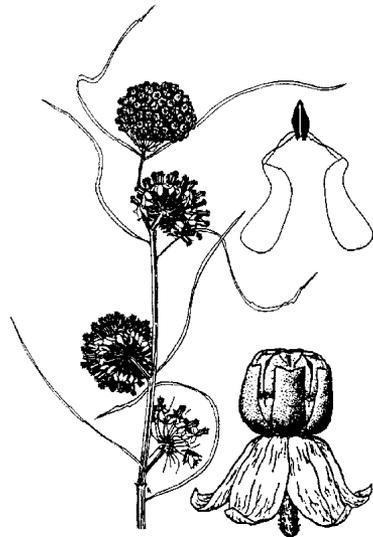
*Asclepias amplexicaulis* [AMB, BT3]



*Asclepias arenaria* [AMB, BB2]



*Asclepias asperula* subsp. *capricornu* [AMB, BT3]



*Asclepias engelmanniana* [AMB, SHI]

phyletic Apocynaceae (Judd et al. 1994); Liede (1997), for example, treated the family as subfamily Asclepiadoideae in the Apocynaceae. (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: herbs or vines usually with *milky sap* frequently opposite leaves, flowers with a distinctive *corona* and a *gynostegium* (= combined structure composed of stamens and pistil), and wind-dispersed seeds with a tuft of long silky hairs. Similar to Apocynaceae (e.g., herbs or vines with milky sap and often opposite leaves) but that family has flowers without corona or gynostegium.

REFERENCES: Woodson 1941; Shinnars 1964b; Bookman 1981; Hartman 1986; Rosatti 1989; Judd et al. 1994; Liede & Albers 1994; Liede 1997.

1. Central column of flower surrounded by 5 separate, fleshy-inflated or fleshy-thickened, erect or spreading stamen-like appendages (= hoods).
  2. Stems not twining, the plants erect to prostrate herbs; corollas without a fleshy disk at base under the separate appendages; corolla appendages usually with an internal horn or crest (horn or crest absent in a few species) \_\_\_\_\_ **Asclepias**
  2. Stems twining, at least towards the tip, the plants vines; corollas with a fleshy disk at base under the appendages; corolla appendages without internal horn or crest \_\_\_\_\_ **Funastrum**
1. Central column of flower or its base with 1 or 2 rows of flat thin appendages OR with a single, entire or lobed, fleshy disk or cup.
  3. Plants woody nearly throughout; leaf bases acute to broadly rounded; introduced species \_\_\_\_ **Periploca**
  3. Plants herbaceous or woody only in lower half; leaf bases cordate (in nc TX species); native species.
    4. Flowers brownish to purple to green; corolla lobes spreading or ascending, not erect; open flowers ca. 8–15 mm across; corolla appendages thin and flat, in 2 rows OR flower with a single, entire or lobed, fleshy disk or cup \_\_\_\_\_ **Mateleia**
    4. Flowers white to cream or greenish white; corolla lobes erect, the tips spreading; open flowers ca. 6–8 mm across; corolla appendages thin and flat, in 1 row \_\_\_\_\_ **Cynanchum**

### ASCLEPIAS MILKWEED, SILKWEED

Perennial herbs; stems erect to reclining; leaves alternate, opposite, or whorled, sessile or petioled; flowers in terminal or lateral umbels; corollas becoming reflexed or shallowly campanulate; hoods with or without an exerted appendage (= horn).

☛ A genus of 100 species of the Americas, especially the United States; some are cultivated as ornamentals; others have been used medicinally since early times. ☛ Many if not most species are poisonous; however, all species are distasteful to livestock and severe losses usually occur only when animals are forced to eat the plants. Abundant MILKWEEDS in a pasture are often a sign of severe overgrazing. The poisonous principles include resinoids, cardiac glycosides, and alkaloids; the milky latex can cause dermatitis in susceptible individuals (Kingsbury 1964; Lewis & Elvin-Lewis 1977; Turner & Szczawinski 1991). Monarch butterflies (*Danaus plexippus*) feed as larvae on *Asclepias* species and obtain cardiac glycosides which provide them with protection from bird predators; the butterflies are poisonous only if they fed on poisonous plants as larvae (Scott 1986). The long silky hairs on the seeds were formerly used in making candle wicks (Ajilvsgi 1984). (Named from Greek Asklepios, god of medicine, alluding to its medicinal properties)

REFERENCES: Woodson 1947, 1953, 1954, 1962; Edwards & Wyatt 1994.

1. Leaf blades linear or narrowly linear-lanceolate, 1–5 mm wide.
  2. Leaves mostly in whorls of 3 or 4 \_\_\_\_\_ **A. verticillata**
  2. Leaves opposite or alternate.
    3. Leaves drooping, usually 10–18 cm long; plants 0.6–1.2(–1.4) m tall; hoods without horns \_\_\_\_\_ **A. engelmanniana**

- 3. Leaves not drooping, 3–14 cm long; plants to 0.8 m tall; hoods with horns, the horns free for much of their length and longer than the hood bodies or adnate with hood bodies and visible as the middle lobe of the hoods.
- 4. Leaves opposite; rootstock of numerous thin segments ca. 1–2 mm thick; leaf blades 3–6(–9) cm long; horns free for much of their length and longer than the hood bodies \_\_\_\_\_ **A. linearis**
- 4. Leaves alternate; rootstock thickly tuberous (to ca. 15 mm thick); leaf blades usually 6–14(–18) cm long; horns adnate and visible as the middle lobe of the hoods \_\_\_\_\_ **A. stenophylla**
- 1. Leaf blades lanceolate to oblong-orbicular, mostly over 8 mm wide.
- 5. Leaves opposite.
- 6. Umbels terminating the stems or some in upper leaf axils, held erect.
- 7. Corollas greenish, tinged with rose or purple; umbels long-peduncled, the peduncle greatly exceeding the upper leaves; leaf apex obtuse to rounded, mucronate \_\_\_\_\_ **A. amplexicaulis**
- 7. Corollas white, white tinged with pink, or bright pink; peduncles various; leaf apex acuminate to broadly acute (rarely rounded).
- 8. Leaf blades 4–9 cm wide, broadly oval; corollas white, the lobes 4.5–8 mm long \_\_\_\_\_ **A. variegata**
- 8. Leaf blades 4 cm or less wide, oval, ovate-elliptic, narrowly oblong to linear-lanceolate; corollas white to bright pink, the lobes 3–4 mm long.
- 9. Corollas usually bright pink (rarely white); larger leaf blades often abruptly narrowed or truncate basally; stems stout, 0.4–1.5(–2.5) m tall; inflorescences usually paired at upper nodes \_\_\_\_\_ **A. incarnata**
- 9. Corollas white, sometimes tinted with pale pink; larger leaf blades gradually or abruptly narrowed basally; stems slender, 0.3–0.6 m tall; inflorescences solitary at upper nodes.
- 10. Follicles pendulous; seeds naked, without a coma; leaf blades narrowly lanceolate to lanceolate, to 15(–20) mm wide; mostly in low swampy areas in se and e TX, in nc TX known only from Dallas Co. \_\_\_\_\_ **A. perennis**
- 10. Follicles erect on erect pedicels; seeds with a coma of hairs to ca. 20 mm long; leaf blades lanceolate to broadly ovate, to 35 mm wide; mostly in rocky shaded areas in c TX; in nc TX known only from s margin of area \_\_\_\_\_ **A. texana**
- 6. Umbels lateral, in leaf axils (but often in upper axils), held in a horizontal or oblique manner.
- 11. Calyx lobes, pedicels, and sometimes even stems and lower surface of leaf blades conspicuously and ± densely white tomentulose \_\_\_\_\_ **A. arenaria**
- 11. Calyx lobes, pedicels, and sometimes even stems and lower surface of leaf blades glabrate to puberulent, but not white tomentulose.
- 12. Pedicels 15–25 mm long; leaves petiolate, the petioles 5–25 mm long; corolla lobes 8–14 mm long; hoods with horns \_\_\_\_\_ **A. oenotheroides**
- 12. Pedicels 5–15(–20) mm long; leaves sessile or petioles to about 5(–7) mm long; corolla lobes 6–7 mm long; hoods without horns \_\_\_\_\_ **A. viridiflora**
- 5. Leaves, except lowest, alternate.
- 13. Stems pilose; corollas yellow, orange, or red; hoods with horns; plants without milky latex \_\_\_\_\_ **A. tuberosa**
- 13. Stems glabrous or short pubescent; corollas green to white; hoods without horns; plants with milky latex; (previously segregated as genus *Asclepiodora*).
- 14. Corolla lobes 7–12 mm long; leaf blades 1–3 cm wide, narrowly oblong- or ovate-lanceolate, the apex narrowly acuminate; anther head much wider than tall \_\_\_\_\_ **A. asperula**
- 14. Corolla lobes 13–17 mm long; leaf blades 1.5–6 cm wide, broadly oblong to ovate, the apex usually obtuse to acute; anther head ca. as wide as tall \_\_\_\_\_ **A. viridis**

**Asclepias amplexicaulis** Sm., (clasping the stem), BLUNT-LEAF MILKWEED. Plant glabrous; stems erect, (20–)40–80(–100) cm tall; upper leaves sessile, clasping; leaf blades ovate to elliptic-ob-

long, 4–12 cm long, 1.8–8 cm wide, apically obtuse to rounded and often mucronate; corolla lobes greenish, tinged with rose or purple; gynostegium pale purple or rose; hoods with horns. Sandy open woods, roadsides, and old fields; Dallas, Grayson, and Tarrant cos., also Lamar Co. (Carr 1994); se and e TX w to East Cross Timbers. May.

***Asclepias arenaria*** Torr., (of sand), SAND MILKWEED. Stems solitary, 20–50(–80+) cm tall, pubescent; leaf blades ca. 5–10 cm long, 3–8 cm wide; petioles usually 10–18 mm long; corolla lobes pale green, 7.5–11 mm long; gynostegium white to cream; hoods with horns. Sandy soils, roadsides; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly w 1/2 of TX and s part of the state. Jun–Sep.

***Asclepias asperula*** (Decne.) Woodson subsp. ***capricornu*** (Woodson) Woodson, (sp.: rough; subsp.: like a goat's horn), ANTELOPE-HORNS, TRAILING MILKWEED. Stems partly decumbent or low-spreading, 10–60 cm long, minutely pubescent or largely glabrous; petioles 2–7 mm long; corolla lobes pale yellowish green, sometimes purple-tinged; gynostegium greenish cream to dark purple; hoods widespreading, without horns. Rocky or sandy prairies; Blackland Prairie w to Rolling Plains and Edwards Plateau. Apr–Jun, sporadically through summer, fall. [*A. asperula* (Decne.) Woodson var. *decumbens* (Nutt.) Shinnery, *A. capricornu* Woodson, *Asclepiodora decumbens* (Nutt.) A. Gray] The common name ANTELOPE-HORNS is said to come from the curved fruits (Kirkpatrick 1992). Reportedly poisonous to livestock (Hartman 1986). ☣ ☒ /79

***Asclepias engelmanniana*** Woodson, (for George Engelmann, 1809–1884, German-born botanist and physician of St. Louis), ENGELMANN'S MILKWEED. Stems (30–)60–120(–140) cm tall, glabrous or nearly so; leaf blades sessile, linear, usually 10–20 cm long, 1–3(–5) mm wide; corolla lobes pale green, purple-tinged; gynostegium yellowish; hoods without horns. Sandy or rocky ground; Brown, Collin, Cooke, Jack, and Tarrant cos., also Hamilton (HPC), Palo Pinto, Somervell (Woodson 1954) cos.; w 2/3 of TX. May–Sep.

***Asclepias incarnata*** L., (flesh-colored), SWAMP MILKWEED. Stems erect, usually (40–)70–150(–250) cm tall; leaf blades linear-lanceolate to lanceolate or ovate-elliptic, (3–)5–15 cm long, to ca. 4 cm wide; petioles 3–10(–17) mm long; corolla lobes bright pink (rarely white); gynostegium pale pink (rarely white); hoods with horns. Wet ground. May–Oct.

1. Plants glabrous or nearly so \_\_\_\_\_ subsp. ***incarnata***  
 1. Plants pubescent \_\_\_\_\_ subsp. ***pulchra***

subsp. ***incarnata***. Dallas Co. (found by Reverchon at Buzzards Spring, not seen recently), also Hood Co. (Woodson 1954); nc TX w through much of w 1/2 of TX.

subsp. ***pulchra*** (Ehrh. ex Willd.) Woodson, (handsome). Indicated by Woodson (1954) to be introduced in nc TX (mapped apparently as Tarrant Co.). [*A. incarnata* L. var. *pulchra* (Ehrh. ex Willd.) Pers.]

***Asclepias linearis*** Scheele, (narrow, with sides nearly parallel), SLIM MILKWEED. Stems erect, usually 20–50 cm tall, glabrous or inconspicuously pubescent; leaves sessile or subsessile; leaf blades linear, 1–4 mm wide; umbels axillary on upper part of stem; corolla lobes greenish white (rarely brownish or purplish); gynostegium white; hoods with horns. Dry prairies; collected at Buzzards Spring, Dallas, in October 1902 by Reverchon (Mahler 1988), also Milam Co. (Woodson 1954); endemic to TX from coast n to Dallas Co. May–Oct. 🐞

***Asclepias oenotheroides*** Cham. & Schltld., (resembling *Oenothera*—evening primrose), SIDE-CLUSTER MILKWEED, HIERBA DE ZIZOTES. Stems erect or spreading, 10–45 cm long, minutely scabrous-pubescent; leaf blades oblong-lanceolate to elliptic, 2.5–12 cm long, 1.5–6 cm wide; petioles 5–25 mm long; corolla lobes greenish white to yellow, gynostegium pale greenish cream; hoods with horns. Sandy or gravelly ground, especially disturbed places; Clay, McLennan,



*Asclepias incarnata* subsp. *incarnata* [AMB, COR]

*Asclepias incarnata* subsp. *pulchra* [BB2]



*Asclepias linearis* [AMB, HEA]



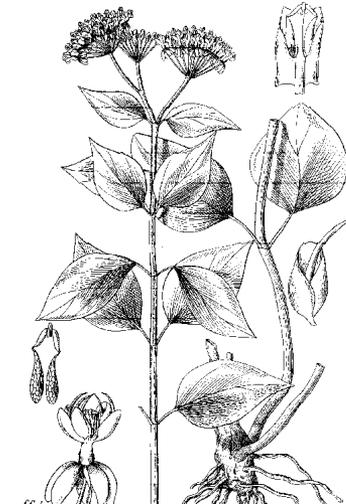
*Asclepias oenotheroides* [AMB, HEA]



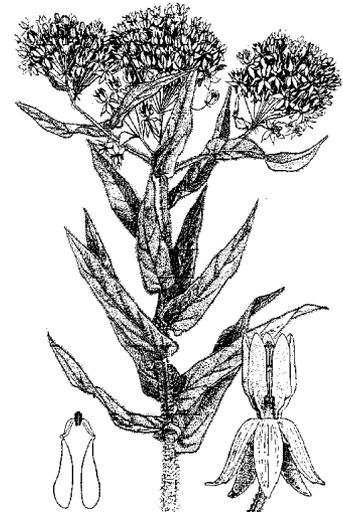
*Asclepias perennis* [AMB, CO1]



*Asclepias stenophylla* [AMB, BB2]



*Asclepias texana* [FMC]



*Asclepias tuberosa* subsp. *interior* [AMB, BT3]

Somervell, Tarrant, and Wise cos., also Brown, Comanche, Hamilton (HPC), Bell, and Dallas (Woodson 1954) cos.; mainly the w 2/3 of TX. May–Oct.

***Asclepias perennis*** Walter, (perennial), SHORE MILKWEED, THIN-LEAF MILKWEED. Stems erect, 30–50 cm tall; plant glabrous except for upper stem, peduncles, and pedicels; leaf blades narrowly to broadly lanceolate, 5–14 cm long, to 15(–20) mm wide; petioles to 15 mm long; corolla lobes white, usually suffused with pale pink or lavender; gynostegium white; hoods with horns; seeds ca. 15 mm long. Damp woods, swampy areas; collected by Reverchon at Dallas, not found there recently (Mahler 1988); mainly se and e TX. Jun–Jul. According to Woodson (1954), the pendulous follicles and large naked seeds may be adaptations to dispersal by water. Woodson (1954) indicated that he could not distinguish this species from *A. texana* except by the strikingly different fruit and seed, and the geographical distribution.

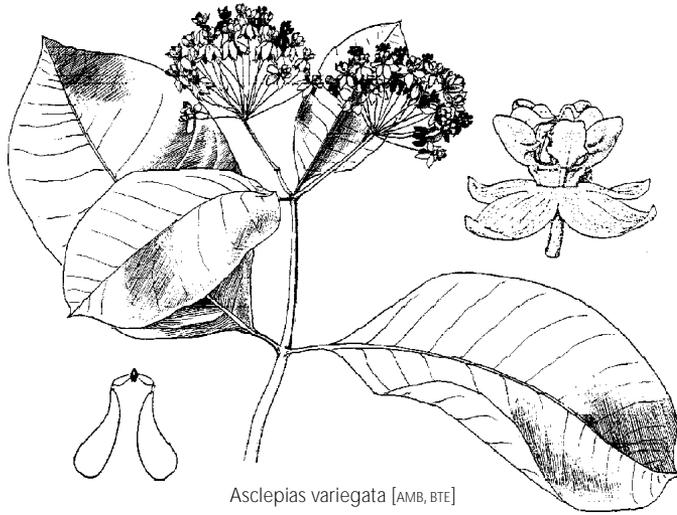
***Asclepias stenophylla*** A. Gray, (narrow-leaved), SLIM-LEAF MILKWEED, NARROW-LEAF MILKWEED. Plant superficially resembling *A. verticillata*, densely pubescent above, with larger corollas; stems erect, 20–80(–100) cm tall, minutely puberulent to glabrate; leaves sessile; leaf blades usually 6–14(–18) cm long; corolla lobes pale greenish cream or yellow, ca. 6 mm long; gynostegium pale greenish cream or white; hoods 3–4 mm long, with horns. Prairies or open ground; Cooke, Grayson, and McLennan cos., also Henderson and Tarrant cos. (Woodson 1954); se and e TX w to nc TX, also Edwards Plateau. Jun–Aug.

***Asclepias texana*** A. Heller, (of Texas), TEXAS MILKWEED. Stems erect, to ca. 50 cm tall, with inconspicuous pubescence in lines; leaf blades lanceolate to broadly ovate, 20–70 cm long, to 35 mm wide; inflorescences solitary at the uppermost nodes; flowers showy; corolla lobes white, ca. 3 mm long; gynostegium white; hoods with horns; follicles erect, 9–12 cm long; seeds ca. 8 mm long, with a white coma to ca. 20 mm long. Rocky shaded areas; Burnet Co. on the very s margin of nc TX (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.), also Travis Co. just s of nc TX; mainly Edwards Plateau and Trans-Pecos. Jun–Aug.

***Asclepias tuberosa*** L. subsp. **interior** Woodson, (sp.: tuberous; subsp.: presumably referring to its range in the interior of the North American continent), BUTTERFLY-WEED, BUTTERFLY MILKWEED, ORANGE MILKWEED, CHIGGER-FLOWER, CHIGGERWEED, PLEURISY-ROOT. Plant without milky latex; stems spreading to erect, to 90 cm long, pilose; leaves many, crowded, oblong-lanceolate, usually 3–12 cm long, to 23(–30) mm wide, ± sessile and clasping or petioles to 5 mm long; corolla lobes usually orange (rarely yellowish or reddish); gynostegium usually orange, occasionally yellowish; hoods with horns. Sandy open woods or occasionally silty clay prairies; throughout TX, more in e 2/3 of the state. May–Jul. [*A. tuberosa* L. subsp. *terminalis* Woodson] Reportedly poisonous to livestock (Hartman 1986). ☣ 🌱/79

***Asclepias variegata*** L., (variegated, irregularly colored), WHITE-FLOWER MILKWEED. Plant glabrous except for upper stem, peduncles, and pedicels; stems erect, (20–)30–120 cm tall; leaf blades oblong-lanceolate to suborbicular, 5–15 cm long, 4–9 cm wide; petioles 10–20 mm long; corolla lobes white; gynostegium white except for purplish column; hoods with short horns. Sandy woods; found by Reverchon at Dallas, not seen there recently (Mahler 1988); mainly e TX. Apr–Jun. 🌱/79

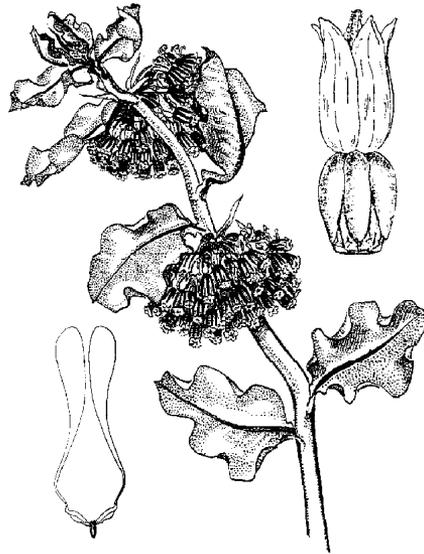
***Asclepias verticillata*** L., (whorled), WHORLED MILKWEED, EASTERN WHORLED MILKWEED. Stems erect, usually 30–90 cm tall, puberulent in lines; leaves mostly in whorls; leaves sessile or nearly so; leaf blades filiform to linear, (1.5–)3–8 cm long, 0.5–2(–3) mm wide, often revolute; corolla lobes greenish white, sometimes with a hint of purple, ca. 3.5 mm long; gynostegium greenish white; hoods ca. 1.5 mm long, with horns. Sandy open woods, rocky slopes, or prairies; se and e TX w to West Cross Timbers and Edwards Plateau, also Trans-Pecos. May–Jul, sporadically later. Reported to be poisonous to livestock (Hartman 1986). ☣



*Asclepias variegata* [AMB, BTE]



*Asclepias verticillata* [REE]



*Asclepias viridiflora* [AMB, BT3]



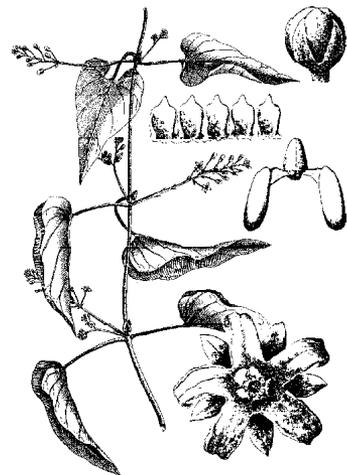
*Asclepias viridis* [AMB, STE]



*Cynanchum barbigerum* [HEA]



*Cynanchum laeve* [BB2]



*Cynanchum racemosum* var. *unifarium* [JAC, TOR]

**Asclepias viridiflora** Raf., (green-flowered), GREEN-FLOWER MILKWEED, GREEN ANTELOPE-HORNS, WAND MILKWEED. Stems erect, usually 20–80(–100) cm tall, glabrous or densely and finely pubescent; leaves sessile or petioles to about 5(–7) mm long; leaf blades quite variable, from narrowly lanceolate to oblong-obovate or suborbicular, 4–13(–14) cm long, 1–5(–6) cm wide; corolla lobes and gynostegium pale green; hoods without horns. Sandy or calcareous areas, gravelly open ground, or prairies; throughout TX. Jun–Aug. [*A. viridiflora* Raf. var. *lanceolata* Torr.] ☒/79

**Asclepias viridis** Walter, (green), GREEN MILKWEED, ANTELOPE-HORNS. Plant glabrous or upper stem and young leaves minutely pubescent; stems low-spreading to suberect, usually 25–60 cm long; leaf blades broadly oblong to ovate, 4–13 cm long, 1.5–6 cm wide; petioles 3–10 mm long; corolla lobes pale green; gynostegium pale purplish rose; hoods wide-spreading, without horns. Prairies, ditch banks, pastures, and disturbed ground; se and e TX w to West Cross Timbers and Edwards Plateau. Apr–Jun, sporadically in summer and fall. [*Asclepiodora viridis* (Walter) A. Gray] Probably the most common milkweed in nc TX; sometimes extremely abundant in overgrazed pastures.

### CYNANCHUM SWALLOW-WORT

Twining vines to 3 m or more long; leaves opposite, petioled, basally cordate; inflorescences axillary; follicles lanceolate in outline, smooth.

☛ A genus of 200 species of tropical and warm areas of the world. (Greek: *cyon*, dog, and *anchein*, to strangle; an ancient name for some plant supposedly poisonous to dogs)

REFERENCE: Sundell 1981.

1. Leaf blades < 10(–12) mm wide, with broadly rounded base, not cordate; petioles usually 1–4(–8) mm long; rare on s edge of nc TX \_\_\_\_\_ **C. barbigerum**
1. Leaf blades 10–70 mm wide, cordate at base; petioles to 50(–90) mm long; widespread in nc TX.
  2. Petals ca. 6–7 mm long; peduncle mostly shorter than petiole of subtending leaf; corolla appendages nearly as long as the corolla, deeply divided into linear segments \_\_\_\_\_ **C. laeve**
  2. Petals ca. 3.5 mm long; peduncle about as long as or longer than petiole of subtending leaf; corolla appendages < 2/3 as long as the corolla, broadly oblong with toothed or lobed summit \_\_\_\_\_ **C. racemosum**

**Cynanchum barbigerum** (Scheele) Shinnars, (bearded, presumably in reference to the densely long pilose inner surfaces of the corolla lobes), BEARDED SWALLOW-WORT, THICKET THREADVINE. Leaf blades linear to linear-oblong or elliptic-lanceolate, to 5 cm long, usually shorter; flowers white or creamy white, in umbellate clusters of 5 or fewer; corollas 3.6–5.2 mm long; corolla lobes strongly recurved above middle; follicles to 5 cm long. In open rocky areas and on herbs and shrubs; Burnet Co. (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.) on s margin of nc TX s to s TX and w to Trans-Pecos. May–Jul. [*Metastelma barbigerum* Scheele]

**Cynanchum laeve** (Michx.) Pers., (smooth), BLUEVINE, SANDVINE, SMOOTH SWALLOW-WORT, SMOOTH ANGLEPOD. Leaf blades triangular-lanceolate to deltoid; petioles to 45(–90) mm long; flowers white, in peduncled umbellate clusters or abbreviated racemes; follicles to 15 cm long. Low moist woods or fields; Cooke, Collin, Dallas, Grayson, Hill, Hood, Palo Pinto, and Tarrant cos., also Brown Co. (HPC); in much of the e 1/2 of TX. Aug–Sep.

**Cynanchum racemosum** (Jacq.) Jacq. var. **unifarium** (Scheele) Sundell, (sp.: with flowers in racemes; var.: of a single rank or series), TALAYOTE. Leaf blades broadly ovate to ovate-lanceolate or triangular-lanceolate with stipule-like small leaves from leaf axils; petioles to 50 mm long; flowers cream or greenish white, in racemes; follicles to 10 cm long. Sandy forests and thickets; Palo Pinto and Tarrant (Fort Worth Nature Center) cos.; also Parker Co. (R. O'Kennon, pers. obs.); also Edwards Plateau, s TX, and Trans-Pecos. May–Oct. [*C. unifarium* (Scheele) Woodson]

**FUNASTRUM** TWINEVINE

Twining vines; leaves opposite, petioled, with cordate bases; inflorescences of peduncled, umbellate clusters in leaf axils; follicles smooth, fusiform, not angled.

☛The species here treated in *Funastrum* have traditionally been placed in *Sarcostemma* (e.g., Correll & Johnston 1970; Kartesz 1994; Jones et al. 1997), a genus in the broad sense of ca. 40 species of leafy or leafless vines with photosynthetically active stems (Liede 1996); it is native to tropical and warm areas of the world. Based on a cladistic analysis, Liede (1996) argued convincingly that *Sarcostemma* be restricted to Old World taxa, while the ca. 15 species in the New World be recognized in *Funastrum*; the similar floral structures of the 2 groups are interpreted as parallel evolution. We are following Liede (1996) and J. Kartesz (pers. comm. 1997) in recognizing *Funastrum*. (Greek: *funis*, rope, presumably in reference to the vine habit)

REFERENCES: Holm 1950; Jones & Jones 1991; Liede 1996.

1. Leaf margins distinctly crisped or ruffled; corollas brownish green or bronze; calyx lobes mostly > 3 times as long as wide \_\_\_\_\_ **F. crispum**
1. Leaf margins neither crisped nor ruffled; corollas white to pale lavender or pinkish; calyx lobes mostly < 3 times as long as wide \_\_\_\_\_ **F. cynanchoides**

**Funastrum crispum** (Benth.) Schltr., (crisped, curled), WAVY-LEAF TWINEVINE, WAVY-LEAF MILKWEEDVINE. Glabrous, low-climbing or tangle-forming vine; leaf blades narrowly triangular and elongate to linear, acuminate, blue-green, with ruffled, occasionally purple-tinged margin; calyx lobes 3–6 mm long, narrowly lanceolate; follicles to 12 cm long. In gravelly or silty limestone soils; Dallas (*Reverchon* in “light soil, West Dallas”), McLennan, and Palo Pinto cos., also Callahan, Dallas (Holm 1950), Johnson, Parker, and Tarrant (R. O’Kennon, pers. obs.) cos.; nc TX s and w to Trans-Pecos. May–Aug. [*Sarcostemma crispum* Benth.] ☒/90

**Funastrum cynanchoides** (Decne.) Schltr., (resembling *Cynanchum*—swallow-wort), CLIMBING-MILKWEED, TWINEVINE, WHITE TWINEVINE. Glabrous to sparsely puberulent twining to trailing vine; leaves broadly to narrowly ovate-lanceolate to triangular-lanceolate, acute to acuminate, foliage with noticeably very unpleasant odor; calyx lobes 2–3 mm long, ovate to ovate-linear; follicles to 7 cm long. Sandy or rocky soils, waste places; Grayson and Lamar cos., also Archer, Brown, Young (Holm 1950), and Tarrant (R. O’Kennon, pers. obs.) cos.; mainly w 1/2 of TX. Apr–Sep. [*Sarcostemma cynanchoides* Decne.] ☒/90

**MATELEA** MILKVINE, ANGLEPOD

Plants variously pubescent or pilose, often with burned-rubber odor; stems trailing to suberect, or twining and climbing; leaves opposite, short- to rather long-petioled; leaf blades ovate to oblong-ovate, with cordate base; flowers axillary; corollas rotate; follicles smooth or with spine-like tubercles, angled or not.

☛A genus of 180 species native to tropical and temperate regions of the New World. (Derivation of generic name not explained by original author)

REFERENCES: Shinnars 1950b; Correll 1965.

1. Flowers in peduncled, axillary, several- or many-flowered umbels or umbel-like racemes; stems twining or climbing; leaf blades to 17 cm long, typically > 6 cm.
2. Corollas greenish brown to brownish purple, without a network of fine veins on the upper surface, the lobes linear-oblong or linear-lanceolate; fruits smooth OR with sharp, spike-like tubercles.
3. Plants without glandular puberulence; sepals glabrous or ciliate only at apex; peduncle of inflorescence ca. the same length as pedicels; fruits smooth; widespread in nc TX \_\_\_\_\_ **M. gonocarpos**

3. Plants minutely glandular-puberulent; sepals pubescent; peduncle of inflorescence much longer than pedicels; fruits with sharp, spine-like tubercles; e margin of nc TX \_\_\_\_\_ **M. decipiens**
2. Corollas green, with a network of fine veins on at least part of the upper surface, the lobes ovate-lanceolate or elliptic; fruits with sharp spine-like tubercles.
4. Upper surface of corollas densely puberulent; only distal part of upper surface of corolla lobes with network of fine veins (with dark green parallel veins below middle); stems and leaves with only sparse short pubescence of curved or appressed hairs; leaves without a strong bad odor; crown (= corona of flower) with 5 short, distinct, rounded, spreading appendages; peduncles to 12 mm long, shorter than the subtending petiole; in nc TX known only from Dallas Co. \_\_\_\_\_ **M. edwardsensis**
4. Upper surface of corollas glabrous; entire upper surface of corollas with network of fine veins; stems and leaves with both long spreading hairs and short glandular hairs; leaves with a strong bad odor; crown without 5 distinct appendages; peduncles usually as long as or longer than the subtending petiole; scattered in nc TX \_\_\_\_\_ **M. reticulata**
1. Flowers mostly in 2s, with pedicels attached directly in leaf axils; stems trailing to suberect, not twining; leaf blades 5(–6.5) cm or less long, often much less.
5. Pedicels shorter than adjacent petioles; corolla lobes 4–7 mm long, dark red-brown or purple brown \_\_\_\_\_ **M. biflora**
5. Pedicels when fully expanded longer than adjacent petioles; corolla lobes 2–4 mm long, dark greenish brown \_\_\_\_\_ **M. cynanchoides**

**Matelea biflora** (Raf.) Woodson, (two-flowered), TWO-FLOWER MILKVINE. Plant usually trailing; stems 10–40 cm long. Praires or open ground, usually limestone areas; Blackland Prairie w to Rolling Plains, also Edwards Plateau. Apr–Jun, occasionally in fall. 📍/98

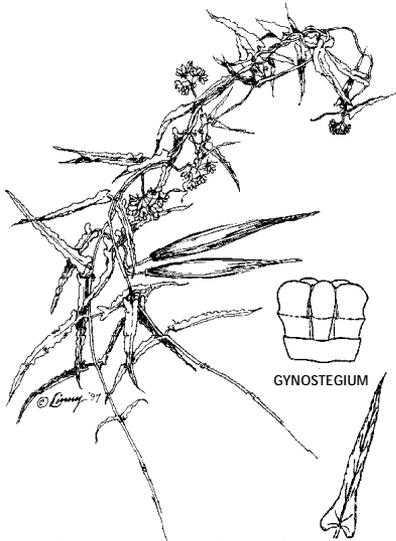
**Matelea cynanchoides** (Engelm.) Woodson, (resembling *Cynanchum*—swallow-wort), MILKVINE. Plant with odor like that of burned rubber, usually ascending to suberect; stems 15–50 cm long. Loose sandy soils, open oak woods; Montague, Navarro, Parker, Tarrant, and Young cos.; se and e TX w to Edwards Plateau and Rolling Plains. Apr–Aug.

**Matelea decipiens** (Alexander) Woodson, (deceptive, not obvious), CLIMBING-MILKWEED. Plant climbing on other plants, with spreading pubescence (hairs 1–2 mm long) and minute glandular puberulence; petioles ca. equal in length to inflorescences; flowers 5–25 per inflorescence; calyx lobes with short pubescence; corollas brownish purple; corolla lobes to 15 mm long; fruits somewhat angled. Sandy soils, wooded areas; Grayson and Henderson cos., also Lamar Co. (Carr 1994); mainly se and e TX. Apr–Jun. [*Gonolobus decipiens* (Alexander) L.M. Perry] A revision currently in progress may separate this species into the genus *Gonolobus*

**Matelea edwardsensis** Correll, (of the Edwards Plateau), PLATEAU MILKVINE. Plant climbing on other plants; leaf blades to 7.5 cm long and 7 cm wide; petioles to 6 cm long; pedicels to ca. 10 mm long; calyx pubescence short; calyx lobes ca. 3 mm long; corolla lobes ca. 8 mm long and 4 mm wide; fruits ca. 9–10 cm long. On limestone, open woods; Dallas Co. (Cedar Hill State Park—collected by Paul Baldon), also Fort Hood (Bell or Coryell cos.—Sanchez 1997); otherwise known only from a few counties on the Edwards Plateau; endemic to TX. Apr–May. 📍 📍/98

**Matelea gonocarpos** (Walter) Shinnars, (angled-fruit), ANGLEPOD. Plant high-climbing, with spreading pubescence (hairs ca. 1 mm long); leaf blades large, thin; petioles longer than inflorescences; flowers 2–12 per inflorescence; corollas greenish brown to brownish purple; corolla lobes to ca. 14 mm long; fruits smooth, sharply angled. Stream bottom woods; se and e TX w to East Cross Timbers and Lampasas Cut Plain. May–Jun. [*Gonolobus gonocarpu*(Walter) L.M. Perry] A revision currently in progress may separate this species into the genus *Gonolobus*

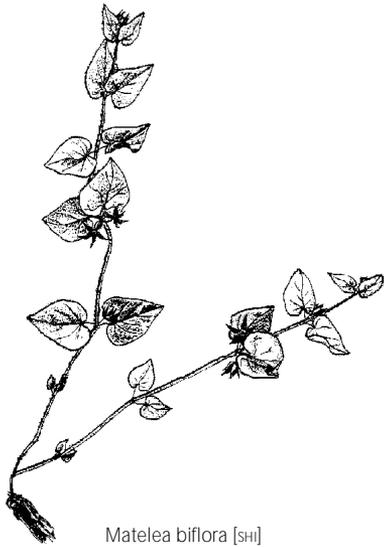
**Matelea reticulata** (Engelm. ex A. Gray) Woodson, (netted) NET-VEIN MILKVINE, GREEN MILK-



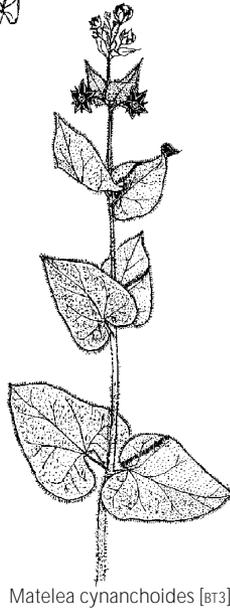
*Funastrum crispum* [AMB, HEA]



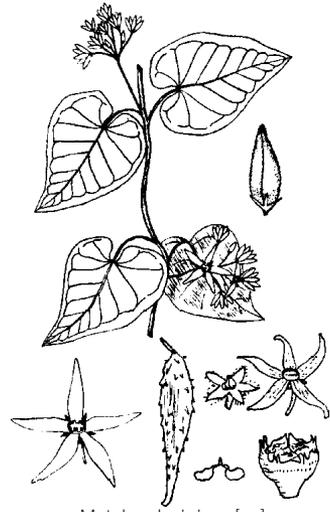
*Funastrum cynanchoides* [AMB, HEA]



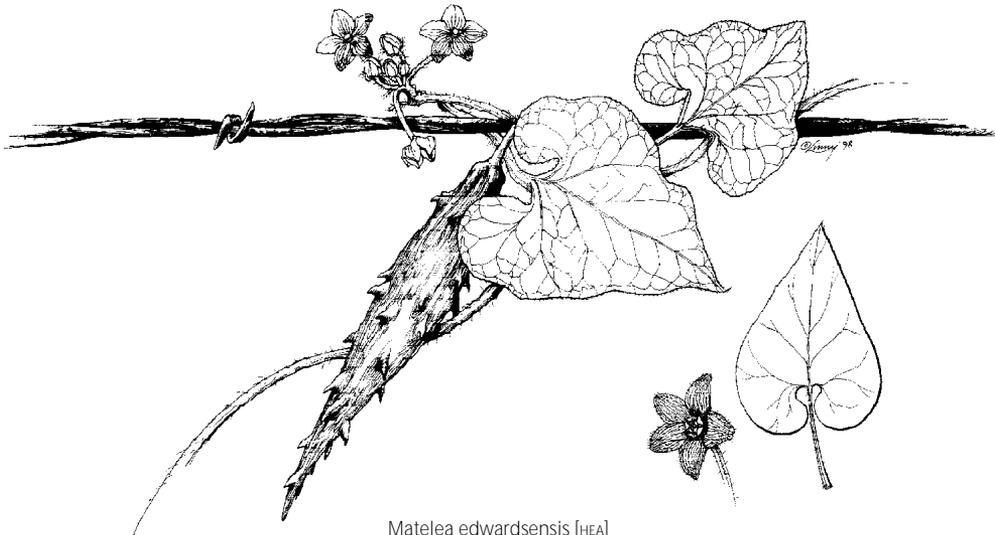
*Matelea biflora* [SHI]



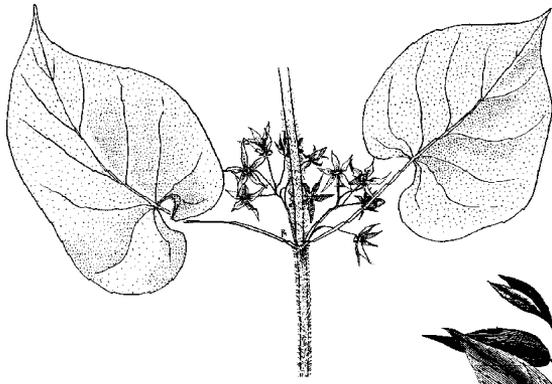
*Matelea cynanchoides* [BT3]



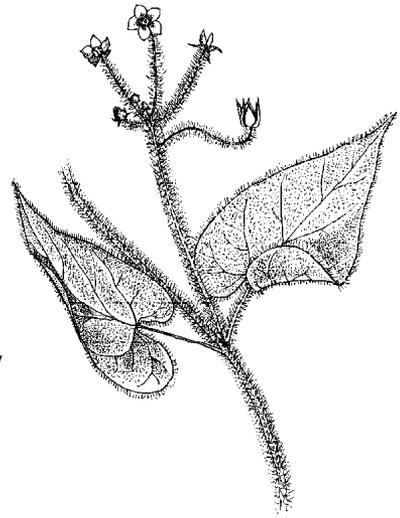
*Matelea decipiens* [STE]



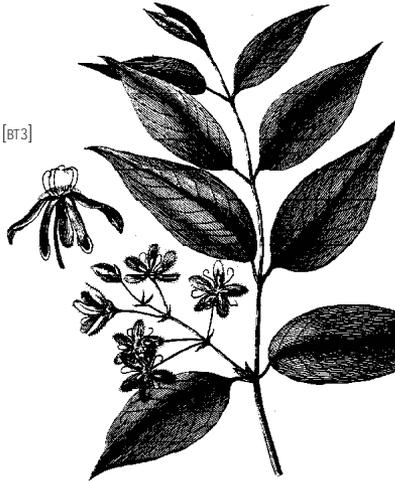
*Matelea edwardsensis* [HEA]



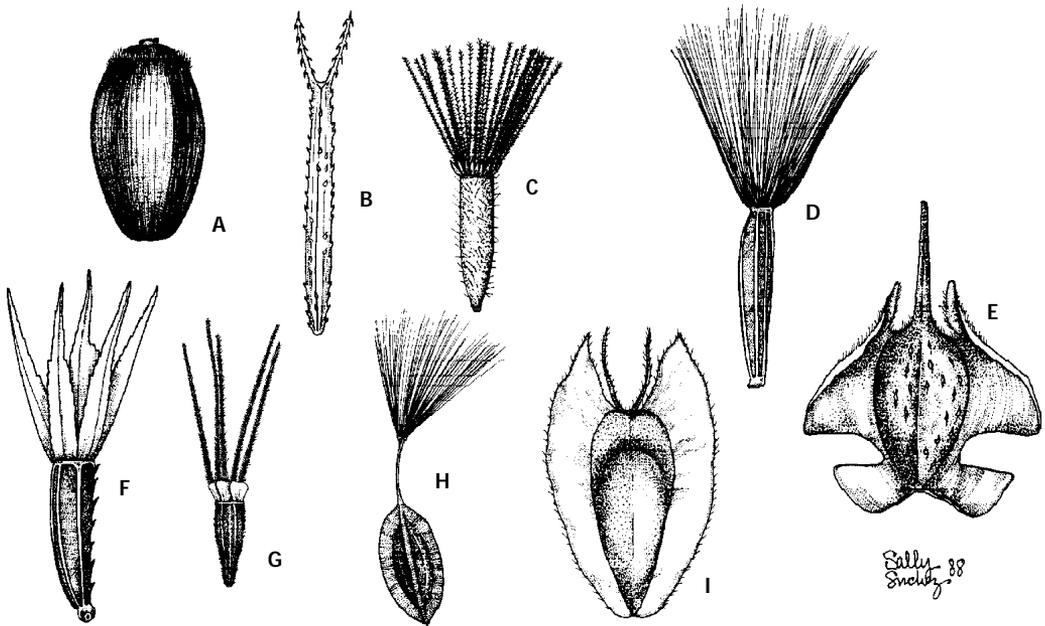
*Matelea gonocarpa* [B73]



*Matelea reticulata* [B73]



*Periploca graeca* [LAM]



**ASTERACEAE FRUIT TYPES.** **A:** Without pappus (e.g., *Helianthus* sp.); **B:** With pappus of 2, barbed awns (e.g., *Bidens* sp.); **C:** With dimorphic pappus: Inner long and outer short bristles (as in *Heterotheca* sp.); **D:** Ribbed with nearly uniform pappus bristles (e.g., *Eupatorium* sp.); **E:** Winged, with spinescent style (e.g., *Soliva* sp.); **F:** Ribbed, with pappus of 5 awn-like scales (e.g., *Ageratum* sp.); **G:** With dimorphic pappus: bristles alternating with scales (e.g., *Krigia* sp.); **H:** With pappus bristles at the tip of the beak (e.g., *Lactuca*); **I:** Winged with pappus of 2 awns (e.g., *Verbesina* sp.). [GAN]

WEEDVINE. Plant climbing on other plants, with long, spreading pubescence (hairs 1-2 mm long) and minute glandular pubescence; petioles to 5.5 cm long; peduncle ca. as long as or exceeding subtending petiole; inflorescences few-flowered; calyx pubescence long, the hairs ca. as long as calyx lobes are wide; calyx lobes 3-4 mm long; corollas 10-15 mm across; fruits to 15 cm long. Thickets on rocky hillsides; Bell, Burnet, Palo Pinto, and Parker cos., also Brown, Comanche, Eastland (HPC), and Johnson (R. O'Kennon, pers. obs.) cos.; also c, s, and w TX. May. ☞/98

### PERIPLOCA SILKVINE

☞ A genus of 11 species native to the Mediterranean region, e Asia, and tropical Africa; some are cultivated as ornamentals; others are used medicinally. *Periploca* is a member of the Periplocoideae, a less specialized subfamily, in contrast to the rest of the members of the family in North Central Texas which are in the Asclepiadoideae. (Greek: *peri*, around and *ploke*, twining, alluding to the climbing habit of some species)

REFERENCE: Venter & Verhoeven 1997.

**Periploca graeca** L., (of Greece), SILKVINE. Twining woody vine to 5 m long; leaves opposite, entire, petiolate; flowers in long pedunculate terminal cymes; corollas brown-purple, rotate, deeply lobed, densely villous in lines; corona a ring of 5 broad lobes, each alternating with a filiform apically cleft lobe 5-10 mm tall; filaments distinct; follicles linear, smooth, not angled. Cultivated and escapes; Dallas Co.; in TX apparently only known from the Blackland Prairie. May. Introduced from se Europe and w Asia. ☞

## ASTERACEAE (COMPOSITAE) SUNFLOWER OR DAISY FAMILY

Annual or perennial herbs or more rarely shrubs; leaves basal, alternate, opposite, or whorled, simple or compound, entire, toothed, or lobed, not stipulate (but small basal lobes sometimes resemble stipules); inflorescence a single involucre head, or several or many involucre heads in corymbs, racemes, or panicles, each head simulating a single flower; involucre of one or more rows of separate or united bracts (termed phyllaries to avoid confusion with bracts on peduncles) imitating sepals; flowers (= florets) without typical calyx, but commonly with modified calyx of hairs, scales, or teeth (= pappus) on summit of the inferior ovary; corollas of two basic types: disk, mainly tubular (varying from thread-like to tubular-funnelform or campanulate with cylindrical basal tube), with 4 or 5 equal or unequal teeth or lobes; and ray, with small basal tube and broad, strap-shaped main portion (= ligule); stamens none or 5, attached inside the corolla tube; anthers separate or united into a ring; pistil 1; style 1, commonly with 2 branches; ovary inferior; fruit an achene (see various types on facing page).

☞ The Asteraceae is one of the two largest families of flowering plants (Orchidaceae is the other), containing ca. 21,000-25,000 species (22,750 species in 1,528 genera—Mabberley 1997). It is a cosmopolitan family of mainly herbs to shrubs and is of significant economic importance as a source of food plants (e.g., *Lactuca*—LETTUCE, *Cynara scolymus* L.—ARTICHOKE), oil (e.g., *Helianthus*—SUNFLOWER and *Carthamus*—SAFFLOWER), and numerous ornamentals (e.g., *Aster*, *Bidens*, *Cosmos*, *Dahlia*, *Helianthus*, *Tagetes*—MARIGOLD). Many are weeds including *Taraxacum* species (DANDELIONS) and *Cirsium* species (THISTLES); ☞ in some parts of the world poisonous species of *Senecio* are a major cause of livestock poisoning; wind-pollinated genera such as *Ambrosia* (RAGWEED), *Iva* (SUMPWEED), and *Artemisia* (SAGEBRUSH), which produce large quantities of allergenic pollen, are important causes of hay fever (Lewis et al. 1983). Cronquist (1981) suggested that the evolutionary success of the family may be in part due to a diversified chemical defense system, including polyacetylenes and sesquiterpene lactones. The 351 species

of Asteraceae found in OK make it the largest family in that state (Taylor & Taylor 1994) and the 620 species (almost 13% of the TX flora) in TX likewise make it the largest TX family (Hatch et al. 1990). The Asteraceae is also the largest family in the nc TX flora; the 263 species represent nearly 12% of the 2,223 species known in nc TX. (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: usually herbs or rarely shrubs with a characteristic inflorescence: flowers in a compact *head* subtended by bracts (= phyllaries)—the inflorescence resembling a single flower (the heads are often grouped together to form compound inflorescences); corollas sympetalous, 5-merous; stamens united by their anthers; fruit a 1-seeded achene of ten topped by a *pappus* of hairs, scales, or teeth.

REFERENCES: Rydberg 1914–1927; Sharp 1935; Solbrig 1963; Vuilleumier 1969a, 1973; Moore & Frankton 1974; Carlquist 1976; Cronquist 1977, 1980, 1985; Gandhi & Thomas 1989; Scott 1990; Jansen et al. 1991, 1992; Bremer 1994; Nesom 1994a; Taylor 1997; Arriagada & Miller 1997.

## KEYS TO GENERA OF ASTERACEAE

Modified from *Keys to the Asteraceae of Oklahoma* (Taylor 1997) contributed by

**CONSTANCE E.S. TAYLOR (DUR)**

### ARTIFICIAL KEY TO THE GENERA OF ASTERACEAE

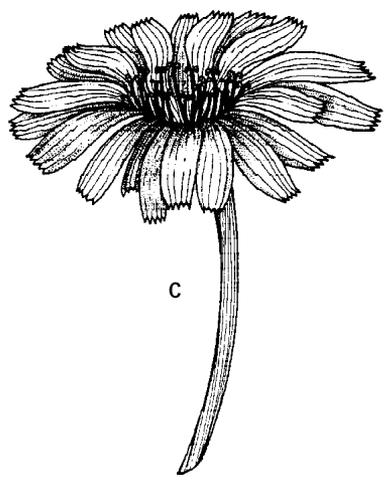
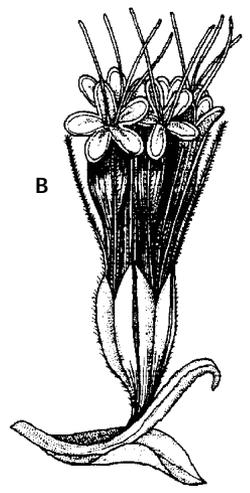
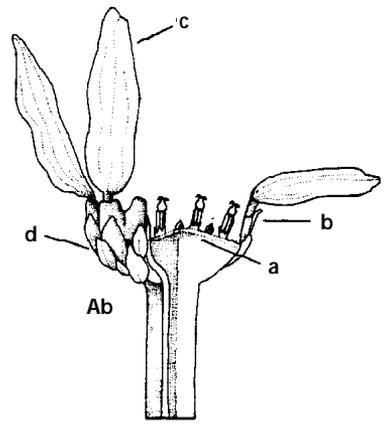
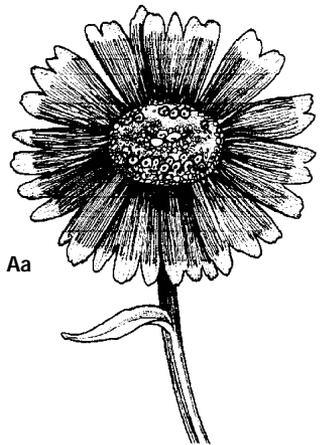
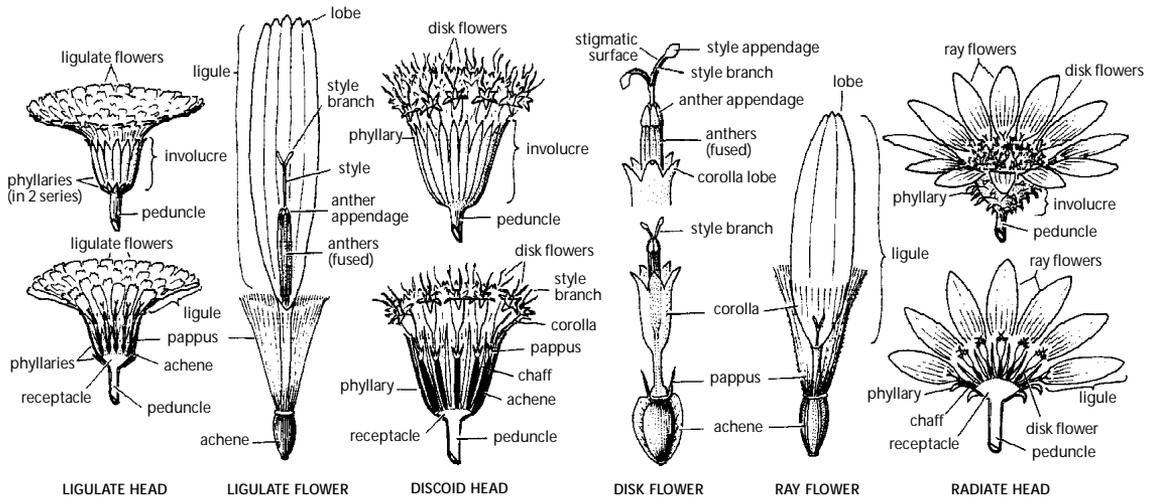
(For Technical Key to Tribes of Asteraceae see page 298)

1. Heads with only ray flowers (with strap-shaped ligules), these all perfect: plant sap usually milky \_\_\_\_\_ Use Key to **Lactuceae Tribe** (page 306)
1. Heads with disk flowers (with tubular eligulate corollas): ray flowers present or absent at the margins of the heads, these pistillate or neutral; plant sap usually watery.
  2. Heads with ray flowers, the ligules evident.
    3. Rays yellow to orange, sometimes with reddish-brown, rusty-brown, or maroon at base.
      4. Receptacle chaffy, a bract associated with each flower, or with bristles. \_\_\_\_\_ **Key 1**
      4. Receptacle naked \_\_\_\_\_ **Key 2**
    3. Rays white, or pink, or lavender, or blue, or reddish purple.
      5. Pappus of capillary bristles \_\_\_\_\_ **Key 3**
      5. Pappus of awns, scales, scaly bristles, a minute crown, or absent. \_\_\_\_\_ **Key 4**
  2. Heads with only disk flowers or apparently so (ray flowers sometimes present with corollas inconspicuous or reduced to a ring or absent).
    6. Phyllaries with either hooked or straight spines or tubercles OR large teeth at edges, sometimes united into a bur; leaves frequently also spiny; receptacle chaffy or bristly (COCKLEBURS, RAGWEEDS, THISTLES) \_\_\_\_\_ **Key 5**
    6. Phyllaries without hooked or straight spines or tubercles or large teeth, not united into a bur; leaves not spiny; receptacle various.
      7. Disk flowers pink, blue, purple, green, white, or yellowish cream \_\_\_\_\_ **Key 6**
      7. Disk flowers yellow, reddish brown, rusty-brown, or maroon \_\_\_\_\_ **Key 7**

**Key 1. Ray and disk flowers both present; ray flowers yellow to orange, sometimes with reddish brown or rusty-brown or maroon marks; receptacle chaffy.**

1. Receptacle chaff bristly; pappus of awned scales, the awns ca. as long as the scale bodies \_\_\_\_\_ **Gaillardia**
1. Receptacle chaff of bracts, associated with each flower; pappus various.
  2. Disk flowers sterile; ray flowers only fertile and maturing achenes, these much larger than those of the sterile disk flowers.
  3. Ray achenes thick, rounded or weakly compressed, without wings; leaf blades usually ± palmately 3–5-lobed \_\_\_\_\_ **Smallanthus**

GENERAL CHARACTERISTICS OF THE ASTERACEAE (COMPOSITAE) FAMILY [JEP]



Sally Bruch 88

ASTERACEAE HEAD TYPES. **Aa**: Radiate head (e.g., *Gallardia*); **Ab**: Vertical section through radiate head; **a**: Receptacle; **b**: Disk flowers; **c**: Ray flowers; **d**: Phyllaries; **B**: Discoid head (e.g., *Eupatorium*); **C**: Ligulate head (e.g., *Cichorium*). [GAN]

- 3. Ray achenes strongly flattened, with or without wings; leaf blades pinnately lobed or unlobed.
  - 4. Achenes broadly winged.
    - 5. Ray flowers usually 5, in 1 row; phyllaries 8 to 10 in 2 rows, the outer row distinctly narrower; disks less than 1.5 cm wide; plants taprooted annuals up to 0.3(-0.65) m tall \_\_\_\_\_ **Lindheimera**
    - 5. Ray flowers numerous, in 2 to 3 rows; phyllaries numerous, in several rows, ± similar except for size; disks (1.5-)2-3 cm wide; plants coarse perennials up to 2(-3) m tall \_\_\_\_\_ **Silphium**
  - 4. Achenes not winged.
    - 6. Ray flowers with back of corolla having green, red, or maroon veins; leaves crenate, serrate, dentate, or lyrate-pinnatifid (in one species rare in nc TX), variously pubescent but not hispid; pappus none \_\_\_\_\_ **Berlandiera**
    - 6. Ray flowers with back of corolla entirely yellow, without colored veins; leaves deeply pinnatifid, densely hispid; pappus of a few scales \_\_\_\_\_ **Engelmannia**
- 2. Disk flowers fertile; ray flowers fertile or neutral.
  - 7. Receptacle columnar.
    - 8. Leaves opposite at base, may be alternate or opposite on upper stem.
      - 9. Plants creeping and rooting at the nodes, the flowering branches ascending; leaves neither connate-perfoliate nor pinnatifid; phyllaries linear, subequal; disks 4-9 mm wide \_\_\_\_\_ **Acmella**
      - 9. Plants ± erect or ascending, not creeping, not rooting at the nodes; leaves either connate-perfoliate or pinnatifid; outer phyllaries ovate, foliaceous, much larger than inner phyllaries; disks > 10 mm wide \_\_\_\_\_ **Tetragonotheca**
    - 8. Leaves all alternate.
      - 10. Leaves simple, the blades entire or toothed.
        - 11. Leaves clasping; achenes terete \_\_\_\_\_ **Dracopis**
        - 11. Leaves not clasping; achenes 4-angled \_\_\_\_\_ **Rudbeckia**
      - 10. Leaves pinnately compound or deeply lobed \_\_\_\_\_ **Ratibida**
  - 7. Receptacle flat, or convex, or very low conic.
    - 12. Leaf bases decurrent; middle and lower stems winged \_\_\_\_\_ **Verbesina**
    - 12. Leaf bases not decurrent; stems not winged.
      - 13. Phyllaries dimorphic, the inner longer and enclosing the head; the outer smaller, less conspicuous; achenes flattened parallel to the phyllaries (or rarely 4-angled in *Bidens*).
        - 14. Inner phyllaries united for up to 1/2 their length; disk corolla lobes often linear \_\_\_\_\_ **Thelesperma**
        - 14. Phyllaries all separate or nearly so; disk corolla lobes triangular to ovate.
          - 15. Pappus of 2(-4) rigid, retrorsely barbed awns \_\_\_\_\_ **Bidens**
          - 15. Pappus of 2(-4) awns or teeth which are inconspicuously barbed or not barbed OR pappus absent.
            - 16. Inner phyllaries spreading at anthesis; achenes not winged and disk corollas yellow \_\_\_\_\_ **Bidens**
            - 16. Inner phyllaries tightly enclosing heads; achenes winged and all corollas yellow OR if achenes not winged, then disk corollas reddish brown \_\_\_\_\_ **Coreopsis**
  - 13. Phyllaries all similar, imbricate, or slightly unequal, but not dimorphic in 2 rows; achenes various.
    - 17. Leaves, including upper ones, mostly opposite.
      - 18. Leaves linear, 10-30 mm long, to only ca. 2 mm wide; plants erect, 8-22 cm tall \_\_\_\_\_ **Zinnia**

- 18. Leaves larger, usually much so; plants either decumbent OR much greater than 22 cm tall.
  - 19. Plants decumbent, slender, 5–30 cm tall; ray flowers 3–8, with corollas 4 mm or less long; mainly a lawn weed \_\_\_\_\_ **Calyptocarpus**
  - 19. Plants erect, coarse; much taller than 30 cm; ray flowers usually 8–numerous, with corollas more than 4 mm long, usually much more; widespread in native habitats.
    - 20. Achenes not winged; ray flowers neutral, without styles and stigmas; widespread in nc TX \_\_\_\_\_ **Helianthus**
    - 20. Achenes winged or with wing-like margins; ray flowers pistillate (fertile or infertile), with styles present; s and w parts of nc TX.
    - 21. Leaves with distinct petioles; petioles with conspicuous auricles basally; pappus of 2 short awns, usually absent on mature achenes plants; plants perennial herbs \_\_\_\_\_ **Simsia**
    - 21. Leaves sessile; auricles lacking; pappus of 2 or 3 short awns subtended by short, hyaline scales; plants small shrubs \_\_\_\_\_ **Wedelia**
- 17. Upper leaves alternate.
  - 22. Achenes winged; petioles auriculate dilated at base OR not so \_\_\_\_\_ **Verbesina**
  - 22. Achenes not winged; petioles not auriculate.
    - 23. Ray flowers neutral, without styles and stigmas; pappus of 2 awns, these stout and early deciduous; squamellae lacking; widespread in nc TX \_\_\_\_\_ **Helianthus**
    - 23. Ray flowers pistillate (but infertile), with styles present; pappus of 2 slender and persistent awns and 4 squamellae; s half of nc TX \_\_\_\_\_ **Viguiera**

**Key 2. Ray and disk flowers both present; ray flowers yellow, sometimes with reddish brown, rusty-brown or maroon; receptacle naked.**

- 1. Pappus of disk flowers of capillary bristles.
  - 2. Phyllaries in 1 series, equal in length, with very minute outer bracts sometimes present at the base.
    - 3. Stem leaves deeply toothed or pinnately lobed or compound, the upper not clasping or but weakly so; plants annuals or perennials \_\_\_\_\_ **Packera**
    - 3. Stem leaves shallowly toothed to subentire, conspicuously clasping; plants annuals \_\_\_\_\_ **Senecio**
  - 2. Phyllaries of unequal lengths; imbricate in 2 or more rows.
    - 4. Pappus of disk flowers double, the inner of capillary bristles, the outer of shorter (0.3–1.0 mm) stout bristles or scales.
      - 5. Receptacle with a chaff of long subulate, persistent scales; phyllaries spiny-tipped, white margined; lower and basal leaves often pinnately lobed, sometimes deeply so \_\_\_\_\_ **Xanthisma**
      - 5. Receptacle naked; phyllaries not as above; leaves entire to toothed to shallowly lobed.
        - 6. Lower stem leaves often grass-like in appearance, with "parallel" veins; basal leaves usually much longer than stem leaves; stems and leaves with long, silvery white, silky pubescence; in nc TX known only from Tarrant Co., mainly se and e TX \_\_\_\_\_ **Pityopsis**
        - 6. Lower stem leaves not as above; basal leaves various; stem and leaf pubescence various; widespread in nc TX.
    - 7. Upper and middle stem leaves little or not narrowed at base, slightly to strongly clasping; annual or perennial from taproot.
      - 8. Upper leaves clasping, ovate; leaf blades scabrous above, hispid-pilose beneath; achenes of ray flowers without a pappus \_\_\_\_\_ **Heterotheca**
      - 8. Upper leaves slightly clasping, oblanceolate; leaf blades hairy to nearly smooth

- on both sides; achenes of ray flowers with a pappus of bristles and sometimes small scales \_\_\_\_\_ **Chrysopsis**
7. Upper and middle stem leaves tapered to slender petiole-like bases; perennial from woody crown \_\_\_\_\_ **Heterotheca**
4. Pappus of all flowers a single row (but sometimes some can be unequal in length).
9. Disk flowers with pappus bristles 1 or 2; leaves linear, entire \_\_\_\_\_ **Chrysopsis**
9. Disk flowers with pappus bristles several to numerous; leaves various.
10. Leaves pinnatifid or bipinnatifid \_\_\_\_\_ **Machaeranthera**
10. Leaves simple, nearly entire to prominently toothed.
11. Heads (excluding ligules of ray flowers) 2 cm or more broad; leaves spiny-toothed \_\_\_\_\_ **Grindelia**
11. Heads (excluding ligules of ray flowers) < 2 cm broad; leaves spiny-toothed OR in most species not spiny-toothed.
12. Heads relatively large, hemispheric or broadly conic, wider than tall; stems glandular-pubescent, from a taproot.
13. Upper leaves conspicuously toothed; phyllaries without scarious margins \_\_\_\_\_ **Rayjacksonia**
13. Upper leaves entire or nearly so (but can be bristly-ciliate); phyllaries with a darker line in the middle and scarious margins \_\_\_\_\_ **Croptilon**
12. Heads small, cylindrical, taller than wide; stems without glandular hairs, from a fibrous root system.
14. Plants with glandular-punctate dots, these especially obvious on the leaves; inflorescences corymbiform (= flat-topped) \_\_\_\_\_ **Euthamia**
14. Plants without glandular-punctate dots (except in 1 species with a panicle); inflorescences paniculate, or axillary, or if corymbiform then not gland-dotted \_\_\_\_\_ **Solidago**
1. Pappus of disk flowers of awns, scales, scaly bristles, a crown, or absent or nearly so.
15. Phyllaries and generally also the leaves conspicuously gland-dotted.
16. Leaves linear, 1–2 mm wide, glandular-punctate marginally; pappus of 0–4 short scales forming a low crown 0.5–1(–2) mm long; phyllaries in 1 series \_\_\_\_\_ **Pectis**
16. Leaves linear, 2–6 mm wide, with coarse teeth marginally OR leaves pinnately divided into 5–15 linear lobes; pappus of 10–12 awned or awnless scales, often longer than 2 mm; phyllaries in 2 series.
17. Leaves with coarse teeth, but not pinnately divided into linear lobes \_\_\_\_\_ **Dysodiopsis**
17. Leaves pinnately divided into 5–15 linear lobes \_\_\_\_\_ **Thymophylla**
15. Phyllaries and leaves without conspicuous glandular dots (but may be minutely punctate-dotted).
18. Phyllaries reflexed at anthesis or curled back; stems winged OR not so.
19. Leaf blades decurrent; stems winged \_\_\_\_\_ **Helenium**
19. Leaf blades not decurrent on stem; stems not winged.
20. Leaves toothed, broader than linear, much > 2 mm wide; phyllaries curled back even in bud, gummy \_\_\_\_\_ **Grindelia**
20. Leaves or leaf segments linear to thread-like, usually < 2 mm wide, entire; phyllaries reflexed at anthesis, not gummy \_\_\_\_\_ **Helenium**
18. Phyllaries erect at anthesis; stems not winged.
21. Stem leaves present, oblanceolate to ovate, much broader than filiform to linear.
22. Leaves sessile, entire; stems and leaf margins with long, wide-spreading, cottony hairs; growing on sandy or rocky open ground \_\_\_\_\_ **Amblyolepis**
22. Leaves petiolate, with large serrations/small lobes; stems and leaf margins gla-

brous or with minute pubescence; growing in crevices on limestone bluffs

\_\_\_\_\_ **Perityle**

21. Stem leaves or their segments filiform to linear OR stem leaves absent.

23. Leaves simple and entire, essentially all cauline; phyllaries resinous shiny, glabrous, in several series \_\_\_\_\_ **Gutierrezia**

23. Leaves simple and entire OR with 1–5 short lobes OR with 3–15 long, linear-filiform divisions, at least some of the leaves frequently forming basal rosettes; phyllaries dull, typically pubescent, usually in 1 series.

24. Leaves pinnatifid with 3–15 long, linear-filiform divisions; outer phyllaries united near their noticeably thickened bases \_\_\_\_\_ **Hymenoxys**

24. Leaves simple, entire, or with 1–5 short lobes; phyllaries all separate, not thickened \_\_\_\_\_ **Tetraneuris**

**Key 3. Ray and disk flowers both present; ray flowers white, pink, lavender, blue, or reddish purple; pappus of capillary bristles.**

1. Ray flowers inconspicuous, barely exceeding the phyllaries \_\_\_\_\_ **Conyza**

1. Ray flowers conspicuous, twice or more length of phyllaries.

2. Leaves basal; heads solitary at end of a scape; corollas of disk flowers bilaterally symmetrical, cream-colored, maturing to crimson \_\_\_\_\_ **Chaptalia**

2. Leaves cauline; heads numerous at ends of branches; corollas of disk flowers radially symmetrical, yellow, or sometimes becoming pink with age.

3. Ray flowers more than 50, with corollas less than 1 mm wide; pappus of ray flowers sparse or absent \_\_\_\_\_ **Erigeron**

3. Ray flowers less than 50, with corollas more than 1 mm wide; pappus of ray flowers of capillary bristles.

4. Capillary bristles barbellate; plants scapose; flowers solitary \_\_\_\_\_ **Townsendia**

4. Capillary bristles smooth; plants caulescent; flowers various.

5. Leaves, particularly those in upper half of plant, scale-like; plants less than 15(–20) cm tall \_\_\_\_\_ **Chaetopappa**

5. Leaves larger, not scale-like, even the upper reduced leaves not scale-like OR if leaves reduced and the plant almost leafless (in *Chloracantha*), then plants much greater than 20 cm tall; plants more than 20 cm tall.

6. Plants almost leafless, rush-like, the leaves if present usually minute; thorns often present in upper leaf axils; stems green and glaucous, photosynthetic, alive for up to ca. 4 growing seasons \_\_\_\_\_ **Chloracantha**

6. Plants with leaves small to well-developed; thorns absent; stems not as above \_\_\_\_\_ **Aster**

**Key 4. Ray and disk flowers both present; ray flowers white, pink, lavender, or reddish purple; pappus of awns, scales, scaly bristles, a minute crown, or absent.**

1. Receptacle chaffy, the bracts associated with each flower.

2. Only ray flowers maturing achenes, these much larger than those of the sterile disk flowers.

3. Corollas of ray flowers white or yellow, the ligules 7–20(–30) mm long; ray achenes thick, rounded or weakly compressed; leaves opposite or alternate.

4. Corollas of ray flowers white; leaf blades entire to pinnately lobed; phyllaries in several series; the inner completely clasping the achenes \_\_\_\_\_ **Melampodium**

4. Corollas of ray flowers yellow; leaf blades usually ± palmately 3–5-lobed; phyllaries in 1–2 series, subtending, not clasping the achenes \_\_\_\_\_ **Smallanthus**

3. Corollas of ray flowers white, the ligules minute, < 1 mm long; ray achenes strongly flattened, without wings, persistent on mature achenes; leaves alternate \_\_\_\_\_ **Parthenium**

2. Ray and disk flowers both maturing achenes.

5. Ray flowers with inconspicuous corollas 3 mm or less long; leaves opposite \_\_\_\_\_ **Eclipta**
5. Ray flowers with corollas 5 mm or more long, often much longer, these usually very conspicuous; leaves alternate.
6. Stems not winged; receptacle chaff stiff, sharp, longer than disk flowers; leaves mostly basal, the stem leaves much reduced upward; heads borne on long, naked, unbranched peduncles \_\_\_\_\_ **Echinacea**
6. Stems winged; receptacle chaff soft, hidden by disk flowers; leaves mostly cauline; little reduced upward; heads on short leafy peduncles \_\_\_\_\_ **Verbesina**
1. Receptacle naked.
7. Pappus a short crown or none.
8. Ray flowers with ligules ca. 2 mm or less long; disk flowers white to pinkish \_\_\_\_\_ **Achillea**
8. Ray flowers with ligules much longer than 2 mm; disk flowers various colors.
9. Leaves bipinnately dissected \_\_\_\_\_ **Anthemis**
9. Leaves entire or toothed or lobed.
10. Leaves toothed to lobed; plants rhizomatous perennials 20–100 cm tall; disk 1–2.5+ cm wide; ligules 10–nearly 30 mm long, white \_\_\_\_\_ **Leucanthemum**
10. Leaves entire; plants taprooted annuals 10–40 cm tall; disk 0.6–1 cm wide; ligules 5–12 mm long, white to bluish- or pinkish-tinged \_\_\_\_\_ **Astranthium**
7. Pappus of awns, scales, hairs, short bristles, or a cup-like crown.
11. Pappus of 5 scales alternating with 5 slender awns; plants low; dainty; plants taprooted annuals, 5–15(–25) cm tall; ray corollas white to pinkish \_\_\_\_\_ **Chaetopappa**
11. Pappus not 5 scales and 5 awns, various; plants various heights; plants annuals or perennials; ray corollas various colors.
12. Disk flowers violet \_\_\_\_\_ **Palafoxia**
12. Disk flowers yellow.
13. Achenes 4-angled to round, not winged; leaves varying from entire to deeply pinnatifid, but at least some usually toothed to pinnatifid, sometimes linear, but usually broader; phyllaries > 0.5 mm wide; annuals or perennials \_\_\_\_\_ **Aphanostephus**
13. Achenes with winged margins (2 or 3 wings); leaves entire, mostly linear (lower leaves sometimes linear-lanceolate); phyllaries < 0.5 mm wide; perennials \_\_\_\_\_ **Boltonia**

**Key 5. Disk flowers only; phyllaries with hooked or straight spines, or tubercles, sometimes united into a bur, OR with large teeth at edges; plants frequently spiny.**

1. All flowers imperfect: pistillate and staminate flowers in different heads (plants monoecious); pistillate flowers apetalous or corolla reduced to a ring; staminate flowers with anthers not joined at the edges; pappus none.
2. Staminate heads in racemes or spikes; bur ca. 5 mm or less long, with straight or hooked spine-like structures OR tubercles, 1-flowered; lower leaves usually opposite \_\_\_\_\_ **Ambrosia**
2. Staminate heads in terminal clusters; bur (cocklebur) 10–30 mm long, with hooked spine-like structures, 2-flowered; lower leaves alternate \_\_\_\_\_ **Xanthium**
1. All flowers perfect; corollas large, showy, with lobes at least 1/3 or more of corolla length, variously colored; anthers joined at the edges; pappus of capillary or plumose bristles (THISTLES).
3. Leaves without spines; phyllaries without spines at tip OR spiny-tipped; corollas of outer row of flowers often enlarged, simulating ray flowers \_\_\_\_\_ **Centaurea**
3. Leaves with spines (can be entire in 1 species of *Carthamus*); phyllaries spiny-tipped; corollas of all flowers similar.
4. Corollas yellow to orange (rarely whitish); pappus absent or of ± rigid, flat, bristle-like scales to ca. 1 cm long \_\_\_\_\_ **Carthamus**
4. Corollas white to pink, lavender, or purple; pappus of plumose or barbellate, hair-like bristles, these of variable length but often much > 1 cm long.

- 5. Pappus bristles plumose (= feather-like, with long side branches) at least basally; phyllaries all ± appressed, linear; widespread native and introduced species \_\_\_\_\_ **Cirsium**
- 5. Pappus bristles barbellate (with short side branches) or barbless; phyllaries variable (but the outer ones sometimes spreading or reflexed, flat, broad, 2–8 mm wide); introduced species with rather limited distributions in nc TX.
- 6. Stems conspicuously prickly winged (by decurrent leaf bases); leaves usually uniformly colored above; filaments separate.
  - 7. Phyllaries 2–9 mm wide (at least near base); leaves ± glabrous or with cottony pubescence below; heads 10–70 mm in diam.; receptacle with numerous bristles ca. 2 mm long; pappus 11–20 mm long \_\_\_\_\_ **Carduus**
  - 7. Phyllaries < 2 mm wide; leaves with cottony pubescence below; heads 25–50 mm in diam.; receptacle bristles absent or very short; pappus 7–9 mm long \_\_\_\_\_ **Onopordum**
- 6. Stems not winged; leaves ± mottled green and white above; filaments united into a tube above their attachment to the corolla, free below anthers \_\_\_\_\_ **Silybum**

**Key 6. Disk flowers only; phyllaries mostly entire; flowers pink, blue, purple, green, white, or yellowish cream.**

- 1. Shrubs.
  - 2. Pappus of capillary bristles; leaf blades entire to toothed, never lobed or dissected.
    - 3. Flowers imperfect, the plants dioecious (male and female plants can have quite different appearances); leaves linear to lanceolate, elliptic, rhomboid, or obovate, sessile; plants very variable in size, from 0.25 m to 6 m tall (but if < 1 m tall, then leaves ± linear) \_\_\_\_\_ **Baccharis**
    - 3. Flowers perfect; leaves ovate to lanceolate, with petioles to 10 mm long; plants to 1.2 m tall \_\_\_\_\_ **Brickellia**
  - 2. Pappus absent; leaf blades entire to more often lobed or dissected \_\_\_\_\_ **Artemisia**
- 1. Herbs.
  - 4. Plants white-woolly, at least on lower leaf surfaces; basal leaves or inflorescence leaves largest; stem leaves smaller or greatly reduced except in one species of *Gnaphalium*.
  - 5. Plants typically small, usually < 10(–15) cm tall; heads ± completely imbedded in woolly hairs; pappus lacking; disk corollas (central) 4-toothed; receptacle chaffy \_\_\_\_\_ **Evax**
  - 5. Plants over 10 cm tall; heads often with woolly hairs, but not completely embedded in the hairs; pappus of hair-like bristles present; disk corollas 3- or 5-toothed; receptacle ± naked.
  - 6. Pappus of plumose bristles (use lens to see side branches) 10–11 mm long; leaves 1.5–4 mm wide; apparently rare in nc TX \_\_\_\_\_ **Facelis**
  - 6. Pappus of smooth or barbellate bristles, the bristles much < 10 mm long except in *Antennaria* which has basal leaves 15–50 mm wide; leaves of various widths, often much wider than 4 mm; widespread in nc TX.
  - 7. Basal and stem leaves present, the stem leaves smaller in most species; basal leaves 22 mm or less wide (usually much less); phyllaries ± completely scarious (except midrib can be greenish); heads all alike, bisexual, usually numerous in elongate or terminal inflorescences, the individual heads usually ± sessile in glomerules.
  - 8. Pappus bristles not united basally, separating individually or in clusters; inflorescences often spreading, somewhat flat-topped, sometimes elongate; phyllaries ± obtuse to acutish; flowering (Jul–)Sep–Nov \_\_\_\_\_ **Pseudognaphalium**
  - 8. Pappus bristles united basally, deciduous as a ring of hairs; inflorescences usually ± elongate, spike-like; phyllaries acute to acuminate; flowering Mar–Jun \_\_\_\_\_ **Gamochoeta**
  - 7. Leaves nearly all basal, the stem leaves very reduced; basal leaves 15–50 mm wide; phyllaries herbaceous at least in lower half; heads of 2 kinds, the sexes on different plants, typically few at end of stem, the individual heads short pedunculate or solitary \_\_\_\_\_ **Antennaria**
- 4. Plants not white-woolly; pubescence various or plants glabrous; leaves various, but in many species stem leaves well-developed and prominent.

9. Pappus of scales or awns, or absent.

10. Pappus absent; heads small, white or greenish, 8 mm or less wide.

11. Plants very small, ca. 15 cm or less tall; achenes flattened, with wings or ± wing-like lateral appendages, tipped by the persistent spine-like style (painful in a manner similar to sandburs) \_\_\_\_\_ **Soliva**

11. Plants 20–200 cm tall; achenes not flattened or not conspicuously so, without either wing-like lateral appendages or spine-like style.

12. Leaf blades entire to toothed, neither lobed nor dissected, not gray- or white-woolly; stems and leaves usually resinous-glandular; receptacles chaffy; flowers pistillate or staminate \_\_\_\_\_ **Iva**

12. Leaf blades (at least some) usually lobed or dissected but varying to entire, if not lobed or dissected then the leaf blades gray- or white-woolly at least on lower surfaces; stems and leaves either gray to white woolly or nearly glabrous, not resinous glandular; receptacles naked; flowers perfect or pistillate or staminate \_\_\_\_\_ **Artemisia**

10. Pappus of awns or scales (sometimes < 1 mm long); heads various.

13. Corollas lavender or pink; leaves usually entire (can be lobed to pinnately dissected in the one species of *Hymenopappus* that keys here).

14. Pappus of 14–18 scales (< 1 mm long); leaves variously lobed or pinnately dissected, or rarely entire \_\_\_\_\_ **Hymenopappus**

14. Pappus of 5–10 scales; leaves entire.

15. Plants with 1–few heads; pappus of 5 scarious translucent scales; receptacle chaffy; involucre > 10 mm across \_\_\_\_\_ **Marshallia**

15. Plants usually with numerous heads; pappus of 7–10 scarious white scales; receptacle naked; involucre ca. 10 mm or less across \_\_\_\_\_ **Palafoxia**

13. Corollas white or greenish; leaves variously lobed or pinnatifid OR entire.

16. Leaves entire; heads (including corollas) commonly 25–35 mm wide at flowering time \_\_\_\_\_ **Marshallia**

16. Leaves dentate to lobed or pinnatifid; heads much < 25 mm wide at flowering time.

17. All leaves usually pinnatifid; phyllaries petaloid at tips; receptacle naked; ray flowers absent \_\_\_\_\_ **Hymenopappus**

17. Upper leaves merely dentate to lobed; phyllaries not petaloid at tips; receptacle chaffy; usually with 5 very short, often overlooked ray flowers \_\_\_\_\_ **Parthenium**

9. Pappus of bristles.

18. Leaves opposite or rarely whorled.

19. Vines; phyllaries 4 per head; flowers usually 4 per head \_\_\_\_\_ **Mikania**

19. Not vines; phyllaries more than 4 per head; flowers more than 4 per head \_\_\_\_\_ **Eupatorium**

18. Leaves alternate.

20. Corollas and sometimes phyllaries pink or lavender to purple.

21. Pappus a double row of bristles, the inner row of long bristles, the outer of very short bristles \_\_\_\_\_ **Vernonia**

21. Pappus a single row of bristles.

22. Several heads clustered and subtended by a whorl of ca. 3 ovate leaf-like bracts ca. 1 cm long; pappus of 5 bristles \_\_\_\_\_ **Elephantopus**

22. Heads not in clusters subtended by leafy bracts; pappus of numerous capillary bristles.

23. Inflorescence an unbranched spike or raceme; leaves essentially linear, entire, punctate; plants without camphor odor \_\_\_\_\_ **Liatris**

- 23. Inflorescence much branched; leaves ovate to elliptic, serrate to serrate-dentate or crenate, more or less glandular pubescent; plants aromatic with distinctive camphor-like odor \_\_\_\_\_ **Pluchea**
- 20. Corollas white or cream.
  - 24. Leaves pinnately dissected into linear segments less than 2 mm wide \_\_\_\_\_ **Eupatorium**
  - 24. Leaves not pinnately dissected.
    - 25. Heads with 5 equal phyllaries and 5 flowers; leaves mostly basal, broadly ovate, up to 15+ cm long, 2–8 cm wide, entire or rarely toothed, with prominent, ± parallel, longitudinal nerves (often 7–9) eventually converging toward the tip \_\_\_\_\_ **Arnoglossum**
    - 25. Heads with numerous phyllaries and more than 5 flowers; leaves basal or cauline, variously shaped, entire or often distinctly toothed, usually smaller, with venation not as above.
      - 26. Leaves mostly basal; several heads clustered and subtended by a whorl of ca. 3 ovate leaf-like bracts ca. 1 cm long; pappus a single whorl of 5 bristles \_\_\_\_\_ **Elephantopus**
      - 26. Leaves mostly cauline; heads not in clusters subtended by bracts; pappus not as above.
        - 27. Plants perennial from a woody base or woody taproot; pappus plumose OR not so; heads with all flowers perfect \_\_\_\_\_ **Brickellia**
        - 27. Plants annual; pappus never plumose; heads with pistillate and perfect flowers.
          - 28. Leaves sharply and conspicuously toothed and sometimes irregularly lobed; inflorescences corymbiform cymes of few to many heads; phyllaries in a single series, 9–17 mm long (sometimes with a few minute bracteoles at base); ray flowers not present \_\_\_\_\_ **Erechtites**
          - 28. Leaves entire or subentire; inflorescences panicles of numerous small heads; phyllaries imbricate, 3–5 mm long; small inconspicuous ray flowers usually present \_\_\_\_\_ **Conyza**

**Key 7. Disk flowers only or apparently so; phyllaries entire or minutely serrated; flowers yellow to reddish brown, rusty-brown, or maroon.**

- 1. Pappus of capillary bristles or stramineous stiff bristles.
  - 2. Leaves opposite \_\_\_\_\_ **Eclipta**
  - 2. Leaves alternate.
    - 3. Phyllaries in a single series (subtended by a few tiny bractlets); middle and upper leaves undulate to pinnately lobed, auriculate, ± clasping \_\_\_\_\_ **Senecio**
    - 3. Phyllaries in several series, imbricate; middle and upper leaves entire or toothed, neither auriculate nor clasping.
      - 4. Flowers 4–6 per head; all flowers perfect and tubular, without ligule; phyllaries resinous \_\_\_\_\_ **Bigelowia**
      - 4. Flowers ca. 20 or more per head; marginal flowers pistillate, with inconspicuous ligule scarcely if at all surpassing the disk; phyllaries not resinous \_\_\_\_\_ **Conyza**
- 1. Pappus of scales or awns or short crown or absent.
  - 5. Receptacle chaffy or with bristly setae.
    - 6. Pappus of 2 retrorsely or antrorsely barbed awns; leaves opposite.
      - 7. Leaves decurrent on stems forming wings \_\_\_\_\_ **Verbesina**
      - 7. Leaves not decurrent, not forming wings on stem.

8. Phyllaries joined at base 1/4 to 1/2 length; corollas yellowish with reddish brown veins \_\_\_\_\_ **Thelesperma**
8. Phyllaries all separate; corollas all yellow \_\_\_\_\_ **Bidens**
6. Pappus of scales or smooth, nonbarbed awns; leaves basal or alternate.
9. Corollas reddish purple or brownish red; heads solitary at end of each peduncle; leaves entire to deeply lobed \_\_\_\_\_ **Gaillardia**
9. Corollas yellowish; heads solitary at end of each peduncle OR heads numerous in corymbose inflorescences; leaves various, entire to tripinnatifid.
10. Heads solitary at end of each peduncle; ray flowers absent; lower and middle leaves entire to toothed or pinnatifid \_\_\_\_\_ **Gaillardia**
10. Heads numerous in corymbose inflorescences; ray flowers usually present with very small corollas; lower and middle leaves bipinnatifid to tripinnatifid \_\_\_\_\_ **Parthenium**
5. Receptacle naked.
11. Phyllaries and leaves with large (up to 1 mm) yellowish brown or orange oil glands \_\_\_\_\_ **Dysodiopsis**
11. Phyllaries and leaves without conspicuous oil glands (but may be minutely punctate-dotted or have glandular hairs).
12. Stems winged; phyllaries reflexed at anthesis, not gummy \_\_\_\_\_ **Helenium**
12. Stems not winged; phyllaries curled back even in bud, gummy \_\_\_\_\_ **Grindelia**

## TECHNICAL KEY TO THE TRIBES

1. All flowers ligulate, perfect, the ligule strap-shaped; plant sap usually milky \_\_\_\_\_ **Lactuceae (Cichorieae)**
1. Disk flowers with tubular eligulate corollas present; ray flowers with strap-shaped ligules present or absent, if present, pistillate or neutral; plant sap usually watery.
2. Ray flowers present (these can rarely lack corollas), these pistillate or neutral.
3. Receptacle chaffy, a bract subtending each flower; lower leaves in most genera opposite; ligules tending to be rather broad, often larger than typical for other tribes \_\_\_\_\_ **Heliantheae**
3. Receptacle naked or rarely with bristles that are not associated with individual flowers; leaves variable; ligules variable.
4. Phyllaries dry, membranous at margins and tips, usually whitish; ray corollas white or absent; pappus absent or a mere border or crown; leaves generally ± dissected; plants often with a characteristic odor \_\_\_\_\_ **Anthemideae**
4. Phyllaries herbaceous; with or without membranous margins; ray corollas usually yellow, occasionally pink, lavender, or white; pappus various or absent; leaves generally entire or toothed; plants usually without a characteristic odor.
5. Phyllaries imbricate (= overlapping) in 2–many series \_\_\_\_\_ **Astereae**
5. Phyllaries not overlapping (the margins of one phyllary can, however, abut the next), in 1–2 series, the second series often minute at base of first.
6. Pappus of capillary bristles; leaves without punctate dots or glandular dots \_\_\_\_\_ **Senecioneae**
6. Pappus of chaffy scales, a mere border or crown, or absent or nearly so; leaves frequently glandular or with punctate dots \_\_\_\_\_ **Helenieae**
2. Ray flowers absent (but ray-like marginal flowers sometimes present in Cardueae and Mutisieae).
7. Corollas of central flowers bilaterally symmetrical; leaves in a basal rosette only; a single genus rare in nc TX \_\_\_\_\_ **Mutisieae**
7. Corollas of central flowers radially symmetrical; leaves basal or cauline; numerous wide-spread genera in nc TX.
8. Corolla tubes elongate, the lobes at least 1/4 or usually more of the total corolla length; receptacle densely bristly, the bristles not associated with individual flowers; anthers long-tailed at base; phyllaries spiny or their margins with large teeth; leaves usually spiny; (THISTLES) \_\_\_\_\_ **Cardueae (Cynareae)**

8. Corolla tubes not elongate, the lobes small teeth less than 1/4 the total corolla length; receptacle naked or with chaff associated with each individual flower, or rarely bristly; anthers tail-less or short-tailed (in Inuleae); phyllaries entire or with fine teeth, not spine-tipped; leaves not spiny.
9. Plants white-woolly pubescent at least on the lower leaf surfaces; phyllaries whitish, with scarious margins; anthers short-tailed \_\_\_\_\_ **Inuleae**
9. Plants glabrous or pubescent, not white-woolly; phyllaries various; with or without scarious margins; anthers tail-less or short-tailed (in Inuleae).
10. Phyllaries of pistillate heads joined and either with hooked or straight spine-like structures or with tubercles, the heads thus bur-like; all flowers imperfect, pistillate and staminate flowers in same or different heads; stamens usually not united by anthers (COCKLEBURS, RAGWEEDS) \_\_\_\_\_ **Heliantheae**
10. Phyllaries without either spine-like structures or tubercles, the heads not bur-like; flowers perfect or imperfect; anthers united into a ring around style.
11. Pappus of scales or awns or none.
12. Receptacle chaffy, bracts associated with each flower; phyllaries variable but tending to be in several series \_\_\_\_\_ **Heliantheae**
12. Receptacle naked or rarely with bristles; phyllaries appearing to be in one series \_\_\_\_\_ **Heleniae**
11. Pappus of capillary bristles.
13. Phyllaries scarious margined or papery, often white or pink or lavender.
14. Phyllaries imbricate (= overlapping like shingles) in 2-many series; anthers short-tailed at base \_\_\_\_\_ **Inuleae**
14. Phyllaries not overlapping (the margins of one phyllary abutting the next), in 1-2 series, the second series often minute at base of first; anthers not tailed at base \_\_\_\_\_ **Senecioneae**
13. Phyllaries herbaceous, sometimes pigmented.
15. Either phyllaries and corollas usually purplish and heads in a corymbose arrangement OR small clusters of several heads subtended by 3 foliaceous ovate bracts; style branches slender to filiform; leaves alternate \_\_\_\_\_ **Vernonieae**
15. Phyllaries not purplish (or if so, heads in a spike-like or raceme-like arrangement; clusters of heads not subtended by 3 foliaceous bracts; style branches either slender but wider apically (= ± clavate) OR broad and flattened; leaves alternate OR opposite.
16. Corollas variously colored, but not distinctly yellow; style branches slender, wider apically \_\_\_\_\_ **Eupatorieae**
16. Corollas often yellow, but varying to other colors; style branches usually broad and flattened \_\_\_\_\_ **Astereae**

### ANTHEMIDEAE TRIBE

1. Pappus of short but discrete scales; phyllaries nearly equal, not imbricate, petaloid at the tips (*Hymenopappus* can be reached here and in *Helenieae* key) \_\_\_\_\_ **Hymenopappus**
1. Pappus a short crown or absent; phyllaries various, not petaloid.
2. Heads with disk flowers only (or apparently so—corolla-less ray flowers present in *Solvia*).
3. Plants very small, 15 cm or less tall; achenes flattened, tipped by the persistent spine-like style (painful in a manner similar to sandburs), with wings or ± wing-like lateral appendages \_\_\_\_\_ **Solvia**
3. Plants 20–150 cm tall; achenes not noticeably flattened, without either spine-like style or wing-like lateral appendages \_\_\_\_\_ **Artemisia**

2. Heads with both evident ray flowers and disk flowers, the ray flowers with evident ligules.
4. Ray corollas with ligules ca. 2 mm long or less \_\_\_\_\_ **Achillea**
4. Ray corollas with ligules 7 mm long or longer.
5. Leaves toothed or lobed, but not finely dissected; ray flowers 15–35 per head; ray corollas with ligules 10–nearly 30 mm long; heads usually solitary at ends of main stems and long branches; plants rhizomatous perennials \_\_\_\_\_ **Leucanthemum**
5. Leaves finely bipinnately dissected; ray flowers ca. 10–14 per head; ray corollas with ligules 7–10(–12) mm long mm long; heads usually several per main stem; plants taprooted annuals \_\_\_\_\_ **Anthemis**

### ASTEREAE TRIBE

1. Heads with only disk flowers.
2. Plants shrubs, very variable in size, from 0.25–6 m tall; flowers imperfect, the plants dioecious (male and female plants can have quite different appearances) \_\_\_\_\_ **Baccharis**
2. Plants herbaceous, 0.1–ca. 2 m tall; at least some flowers perfect, the plants not dioecious.
3. Phyllaries resinous; corollas yellow.
4. Flowers numerous per head; leaves serrate to spiny toothed, oblong to lanceolate or deltoid, over 5 mm wide \_\_\_\_\_ **Grindelia**
4. Flowers 4–6 per head; leaves entire, linear, ca. 2 mm wide \_\_\_\_\_ **Bigelovia**
3. Phyllaries not resinous; corollas white.
5. Leaves opposite \_\_\_\_\_ **Eclipta**
5. Leaves alternate \_\_\_\_\_ **Conyza**
1. Heads with ray and disk flowers, the ray flowers usually conspicuous but rarely concealed by phyllaries.
6. Ray flowers yellow.
7. Pappus of scales or awns or a few stout bristles or none.
8. Leaves linear, entire; pappus of scales or none; disks less than 0.5 cm wide \_\_\_\_\_ **Gutierrezia**
8. Leaves linear-lanceolate or wider, serrate to spiny-toothed; pappus of awns or a few stout bristles; disks 0.7–3 cm wide \_\_\_\_\_ **Grindelia**
7. Pappus with numerous capillary bristles, with or without an additional row of scales or short bristles.
9. Pappus of disk flowers double, the inner of capillary bristles, the outer of shorter stout bristles or scales.
10. Receptacle with a chaff of long subulate, persistent scales; phyllaries spiny-tipped, white-margined; lower and basal leaves often pinnately lobed, sometimes deeply so \_\_\_\_\_ **Xanthisma**
10. Receptacle naked; phyllaries not as above; leaves entire to toothed to shallowly lobed.
11. Lower stem leaves often grass-like in appearance, with "parallel" veins; basal leaves usually much longer than stem leaves; stems and leaves with long, silvery white, silky pubescence; in nc TX known only from Tarrant Co., mainly se and e TX \_\_\_\_\_ **Pityopsis**
11. Lower stem leaves not as above; basal leaves various; stem and leaf pubescence various; widespread in nc TX.
12. Upper and middle stem leaves little or not narrowed at base, slightly to strongly clasping; plants annuals or perennials from taproot.
13. Upper leaves clasping, ovate; leaf blades scabrous above, hispid-pilose beneath; achenes of ray flowers without a pappus \_\_\_\_\_ **Heterotheca**
13. Upper leaves slightly clasping, oblanceolate; leaf blades hairy to sparsely

- 12. Upper and middle stem leaves tapered to slender petiole-like bases; plants  
perennials from woody crown \_\_\_\_\_ **Heterotheca**
- 9. Pappus of all flowers a single row of capillary bristles.
  - 14. Disk flowers with pappus bristles 1 or 2; leaves linear, entire \_\_\_\_\_ **Chrysopsis**
  - 14. Disk flowers with pappus bristles several to numerous; leaves various.
    - 15. Leaves pinnatifid or bipinnatifid \_\_\_\_\_ **Machaeranthera**
    - 15. Leaves simple, nearly entire to prominently toothed.
      - 16. Heads (excluding ligules of ray flowers) 2 cm or more broad; leaves spiny  
toothed \_\_\_\_\_ **Grindelia**
      - 16. Heads (excluding ligules of ray flowers) < 2 cm broad; leaves spiny-toothed  
OR in most species not spiny-toothed.
        - 17. Heads relatively large, hemispheric or broadly conic, wider than tall; stems  
and phyllaries glandular pubescent; taprooted annuals OR perennials.
          - 18. Upper leaves conspicuously toothed; phyllaries without scarious  
margins \_\_\_\_\_ **Rayjacksonia**
          - 18. Upper leaves entire or nearly so (but can be bristly-ciliate); phyllaries  
with a darker line in the middle and scarious margins \_\_\_\_\_ **Croptilon**
        - 17. Heads small, cylindrical, taller than wide; stems without glandular hairs;  
perennials from a fibrous root system.
          - 19. Inflorescences corymbiform (= flat-topped).
            - 20. Leaves with glandular-punctate dots \_\_\_\_\_ **Euthamia**
            - 20. Leaves without glandular-punctate dots \_\_\_\_\_ **Solidago**
          - 19. Inflorescences panicles, or axillary \_\_\_\_\_ **Solidago**
- 6. Ray flowers white, or pink, or lavender, or purple.
  - 21. Pappus absent or nearly so (minute ring of tissue can be present) \_\_\_\_\_ **Astranthium**
  - 21. Pappus present of capillary bristles, awns, scales, hairs, or a cup-like crown.
    - 22. Pappus of disk flowers of awns, scales, hairs, or a cup-like crown.
      - 23. Pappus of 5 scales alternating with 5 slender awns; plants low, dainty, taprooted  
annuals 5–15(–25) cm tall; ray corollas white to pinkish \_\_\_\_\_ **Chaetopappa**
      - 23. Pappus not of 5 scales and 5 awns, various; plants annuals or perennials of various  
heights, often much larger than 25 cm tall; ray corollas various colors.
        - 24. Achenes 4-angled to round, not winged; leaves varying from entire to deeply  
pinnatifid, but at least some usually toothed to pinnatifid, sometimes linear,  
but usually broader; phyllaries > 0.5 mm wide; annuals or perennials \_\_\_\_\_ **Aphanostephus**
        - 24. Achenes with winged margins (2 or 3 wings); leaves entire, mostly linear (lower  
leaves sometimes linear-lanceolate); phyllaries < 0.5 mm wide; perennials  
\_\_\_\_\_ **Boltonia**
    - 22. Pappus of disk flowers of numerous capillary bristles.
      - 25. Ray flowers inconspicuous, barely exceeding the phyllaries \_\_\_\_\_ **Conyza**
      - 25. Ray flowers conspicuous, twice or more length of phyllaries.
        - 26. Ray flowers more than 50, with corollas less than 1 mm wide; pappus of ray  
flowers sparse or absent \_\_\_\_\_ **Erigeron**
        - 26. Ray flowers less than 50, with corollas 1 mm wide or wider; pappus of ray  
flowers of capillary bristles.
          - 27. Capillary bristles barbellate; plants scapose; flowers solitary \_\_\_\_\_ **Townsendia**
          - 27. Capillary bristles smooth; plants caulescent; flowers various.
            - 28. Leaves, particularly those in upper half of plant, scale-like; plants less  
than 15(–20) cm tall \_\_\_\_\_ **Chaetopappa**
            - 28. Leaves larger, not scale-like, even the upper reduced leaves not scale-  
like OR if leaves reduced and the plant almost leafless (in *Chloracantha*),

then plants much greater than 20 cm tall; plants more than 20 cm tall.

29. Plants almost leafless, rush-like, the leaves if present usually minute; thorns often present in upper leaf axils; stems green and glaucous, photosynthetic, alive for up to ca. 4 growing seasons \_\_\_\_\_ **Chloracantha**
29. Plants with leaves small to well-developed; thorns absent; stems not as above \_\_\_\_\_ **Aster**

### CARDUEAE (CYNAREAE) TRIBE

1. Leaves without spines; phyllaries without spines at tip OR spiny-tipped; corollas of outer row of flowers often enlarged, simulating ray flowers \_\_\_\_\_ **Centaurea**
1. Leaves with spines (can be entire in 1 species of *Carthamus*); phyllaries spiny-tipped; corollas of all flowers similar.
2. Corollas yellow to orange (rarely whitish); pappus absent OR of  $\pm$  rigid, flat, bristle-like, ciliate scales to 1 cm long as well as some outer short scales \_\_\_\_\_ **Carthamus**
2. Corollas white to pink, lavender, or purple; pappus of plumose or barbellate, hair-like bristles, these of variable length but often much  $>$  1 cm long.
3. Pappus bristles plumose (= feather-like, with long side branches) at least basally; phyllaries all  $\pm$  appressed, linear; widespread native and introduced species \_\_\_\_\_ **Cirsium**
3. Pappus bristles barbellate (= with short side branches) or barbless; phyllaries variable (but the outer ones sometimes spreading or reflexed, flat, broad, 2–8 mm wide); introduced species with rather limited distributions in nc TX.
4. Stems conspicuously prickly winged (by decurrent leaf bases); leaves usually uniformly colored above; filaments separate.
5. Phyllaries 2–9 mm wide (at least near base); leaves  $\pm$  glabrous or with cottony pubescence below; heads 10–70 mm in diam.; receptacle with numerous bristles ca. 2 mm long; pappus 11–20 mm long \_\_\_\_\_ **Carduus**
5. Phyllaries  $<$  2 mm wide; leaves with cottony pubescence below; heads 25–50 mm in diam.; receptacle bristles absent or very short; pappus 7–9 mm long \_\_\_\_\_ **Onopordum**
4. Stems not winged; leaves  $\pm$  mottled green and white above; filaments united into a tube above their attachment to the corolla, free below anthers \_\_\_\_\_ **Silybum**

### EUPATORIEAE TRIBE

1. Perennial twining vine; leaves opposite; phyllaries 4 per head; flowers usually 4 per head \_\_\_\_\_ **Mikania**
1. Perennial or annual, not a twining vine; leaves alternate or opposite; phyllaries more than 4 per head; flowers 3–numerous per head.
2. Leaves alternate, not finely dissected; achenes 10-ribbed.
3. Leaves essentially linear, entire, sessile; corollas purple (rarely white); inflorescence an unbranched spike or raceme \_\_\_\_\_ **Liatris**
3. Leaves lanceolate to ovate, usually toothed (rarely entire), with petioles to 1 cm long; corollas cream to yellowish cream; inflorescence usually branched,  $\pm$  hemispherical to flat-topped or paniculate or racemose \_\_\_\_\_ **Brickellia**
2. Leaves either opposite and not finely dissected OR alternate and finely dissected; achenes 5-ribbed \_\_\_\_\_ **Eupatorium**

### HELENIEAE TRIBE

1. Phyllaries and generally also the leaves conspicuously gland-dotted.
2. Leaves linear, 1–2 mm wide, glandular-punctate marginally; pappus of 0–4 short scales forming a low crown 0.5–1(–2) mm long; phyllaries in 1 series \_\_\_\_\_ **Pectis**

2. Leaves linear, 2–6 mm wide, with coarse teeth marginally OR leaves pinnately divided into 5–15 linear lobes; pappus of 10–12 awned or awnless scales, often longer than 2 mm; phyllaries in 2 series.
3. Leaves with coarse teeth, but not pinnately divided into linear lobes \_\_\_\_\_ **Dysodiopsis**
3. Leaves pinnately divided into 5–15 linear lobes \_\_\_\_\_ **Thymophylla**
1. Phyllaries and leaves without conspicuous glandular dots (but may be minutely punctate-dotted).
4. Receptacle bristly with spine-like setae usually exceeding the achenes \_\_\_\_\_ **Gaillardia**
4. Receptacle usually naked, rarely with poorly developed bristles.
5. Flowers white or pink or lavender.
6. Leaves pinnatifid, with conspicuous lobes; flowers usually white (reddish-tinged in 1 species) \_\_\_\_\_ **Hymenopappus**
6. Leaves entire; flowers pink or lavender. \_\_\_\_\_ **Palafoxia**
5. Flowers yellow, dark red-maroon, rusty-brown, maroon, or a combination of these colors.
7. Leaf blades decurrent on stem, forming wings \_\_\_\_\_ **Helenium**
7. Leaf blades not decurrent on stem, the stems thus not winged.
8. Leaves or their segments filiform to linear (all very narrow).
9. Heads (excluding ray flowers) globose; phyllaries and ray flowers reflexed \_\_\_\_\_ **Helenium**
9. Heads (excluding ray flowers) hemispherical to cylindrical; phyllaries and ray flowers spreading to erect.
10. Leaves pinnatifid with 3–15 long, linear-filiform divisions; outer phyllaries united near their noticeably thickened bases \_\_\_\_\_ **Hymenoxys**
10. Leaves simple, entire, or with 1–5 short lobes; phyllaries all separate, not thickened \_\_\_\_\_ **Tetraneuris**
8. Leaves oblanceolate to ovate, much broader than filiform to linear.
11. Leaves sessile, entire; stems and leaf margins with long, wide-spreading, cottony hairs; growing on sandy or rocky open ground \_\_\_\_\_ **Amblyolepis**
11. Leaves petiolate, with large serrations/small lobes; stems and leaf margins glabrous or with minute pubescence; growing in crevices on limestone bluffs \_\_\_\_\_ **Perityle**

### HELIANTHEAE TRIBE

1. Plants generally wind-pollinated or self-pollinated, the heads small and not at all showy nor attractive to pollinators; all flowers imperfect; pistillate and staminate flowers in same or different heads; ray flowers absent; phyllaries either joined forming a bur-like structure with hooked or straight spine-like structures or tubercles OR not joined and not bur-like; pappus none.
2. Staminate and pistillate flowers in same heads; phyllaries without either spine-like structures or tubercles, the heads not bur-like \_\_\_\_\_ **Iva**
2. Staminate and pistillate flowers in separate heads, the staminate usually uppermost; phyllaries of pistillate heads joined and either with hooked or straight spine-like structures or with tubercles, the heads thus bur-like.
3. Staminate heads in racemes or spikes; bur ca. 5 mm or less long, with straight or hooked spine-like-structures OR tubercles, 1-flowered; lower leaves usually opposite \_\_\_\_\_ **Ambrosia**
3. Staminate heads in terminal clusters; bur (cocklebur) 10–30 mm long, with hooked spine-like structures, 2-flowered; lower leaves alternate \_\_\_\_\_ **Xanthium**
1. Plants generally adapted for attracting pollinating insects, the heads colorful and otherwise attractive; some or all flowers perfect; ray flowers usually present, with strap-shaped ligule; phyllaries separate, not forming a bur-like structure; pappus various.
4. Only ray flowers fertile (= maturing achenes), these achenes much larger than those of the sterile disk flowers.
5. Ray achenes thick, rounded or weakly compressed, without wings.

6. Corollas of ray flowers white; leaf blades entire to pinnately lobed; phyllaries in several series, the inner completely clasping the achenes \_\_\_\_\_ **Melampodium**
6. Corollas of ray flowers yellow; leaf blades usually  $\pm$  palmately 3–5-lobed; phyllaries in 1–2 series, subtending, not clasping the achenes \_\_\_\_\_ **Smallanthus**
5. Ray achenes strongly flattened, with or without wings.
7. Achenes broadly winged.
8. Ray flowers usually 5, in 1 row; phyllaries 8–10 in 2 rows, the outer row distinctly narrower; disks less than 1.5 cm wide; plants taprooted annuals up to 0.3(–0.65) m tall \_\_\_\_\_ **Lindheimeria**
8. Ray flowers numerous, in 2–3 rows; phyllaries numerous, in several rows,  $\pm$  similar except for size; disks (1.5–)2–3 cm wide; plants coarse perennials up to 2(–3) m tall \_\_\_\_\_ **Silphium**
7. Achenes not winged.
9. Ray flowers with corollas white, ca. 1 mm long, persistent on mature achenes \_\_\_\_\_ **Parthenium**
9. Ray flowers with corollas yellow, 10 mm or longer, deciduous from mature achenes.
10. Ray flowers with back of corolla having green, red, or maroon veins; leaves crenate, serrate, dentate, or lyrate-pinnatifid (in one species rare in nc TX), variously pubescent but not hispid; pappus none \_\_\_\_\_ **Berlandiera**
10. Ray flowers with back of corolla entirely yellow, without colored veins; leaves deeply pinnatifid, densely hispid; pappus of a few scales \_\_\_\_\_ **Engelmannia**
4. Disk flowers fertile; ray flowers present and fertile OR sterile OR absent.
11. Ray flowers white, pink, or lavender OR if absent, then disk flowers white, pink, or lavender.
12. Ray flowers absent; disk flowers with corollas elongate, hairy, conspicuously lobed \_\_\_\_\_ **Marshallia**
12. Ray flowers present; disk flowers not elongate, glabrous or pubescent, the corolla lobes only small teeth.
13. Ray flowers with inconspicuous corollas 3 mm or less long; leaves opposite \_\_\_\_\_ **Eclipta**
13. Ray flowers with corollas 5 mm or more long, sometimes much longer, these usually conspicuous; leaves alternate.
14. Stems not winged; receptacle chaff stiff, sharp, longer than disk flowers; leaves mostly basal, the stem leaves much reduced upward; heads borne on long, naked, unbranched peduncles; ligules of ray corollas 2–9 cm long \_\_\_\_\_ **Echinacea**
14. Stems winged; receptacle chaff soft, hidden by disk flowers; leaves mostly cauline, little reduced upward; heads on short leafy peduncles; ligules of ray corollas < 1 cm long \_\_\_\_\_ **Verbesina**
11. Ray flowers yellow, sometimes with maroon, deep red, or rusty-brown toward the base.
15. Receptacle columnar.
16. Leaves opposite at base, may be alternate or opposite on upper stems; plants creeping and rooting at the nodes, the flowering branches ascending \_\_\_\_\_ **Acmella**
16. Leaves all alternate; plants erect.
17. Leaves simple, the blades entire or toothed.
18. Leaves clasping; achenes terete \_\_\_\_\_ **Dracopis**
18. Leaves not clasping; achenes 4-angled \_\_\_\_\_ **Rudbeckia**
17. Leaves pinnately compound or deeply lobed \_\_\_\_\_ **Ratibida**
15. Receptacle flat, or convex, or very low conic.
19. Leaf bases decurrent, the stems thus winged \_\_\_\_\_ **Verbesina**
19. Leaf bases not decurrent, the stems not winged.
20. Phyllaries dimorphic, the outer row much smaller than the inner; achenes flattened parallel to the phyllaries (or rarely 4 angled in *Bidens*).
21. Inner phyllaries united for up to 1/3 their length; disk corolla lobes often linear \_\_\_\_\_ **Thelesperma**
21. Phyllaries all separate or nearly so; disk corolla lobes triangular to ovate.
22. Pappus of 2(–4) rigid, retrorsely barbed awns \_\_\_\_\_ **Bidens**

- 22. Pappus of 2(-4) awns or teeth which are inconspicuously barbed or not barbed OR pappus absent.
- 23. Inner phyllaries spreading at anthesis; achenes not winged and disk corollas yellow \_\_\_\_\_ **Bidens**
- 23. Inner phyllaries tightly enclosing heads; achenes winged and all corollas yellow OR if achenes not winged, then disk corollas red-dish brown \_\_\_\_\_ **Coreopsis**
- 20. Phyllaries all similar, imbricate, or slightly unequal, not dimorphic in 2 rows; achenes various.
- 24. Leaves, including upper ones, mostly opposite.
- 25. Leaves linear, 10-30 mm long, to only ca. 2 mm wide; plants erect, 8-22 cm tall \_\_\_\_\_ **Zinnia**
- 25. Leaves larger, usually much so; plants either decumbent OR much greater than 22 cm tall.
- 26. Plants decumbent, slender, 5-30 cm tall; ray flowers 3-8, with corollas 4 mm or less long; mainly a lawn weed \_\_\_\_\_ **Calypocarpus**
- 26. Plants erect, coarse; much taller than 30 cm; ray flowers usually 8- numerous, with corollas more than 4 mm long, usually much more; widespread in native habitats.
- 27. Achenes not winged; ray flowers neutral, styles and stigmas absent; widespread in nc TX \_\_\_\_\_ **Helianthus**
- 27. Achenes winged or with wing-like margins; ray flowers pistillate (fertile or infertile), styles present; s and w parts of nc TX.
- 28. Leaves with distinct petioles; petioles with conspicuous auricles basally; pappus of 2 short awns, usually absent on mature achenes; plants perennial herbs \_\_\_\_\_ **Simsia**
- 28. Leaves sessile; auricles lacking; pappus of 2 or 3 short awns subtended by short, hyaline scales; plants small shrubs \_\_\_\_\_ **Wedelia**
- 24. Upper leaves alternate.
- 29. Achenes winged; petioles auriculate dilated at base OR not so \_\_\_\_\_ **Verbesina**
- 29. Achenes not winged; petioles not auriculate.
- 30. Ray flowers neutral, styles and stigmas absent; pappus of 2 awns, these stout and early deciduous; squamellae lacking; widespread in nc TX \_\_\_\_\_ **Helianthus**
- 30. Ray flowers pistillate, styles present (but infertile); pappus of 2 slender and persistent awns and 4 squamellae; s half of nc TX \_\_\_\_\_ **Viguiera**

**INULEAE TRIBE (INCLUDING PLUCHEEAE AND GNAPHALIEAE)**

- 1. Plants typically small, usually < 10(-15) cm tall; heads ± completely imbedded in woolly hairs; pappus lacking; disk corollas (central) 4-toothed; receptacle chaffy \_\_\_\_\_ **Evax**
- 1. Plants over 10 cm tall; heads often with woolly hairs, but not completely embedded in the hairs; pappus of hair-like bristles present; disk corollas 3- or 5-toothed; receptacle ± naked.
- 2. Plants without conspicuous white or gray woolly pubescence; middle and upper stem leaves broad, 10-70 mm wide; phyllaries ± herbaceous (= greenish, but often tinged purplish), not scarious, sometimes puberulent or with minute resin-globules; plants aromatic with distinctive camphor-like odor \_\_\_\_\_ **Pluchea**
- 2. Plants with conspicuous white or gray woolly pubescence; middle and upper stem leaves narrow, 1-15(-20) mm wide; phyllaries ± scarious (= dry, membranous), glabrous above the often woolly base; plants without camphor-like odor.

3. Pappus of plumose bristles (use lens to see side branches) 10–11 mm long; leaves 1.5–4 mm wide; apparently rare in nc TX. \_\_\_\_\_ **Facelis**
3. Pappus of smooth or barbellate bristles, the bristles much < 10 mm long except in *Antennaria* which has basal leaves 15–50 mm wide; leaves of various widths, often much wider than 4 mm; widespread in nc TX.
4. Basal and stem leaves present, the stem leaves smaller in most species; basal leaves 22 mm or less wide (usually much less); phyllaries ± completely scarious (except midrib can be greenish); heads all alike, bisexual, usually numerous in elongate or terminal inflorescences, the individual heads usually ± sessile in glomerules.
5. Pappus bristles not united basally, separating individually or in clusters; inflorescences often spreading, somewhat flat-topped, sometimes elongate; phyllaries ± obtuse to acutish; flowering (Jul–)Sep–Nov \_\_\_\_\_ **Pseudognaphalium**
5. Pappus bristles united basally, deciduous as a ring of hairs; inflorescences usually ± elongate, spike-like; phyllaries acute to acuminate; flowering Mar–Jun \_\_\_\_\_ **Gamochoaeta**
4. Leaves nearly all basal, the stem leaves very reduced; basal leaves 15–50 mm wide; phyllaries herbaceous at least in lower half; heads of 2 kinds, the sexes on different plants, typically few at end of stem, the individual heads short pedunculate or solitary \_\_\_\_\_ **Antennaria**

### LACTUCEAE (CICHORIEAE) TRIBE

1. Pappus of scales OR scales and bristles OR pappus lacking.
2. Corollas blue, pink, or white; pappus of numerous minute scales ca. 0.2 mm long \_\_\_\_\_ **Cichorium**
2. Corollas yellow or yellow-orange or in one species yellow with purple teeth; pappus of scales and bristles, or only scales, or pappus absent.
3. Corollas completely yellow or yellow-orange; plants ± glabrous; pappus of all flowers the same; achenes < 3 mm long \_\_\_\_\_ **Krigia**
3. Corollas yellow with purple teeth; plants with conspicuous pubescence; pappus of outer flowers a fringed crown, ca. 1 mm long, that of inner flowers of bristle-like scales ca. 5 mm long; achenes 5–7.5 mm long \_\_\_\_\_ **Hedypnois**
1. Pappus of bristles or hairs.
4. Pappus plumose (= feather-like, the bristles with long side hairs—use lens).
5. Stems essentially leafless or with a few leaves toward base; basal leaves oblanceolate, toothed or pinnatifid; achene body 4–5 mm long, the beak 5 mm long or less; involucre ca. 0.8–1 cm high at flowering time \_\_\_\_\_ **Hypochoeris**
5. Stems with leaves; leaves linear, grass-like, entire; achene body 10–25 mm long, the beak 10–25 mm long; involucre ca. 2.4–4 cm high at flowering time \_\_\_\_\_ **Tragopogon**
4. Pappus not plumose.
6. Corollas blue, red, or white.
7. Phyllaries imbricated, in several series; plants 10–30 cm tall \_\_\_\_\_ **Pinaropappus**
7. Phyllaries in one series or with basal row of short ones; plants usually > 30 cm tall.
8. Achenes flattened; stems with well-developed leaves \_\_\_\_\_ **Lactuca**
8. Achenes terete; most leaves basal, stems only with a few reduced leaves or bracts \_\_\_\_\_ **Lygodesmia**
6. Corollas yellow, or in one species yellow with purple teeth.
9. Achenes flattened.
10. Achenes beaked (with a thin extension between the body of the achene and the attachment point of the pappus), the beak usually very thin; heads with relatively few flowers (ca. 8–56) \_\_\_\_\_ **Lactuca**
10. Achenes beakless; heads with many flowers (ca. 80–250) \_\_\_\_\_ **Sonchus**
9. Achenes rounded in cross-section (terete, cylindrical or fusiform).
11. Achenes at maturity beakless or essentially so, the pappus attached at the end of the achene body.

12. Leaves entire, with conspicuous, long, spreading pubescence \_\_\_\_\_ **Hieracium**
12. Leaves toothed or lobed, with pubescence various.
13. Lower stems glabrous or with sparse pubescence; flowering involucre < 6 mm long; achenes 1.5–2.5 mm long \_\_\_\_\_ **Youngia**
13. Lower stems conspicuously pubescent to the naked eye; flowering involucre 7–12 mm long; achenes ca. 4–7.5 mm long.
14. Corollas with purple teeth; pappus of outer flowers a fringed crown, ca. 1 mm long, that of inner flowers of a few bristle-like scales ca. 5 mm long \_\_\_\_\_ **Hedynois**
14. Corollas completely yellow; pappus of all flowers the same, of numerous hair-like bristles 4–5 mm long \_\_\_\_\_ **Crepis**
11. Achenes at maturity with long, slender, conspicuous beaks, the pappus well-separated from the body of the achene (beak not visible in young flowers).
15. Plants stemless, leaves all basal (in a rosette); beak without a ring of hairs just beneath the pappus; stems unbranched, each with only a single head \_\_\_\_\_ **Taraxacum**
15. Plants usually with leafy stems (often 1–few leaves low on the stem); beak with a ring of microscopic, reflexed hairs just beneath where the pappus attaches (use lens); stems sometimes branched, each with 1–several heads \_\_\_\_\_ **Pyrrhopappus**

### MUTISEAE TRIBE

Only one genus \_\_\_\_\_ **Chaptalia**

### SENECIONEAE TRIBE

1. Corollas yellow; heads with both ray and disk flowers (ray flowers absent in 1 species that is rare in nc TX).
2. Stem leaves deeply toothed or pinnately lobed or compound, the upper not clasping or but weakly so; phyllaries not black-tipped; plants annuals or perennials; ray flowers present \_\_\_\_\_ **Packera**
2. Stem leaves shallowly toothed to pinnately lobed (if pinnately lobed, then phyllaries with black tips and rays flowers absent), conspicuously clasping; phyllaries black-tipped or not so; plants annuals; ray flowers absent or present \_\_\_\_\_ **Senecio**
1. Corollas white, cream, or yellowish-white; heads with only disk or disk-like flowers.
3. Leaves entire or rarely toothed, with prominent,  $\pm$  parallel longitudinal nerves (often 7–9) eventually converging toward the tip; stem leaves few; heads with all florets bisexual; plants perennials; prairies and open woods, widespread in nc TX \_\_\_\_\_ **Arnoglossum**
3. Leaves sharply double serrate and sometimes irregularly lobed, with but a single prominent midnerve (prominent, parallel, longitudinal nerves lacking); leaves well-distributed up the stem; heads with marginal florets pistillate; plants annuals; wet areas in extreme ne part of nc TX \_\_\_\_\_ **Erechtites**

### VERNONIEAE TRIBE

1. Heads in dense clusters subtended by whorls of ca. 3 leaf-like ovate bracts ca. 1 cm long; leaves mostly basal, much larger than the reduced stem leaves; pappus of 5 bristles; phyllaries not purplish, often pale yellowish \_\_\_\_\_ **Elephantopus**
1. Heads without a whorl of leaf-like bracts; leaves  $\pm$  uniform in size and well-distributed up the stem; pappus a double row of numerous bristles, the outer much shorter than the inner; phyllaries often purplish \_\_\_\_\_ **Vernonia**

### ACHILLEA YARROW

☛ A mainly n temperate genus of 115 species; many are used medicinally or cultivated as ornamentals. (So named because its healing powers were said to have been discovered by Achilles of

Greek mythology; he supposedly stopped the flow of blood from the wounds of his Myrmidon warriors, perhaps with this plant—Arriagada & Miller 1997) (tribe Anthemideae)

REFERENCES: Mulligan & Bassett 1959; Arriagada & Miller 1997.

**Achillea millefolium** L., (thousand-leaved), MILFOIL, WESTERN YARROW, COMMON YARROW. Aromatic, woolly-pubescent, rhizomatous, perennial herb 35–100 cm tall, usually unbranched up to the inflorescence; leaves alternate, sessile, lanceolate, 2–3 times pinnately compound, fern-like in appearance and often confused with ferns by non-botanists, the crowded, narrow leaflets finely lobed or toothed; heads small, in a dense, terminal corymbose arrangement; ray flowers 5–12, white, rarely pinkish, the ligules ca. 2 mm long; disk corollas white or creamy white to pinkish; pappus absent. Roadsides, disturbed sites; widespread in TX. Apr–May. [*A. lanulosa* Nutt., *A. millefolium* var. *lanulosa*, *A. millefolium* subsp. *lanulosa* (Nutt.) Piper, *A. millefolium* var. *occidentalis* DC., *A. occidentalis* (DC.) Raf. ex Rydb.] While this species is often split into subspecific taxa (e.g., Kartesz 1994; Jones et al. 1997), Cronquist (1980) indicated that it is a highly variable polyploid complex with both native and introduced forms not yet satisfactorily sorted into infraspecific taxa. We are thus not recognizing subspecies or varieties. When the foliage is crushed, it releases a spicy odor. MILFOIL was attributed to have extensive curative powers by herbals of the Middle Ages, supposedly being useful in treating such conditions as influenza, gout, and ailments of the kidneys and liver (Wills & Irwin 1961). It was also used medicinally by Native Americans and is still used in folk remedies; however, ingestion was reported to cause irritation of mucous membranes and gastric and abdominal pain (Burlage 1968). ☘

## ACMELLA

☛ A mainly tropical genus of 30 species. Previously included in and closely related to *Spilanthes*. (Derivation of generic name unknown) (tribe Heliantheae)

REFERENCES: Jansen 1981, 1985a, 1985b.

**Acemella oppositifolia** (Lam.) R.K. Jansen var. **repens** (Walter) R.K. Jansen, (sp.: opposite-leaved; var.: creeping), CREEPING SPOTFLOWER. Herbaceous rhizomatous perennial, creeping, rooting at nodes; flowering branches ascending; leaves opposite, petioled; leaf blades ovate, rhombic to deltoid, 20–40 mm long, serrate; heads few, solitary, on axillary peduncles 5–15 cm long; phyllaries linear, in 2 series; ray flowers few, pistillate, infertile, the ligules ca. 5 mm long, yellow; disk flowers perfect, fertile, yellow; pales (= bracts on receptacle) about equaling disk flowers; receptacles elongate, conical, 8–10 mm long in fruit; achenes black; pappus absent or rarely with 1–2 awns. Low moist areas, ditches, ponds; Grayson, Red River, and Tarrant cos., also Parker Co. (nursery escape), also Ellis Co. (Jansen 1985a); mainly se and e TX, also Edwards Plateau. May–Nov. [*A. repens* (Walter) Rich., *Spilanthes americana* (Mutis) Hieron. var. *repens* (Walter) A.H. Moore]

## AMBLYOLEPIS HUISACHE DAISY

☛ A monotypic genus endemic to the sw United States and Mexico; previously treated in *Helenium*. (Greek: *ambly*, blunt, and *lepis*, scale) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCE: Bierner 1990.

**Amblyolepis setigera** DC., (bristle-bearing), HUISACHE DAISY. Small annual 10–50 cm tall with odor resembling recently cut *Medicago* hay or *Melilotus*; stems and leaf margins with long, wide-spreading, cottony hairs; leaves sessile, entire, the lowest oblanceolate, the upper ovate and clasping; heads long-peduncled and large, the involucre 7–11 mm high; phyllaries in about 2 rows, slightly unequal, lanceolate, subappressed; ray and disk corollas yellow; disk hemi-

spherical-ovoid; achenes with a cage-like exterior of stout, separate ribs. Sandy or rocky open ground; Brown, Mills, and Shackelford cos., also Comanche and Hamilton cos. (HPC); se TX and w part of nc TX w to w TX. Mar–Jul. [*Helenium setigerum* (DC.) Britton & Rusby]

### AMBROSIA RAGWEED

Annual or perennial herbs, 0.3–3+ m tall; leaves alternate, alternate above and opposite below, or opposite, nearly sessile to petioled, palmately lobed or pinnatifid, sometimes aromatic; flowers unisexual, in separate heads, these on the same plant; staminate heads in spike-like or raceme-like inflorescences; phyllaries united and cup-shaped; anthers distinct; pistillate heads 1 or few-flowered, axillary, below the staminate; phyllaries united, enclosing the achenes at maturity, forming a hard indehiscent “bur” or “fruit,” the bur often with the tips of the phyllaries projecting as spines or tubercles; corollas and pappus absent.

☛ A cosmopolitan, but especially American genus of 43 species. The flowers of *Ambrosia* species are small and wind-pollinated; the abundant air-borne pollen is a problematic cause of allergic reactions during the fall and is considered the leading cause of hay fever in the U.S. (Lewis & Elvin-Lewis 1977). The allergic response is initiated when pollen grain proteins (antigens) attach to receptors on antibodies (immunoglobulin E–IgE) linked to immune system cells. This results in the immune cells releasing histamines which are the molecules directly responsible for the symptoms known as hay fever (Kuby 1997; Lim 1998). A cladistic study by Karis (1995) suggested that *Xanthium* is a monophyletic clade in a paraphyletic *Ambrosia* (Early Greek name for aromatic plants; the mythic food of the gods) (tribe Heliantheae)

REFERENCES: Rydberg 1922; Payne 1964; Lee & Dickinson 1980; Lee 1981; Karis 1995.

1. Leaves 3–5-lobed or sometimes unlobed.
  2. Side lobes of leaves basically a large tooth on each side, these a small fraction as large as the middle lobe; lobes or whole leaf (if unlobed) 12 mm wide or less; plants < 1 m tall; sap not red; staminate heads sessile \_\_\_\_\_ **A. bidentata**
  2. Side lobes of leaves not much smaller than the middle lobe; lobes or whole leaf > 12 mm wide (often much more); plants 1–3(–5) m tall; sap often red; staminate heads on short stalks \_\_\_\_\_ **A. trifida**
1. Leaves pinnatifid, divided into numerous narrow segments.
  3. Leaves 1–4 times pinnatifid, parsley-like in appearance, with petioles to 15 cm long (longest on lower leaves); staminate involucre to 10 mm across; spines of the bur (0–)10–20, in several series on the upper 2/3 of the body of the bur; rare in nc TX \_\_\_\_\_ **A. confertifolia**
  3. Leaves 1–3 times pinnatifid, but not parsley-like, subsessile or with petioles to only 3 cm long; staminate involucre ca. 2.5–3 mm across; spines or tubercles of the bur 5–7, in a single series near the middle to the apex (= beak) of the bur; widespread throughout nc TX.
    4. Stem leaves petioled; plants annuals with a taproot; female involucre with 5–7 short spines \_\_\_\_\_ **A. artemisiifolia**
    4. Stem leaves essentially sessile; plants perennials from creeping rootstocks; female involucre with 4–6 short, stout tubercles, these sometimes obscure \_\_\_\_\_ **A. psilostachya**

***Ambrosia artemisiifolia* L.**, (with leaves like *Artemisia*—sagebrush, wormwood), COMMON RAGWEED, ROMAN WORMWOOD, SHORT RAGWEED, ALTAMISA, HOGBRAKE. Annual; stems 0.3–1 m tall; leaves opposite or uppermost sometimes alternate, pinnatifid to bipinnatifid, with petioles usually 10–30 mm long; staminate heads short-stalked; “fruits” ca. 3 mm long, obovoid in outline, the spines subulate. Disturbed areas; se and e TX w to nc TX and Edwards Plateau. Aug–Nov.

***Ambrosia bidentata* Michx.**, (two-toothed), SOUTHERN RAGWEED, LANCE-LEAF RAGWEED. Annual; stems 0.3–1 m tall; leaves alternate above, opposite towards base, sessile, narrowly ovate, 3–5 cm long, usually with a broad tooth or small lobe on each side at the blade base; staminate

heads sessile with oblique involucre; "fruits" ca. 5 mm long, 4-angled, the spines 4. Prairies; Grayson and Lamar cos. in Red River drainage and Bowie Co. and Sabine Co. (G. Nesom, pers. comm.) in extreme e TX are apparently the only records for the state. Aug-Sep.

**Ambrosia confertiflora** DC., (with flowers crowded together), FIELD RAGWEED, BUR-SAGE. Perennial, forming colonies; stems 0.3–0.6(–1.8) m tall; leaves alternate, 1–4 times pinnatifid, often with 1–several pair of small lobes on the petiolar bases below the main blade; staminate heads short-stalked; "fruits" ca. 5 mm long, the spines usually (0–)10–20, ca. 1–2 mm long, with hooked tips. Disturbed areas; mainly w 1/2 of TX e to Brown and Mills cos. on w margin of nc TX, disjunct e to Dallas Co. Mostly Aug–Nov.

**Ambrosia psilostachya** DC., (naked spike), WESTERN RAGWEED, PERENNIAL RAGWEED. Perennial, forming colonies; stems 0.3–0.6(–1+) m tall; leaves pinnatifid, sessile; staminate heads short-stalked; "fruits" ca. 2.5 mm long, obovoid in outline, the tubercles acute or blunt. Disturbed areas; nearly throughout TX. Aug–Nov. [*A. cumanensis* of authors, not Kunth] Used as a medicinal tea by Native Americans.; also apparently inhibits the growth of some other organisms through allelopathy (Cheatham & Johnston 1995).

**Ambrosia trifida** L. var. **texana** Scheele, (sp.: three-parted; var.: of Texas), BLOOD RAGWEED, GIANT RAGWEED, BUFFALOWEED. Annual; sap blood red; stems often very tall, 1–3(–5) m tall; leaves usually opposite, palmately 3(–5)-lobed or uppermost rarely unlobed, scabrous on both sides, extremely so on upper surface, petioled; staminate heads stalked; "fruits" ca. 4 mm long, obovoid in outline, the tubercles 4–8, small or obsolete. Disturbed areas, often extremely abundant; nearly throughout the state except s TX and Trans-Pecos. Aug–Nov. The sap stains the hands red if the tissues are damaged.

### ANTENNARIA PUSSY-TOES, EVERLASTING, LADIES'-TOBACCO

☛ A temperate and warm area genus of 71 species of small dioecious herbs; some are cultivated as rock garden subjects. (Latin: *antenna*; the pappus of the male flowers have swollen tips resembling a butterfly's antennae) (tribe Inuleae)

REFERENCES: Bayer & Stebbins 1982; Bayer 1984, 1985; Anderberg 1991.

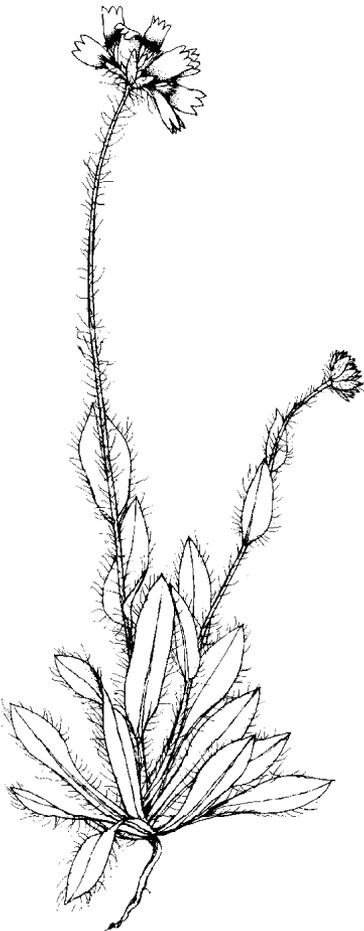
**Antennaria parlinii** Fernald subsp. **fallax** R.J. Bayer & Stebbins, (sp.: for its discoverer, John Crawford Parlin, 1863–1948, of Maine; subsp.: deceptive), LARGE-LEAF PUSSY-TOES, PLAIN-LEAF PUSSY-TOES. Small stoloniferous perennial to 25(–35) cm tall, gray-pubescent with matted, woolly hairs; leaves simple, entire, prominently 3- to 5-nerved, with conspicuously different upper and lower surfaces, olive green and glabrate above, gray woolly below; heads terminal, few, in a cymose cluster, unisexual; phyllaries with scarious or white tips; ray flowers absent; staminate flowers with prominent black-brown anthers; pistillate flowers with prominent, white, hair-like pappus; achenes < 1 mm long. Sandy woods; e TX w to West Cross Timbers. Mar–Apr. [*A. fallax* Greene] Thought to be a polyploid of hybrid origin (Bayer & Stebbins 1982; Bayer 1985).

### ANTHEMIS MAYWEED, DOG-FENNEL, CHAMOMILE

☛ An Old World genus of ca. 210 species ranging from Europe through the Mediterranean region to Iran and e Africa; some are medicinal; others are cultivated as ornamentals. (Greek name for the related *Chamaemelum nobile* (L.) All., camomile; probably derived from *antheon*, flower) (tribe Anthemideae)

REFERENCE: Arriagada & Miller 1997.

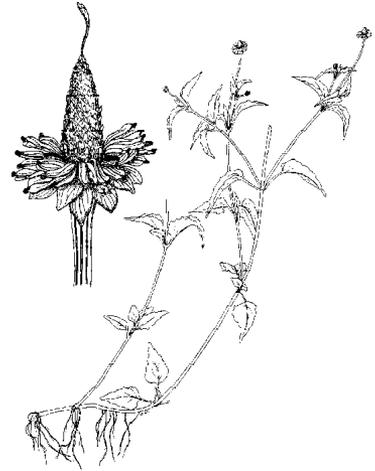
**Anthemis cotula** L., (small cup), MAYWEED CHAMOMILE, MAYWEED, DOG-FENNEL, STINKING CAMOMILE, STINKWEED. Rankly aromatic, slightly and inconspicuously pubescent, annual to 60 cm



*Amblyolepis setigera* [HEA]



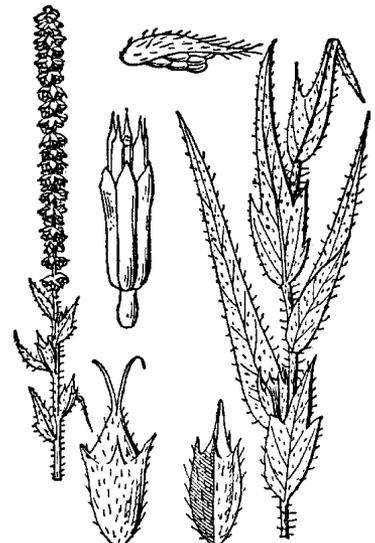
*Achillea millefolium* [REE]



*Acnella oppositifolia* var. *repens* [CO1]



*Ambrosia artemisiifolia* [REE]



*Ambrosia bidentata* [BB2]



*Ambrosia confertiflora* [PAR]



*Ambrosia psilostachya* [REE]



*Ambrosia trifida* var. *texana* [REE]

tall; leaves alternate, finely and deeply cut, twice compound or pinnately lobed; heads corymbose; phyllaries appressed, scarious-margined; ray flowers 10–14 per head, sterile, persistent and reflexed in age, the ligules white, ca. 7–12 mm long; disk ovoid-conical; disk corollas greenish yellow; achenes 1–1.5 mm long; pappus absent. Sandy roadsides, pastures, disturbed areas; cultivated and escaped; Dallas, Denton, Fannin, Grayson, Hopkins, Kaufman, and Palo Pinto cos.; se and e TX w to nc TX. Apr–May. Native of Europe. Reverchon (1880) stated that its introduction in Dallas Co. dates from 1875. Source of an insecticide and reported to taint cow's milk (Mabberley 1987); related to *Chamaemelum nobile*, which is the source of the stomach remedy camomile. ☞

### APHANOSTEPHUS LAZY DAISY, DOZE DAISY

Annual or perennial herbs; leaves alternate, with narrowed, petiolar base; blades linear to oblong-oblancheolate, varying from entire to pinnately lobed; heads solitary or corymbose; ray flowers with ligules white to pink, often rose-red or rose-purple beneath, spreading from mid-morning to late afternoon, erect at night; disk corollas yellow; pappus minute to small, 1 mm or less long.

☞ A genus of 4 species endemic to the United States and Mexico. The common names refer to the flowers remaining closed until mid-morning or later (Ajilvsgi 1984); the often rose-red or rose-purple undersides of the unopened ray flowers are conspicuous (Kirkpatrick 1992). (Presumably from Greek: *aphanes*, unseen or hidden, and *stephanus*, crown, presumably from the inconspicuous pappus) (tribe Astereae)

REFERENCES: Shinnars 1946c; Turner 1984, Elisens et al. 1992.

- Plants soft-pubescent to hispid-pubescent with spreading to reflexed hairs (usually < 1 mm long); heads not crowded, on long peduncles naked for 15–100 mm below the heads (to 150 mm in age); ray flowers 16–85 per head.
- Ray flowers with ligules 5–10 mm long; pappus a ring of minute subequal hairs 0.25 mm or less long; bases of disk corollas only slightly enlarged at maturity; plants taprooted annuals or clump-forming perennials; w part of nc TX.
- Ray flowers usually 16–32 per head; plants annuals from slender taproot \_\_\_\_\_ **A. ramosissimus**
- Ray flowers 40–85 (as few as 25 in second flowering of summer and fall) per head; plants perennials forming clumps from branched, woody root \_\_\_\_\_ **A. riddellii**
- Ray flowers with ligules 8–15 mm long; pappus an uneven crown of ca. 5 small acute scales 0.25–1 mm long; bases of disk corollas becoming swollen (to 2 times or more their original diam.) and hardened at maturity; plants taprooted annuals; widespread in nc TX \_\_\_\_\_ **A. skirrhobasis**
- Plants conspicuously hispid with long (0.7–2.2 mm long), coarse, jointed, translucent hairs spreading at right angles; heads ± crowded, on short peduncles naked for only 3–12 mm below the heads (to 25 mm in age); ray flowers 12–18 \_\_\_\_\_ **A. pilosus**

**Aphanostephus pilosus** Buckley, (pilose, with long soft hairs), HAIRY LAZY DAISY. Small annual; stems 6–33 cm tall; involucre 4.5–5.5 mm high, 4–6 mm wide; ligule 5–7 mm long, white to rosy-lavender, especially upon withering; pappus a cup-like, small, scaly crown 0.3–0.4 mm tall. Sandy or silty soils; low prairies, draws, and ditches; Archer, Clay, and Jack cos. in w part of nc TX; Rolling Plains and West Cross Timbers; also disjunct e to Red River Co. May–Jun.

**Aphanostephus ramosissimus** DC., (much-branched), PLAINS LAZY DAISY, ARIZONA LAZY DAISY. More or less soft pubescent annual, often widely branched and partly decumbent; stems 5–45 cm tall; involucre 3.3–5 mm high, 5–9 mm wide; ligule 5.5–7.5 mm long, white or becoming rose to purple, especially on lower surface; pappus minute, to 0.25 mm long. Sandy open woods, fields, prairies, and roadsides; Archer and Erath cos., also disjunct e to Tarrant Co., also Callahan Co. (Shinnars 1946c); w part of nc TX s and w to w TX; Apr–Jun(–Aug).



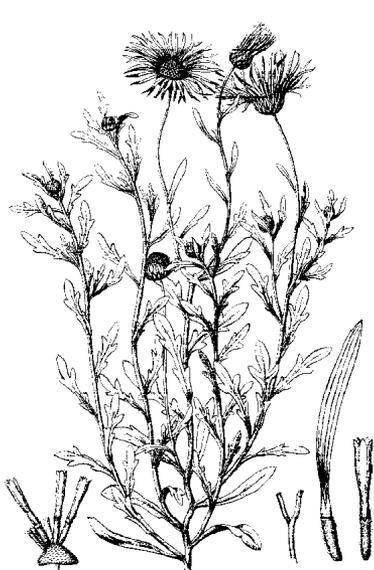
*Anthemis cotula* [REE]



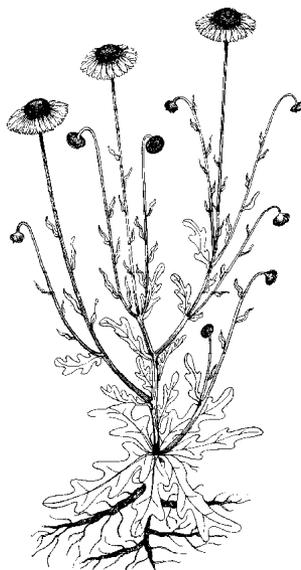
*Antennaria parlinii* subsp. *fallax* [HEA]



*Aphanostephus pilosus* [BR3]



*Aphanostephus ramosissimus* [MAR]



*Aphanostephus riddellii* [JON]



*Aphanostephus skirrhobasis* [BB2]

**Aphanostephus riddellii** Torr. & A. Gray, (for John Leonard Riddell, 1807–1865, botanist), RIDDELL'S LAZY DAISY. Hispid-pubescent perennial; stems 10–50 cm tall; heads usually numerous, rather large and long-peduncled; involucre 4.5–6.2 mm high, 9–14 mm wide; ligule 7–10 mm long, white; pappus minute, to 0.2 mm long. Rocky or sandy ground, chiefly on limestone; Burnet, Coleman, and Shackelford cos. on w margin of nc TX s and w to w TX. Apr–Jun(–Jul–Oct).

**Aphanostephus skirrhobasis** (DC.) Trel., (possibly white parasol rosy at base, from the ligules colored on the lower surface), ARKANSAS LAZY DAISY. Soft, gray-pubescent annual from a taproot; stems to 50 cm tall; heads rather large; involucre 6–8 mm high, 7–13 mm wide; ray flowers 20–44 with ligules 8–15 mm long, white or reddish to rosy on the lower surface, the color of ten streaked; pappus minute, 0.25–1 mm long. Sandy open woods, fields, prairies, and roadsides; widespread in TX. Apr–Jun, sporadically later. Sometimes cultivated as an ornamental. ☒/78

### ARNOGLOSSUM INDIAN-PLANTAIN

☛ A genus of 7 species native to the e United States; previously recognized in *Cacalia*. (Presumably from Greek: *arnos*, lamb, and *glossa* tongue) (tribe Senecioneae)

REFERENCES: Shinnars 1950c; Robinson 1974; Pippen 1978.

**Arnoglossum plantagineum** Raf., (resembling *Plantago*—plantain), PRAIRIE-PLANTAIN, GROOVE-STEM INDIAN-PLANTAIN, TUBEROUS INDIAN-PLANTAIN. Glabrous, coarse perennial from fleshy-fibrous roots, 0.5–1(–1.5) m tall; stems striate-angled, often dark purple; basal leaves conspicuous, 5–15+ cm long, 2–8 cm wide, long-petioled, the blades elliptic or ovate, entire or rarely toothed, somewhat thick and fleshy, with prominent ± parallel, longitudinal nerves (often 7–9) eventually converging toward the tip; stem leaves relatively few, alternate, much smaller, the upper subsessile; heads numerous in a broad corymbose arrangement at apex of plant; phyllaries 5, 7–10 mm long, with narrow, sharp, prominent keel; ray flowers absent; disk corollas 5, creamy white; achenes 4–5 mm long; pappus of numerous slender bristles. Prairies, fields, and open woods; se and e TX w to Denton, Grayson, McLennan, Tarrant, and Williamson cos., also Hamilton (HPC) and Somervell (Fossil Rim Wildlife Center—R. O'Kennon, pers. obs.) cos.; also Edwards Plateau. Apr–Jun, rarely late Sep–Nov. [*Cacalia plantaginea* (Raf.) Shinnars]. The striking leaves and erect flowering stalks make this species a conspicuous spring component of many nc TX prairies and fields.

The only other *Arnoglossum* species in TX, *A. ovatum* (Walter) H. Rob. (LANCE-LEAF INDIAN-PLANTAIN), occurs in se and e TX. It has lanceolate leaves, phyllaries without keels, and flowers from Jul–Oct.

### ARTEMISIA SAGEBRUSH, WORMWOOD, SAGEWORT, SAGE, MUGWORT

Ours perennial or biennial herbs or slightly subshrubby below; white-pubescent or nearly glabrous, often aromatic; leaves alternate, entire or deeply lobed, the segments linear to oblong, elliptical, or ovate; heads small, in numerous panicles; involucre white-woolly or nearly glabrous; ray flowers fertile or infertile, 1–few; corollas yellowish white; disk flowers fertile or infertile, corollas minute, yellowish white; achenes ca. 1 mm or less long; pappus absent.

☛ A genus of ca. 350 species of the n temperate area, w South America, and s Africa; usually in dry areas. *Artemisia* species are wind-pollinated and cause allergies; they are typically aromatic shrubs and herbs; *Artemisia tridentata* Nutt. is the famous SAGEBRUSH widespread in the w 1/2 of the U.S.; TARRAGON, a culinary herb, is obtained from the Eurasian *A. dracuncululus* L.; the WORMWOOD of the Bible is *A. herba-alba* Asso; the harmful green liqueur, absinthe, is made from the European *A. absinthium* L. (Ancient name of *Artemisia vulgaris* L., MUGWORT, from Greek goddess of the hunt, Artemis, or possibly from Artemisia, wife of Mausolus, king of Caria) (tribe Anthemideae)

REFERENCES: Hall & Clements 1923; McArthur & Welch 1984; Arriagada & Miller 1997.

1. Leaf blades nearly glabrous, usually very deeply and finely dissected, the divisions linear to thread-like, 2 mm wide or less; foliage not aromatic; disk flowers sterile; on extreme w margin of nc TX \_\_\_\_\_ **A. campestris**
1. Leaf blades conspicuously grayish or whitish woolly on both surfaces or at least on lower surfaces, entire to lobed or dissected, the main axis and lobes usually 3–10+ mm wide; foliage aromatic; disk flowers all fertile; throughout nc TX \_\_\_\_\_ **A. ludoviciana**

**Artemisia campestris** L. subsp. **caudata** (Michx.) H.M. Hall & Clem., (sp.: of the fields or plains; subsp.: tailed), WESTERN SAGEWORT, THREAD-LEAF SAGEWORT. Biennial or weakly perennial herb 30–90 cm tall; involucre essentially glabrous, 2.5–4 mm high. Roadsides, prairies, open areas; Callahan Co. on extreme w margin of nc TX; mainly Plains Country and Trans-Pecos. Sep–Oct. [*A. caudata* Michx.]

**Artemisia ludoviciana** Nutt. subsp. **mexicana** (Willd. ex Spreng.) D.D. Keck, (sp.: of Louisiana; subsp.: of Mexico) MEXICAN SAGEBRUSH. Perennial herb, rarely slightly subshrubby, 20–90(–150) cm tall; leaves very variable in shape, usually some lobed or dissected but varying to entire, also variable in terms of pubescence, the young leaves white woolly above and below to glabrate and dark green above and white woolly below; inflorescences compact to open diffuse; involucre grayish or white woolly, 2.5–4+ mm high. Prairies, disturbed habitats; widespread throughout most of TX. Oct–Nov. [*A. ludoviciana* var. *mexicana* Willd. ex Spreng.] According to Jones et al. (1997) and J. Kartesz (pers. comm. 1997), subsp. *ludoviciana* does not occur in TX.

**ASTER**

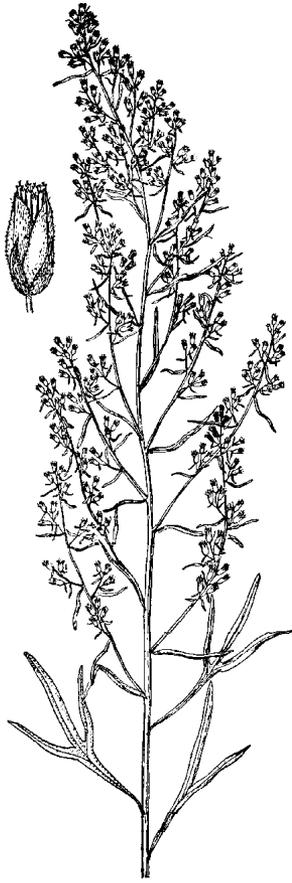
Ours herbaceous perennials (1 species annual); leaves alternate, simple, entire to toothed; heads usually numerous; ray flowers fertile, the ligule often conspicuous, white to pink, blue, violet, or purplish, never yellow; disk flowers perfect, the corollas yellow to rose, purple, or blue; phyllaries imbricated, the tips usually green; receptacles naked; achenes somewhat flattened; pappus of hair-like bristles, white.

☛Mabberley (1997) viewed *Aster* as a large genus of ca. 250 species found in America, Eurasia, and Africa; a number are cultivated; many species hybridize and intergrade; definite identification is often difficult. Nesom (1994b) treated *Aster* as an essentially Old World genus of ca. 180 species; he divided the New World taxa traditionally recognized in *Aster* into 13 genera (number of species in parentheses): *Ampelaster* (1), *Almutaster* (1), *Chloracantha* (1), *Canadanthus* (1), *Doellingeria* (11 total, 3 from North America, 8 from Asia), *Eucephalus* (11), *Eurybia* (28), *Ionactis* (5), *Oclemena* (3), *Orøstemma* (3), *Psilactis* (6), *Sericocarpus* (5), and *Symphyotrichum* (97). All nc TX *Aster* species fall into *Symphyotrichum* Until consensus is reached on generic circumscription in the Asteraceae, we are following the conservative approach in maintaining all nc TX species (except *Chloracantha*) in the genus *Aster*; however, appropriate synonymy is provided. Semple et al. (1996) also retained *Symphyotrichum* in *Aster*. (Greek, *aster*, a star, from the radiate heads) (tribe Astereae)

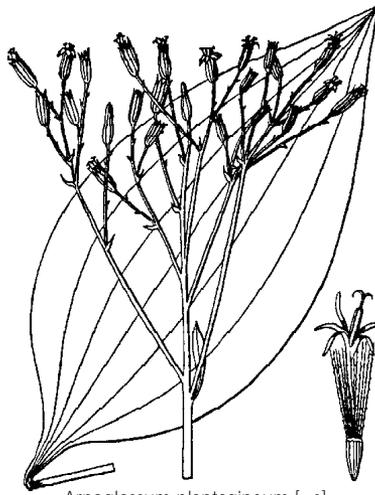
REFERENCES: Shinnars 1953e; Jones, A. 1978a, 1978b, 1980, 1983, 1984, 1987, 1992; Semple & Brouillet 1980a, 1980b; Jones, A. & Young 1983; Jones, R. 1983; Semple & Chmielewski 1987; Nesom 1994b, 1997a; Semple et al. 1996.

1. Uppermost leaves crowding heads, not much reduced in size, sometimes canescent, longer and broader than phyllaries, partly hiding phyllaries or grading into them; head-bearing branchlets few, usually only 10–30 per plant; heads 20–30 mm in diam. when ligules fully extended.
2. Outer phyllaries glabrous to slightly pubescent, 2–3 mm wide, marginally with a fringe of minute cilia; involucre 10–20 mm wide; widespread in nc TX \_\_\_\_\_ **A. pratensis**
2. Outer phyllaries with antrorse-appressed whitish pubescence, 1.3–2 mm wide, not distinctly fringed; involucre 7–12 mm wide; rare in nc TX \_\_\_\_\_ **A. sericeus**

1. Uppermost leaves not crowding or hiding phyllaries, usually reduced in size, not canescent, smaller than phyllaries; head-bearing branchlets usually more numerous than 30 per plant; heads often smaller than 20 mm in diam.
2. Phyllaries with greenish, linear (very narrow) midrib; leaves on the branches usually subulate, tapered from base to apex, usually  $\pm$  entire; head-bearing branchlets usually not very leafy (reduced bracts present).
3. Ligules of ray flowers usually white; leaves small or nearly absent; plants superficially reed-like, usually without well-developed leaves; usually some branchlets developed into thorns; plants perennials forming colonies from creeping rhizomes \_\_\_\_\_ see **Chloracantha**
3. Ligules of ray flowers white, violet, purplish, blue, or pink; leaves well-developed, at least basally; plants not reed-like; thorns absent; plants annuals from a taproot \_\_\_\_\_ **A. subulatus**
2. Phyllaries with greenish central midrib narrowly to broadly rhomboid (= diamond-shaped) or obovate; leaves on the branches often ovate to lanceolate or linear (rarely subulate), often serrate; head bearing branchlets leafy or not so.
  4. Stem leaves sessile and conspicuously auriculate-clasping \_\_\_\_\_ **A. patens**
  4. Stem leaves sessile or petiolate, not auriculate-clasping.
    5. Phyllaries, peduncles, and often also the leaves and upper stems glandular (use lens); basal and lower cauline leaves sessile \_\_\_\_\_ **A. oblongifolius**
    5. Phyllaries, peduncles, leaves, and stems varying from glabrous to hairy, but not glandular; basal and lower cauline leaves sessile to petiolate.
    6. Longest phyllaries usually only ca. 3–4 mm long, obtuse, with a fringe of a few short cilia; ligules of ray flowers white \_\_\_\_\_ **A. ericoides**
    6. Longest phyllaries usually longer than 4 mm OR ciliate fringe absent; ligules of ray flowers white OR variously colored.
    7. Basal and lower stem leaves with long, winged petiolar bases quite distinct from the much wider well-delimited blade portion.
    8. Stem leaves usually cordate (sometimes truncate) where narrowed to petiolar base; leaves of inflorescence obovate to elliptic or lanceolate, not linear; middle and sometimes even upper stem leaves sharply serrate \_\_\_\_\_ **A. drummondii**
    8. Stem leaves usually rounded or truncate or even attenuate where narrowed to petiolar base; leaves of inflorescence linear; middle and upper stem leaves usually entire \_\_\_\_\_ **A. oolentangiensis**
  7. Basal and lower stem leaves sessile or gradually narrowed to base, not distinctly differentiated into petiolar and blade portions.
    9. Mid-stem leaves linear, only 10–25(–34) mm long, 1–3(–5) mm wide; leaves of the head-bearing branchlets numerous, linear-subulate \_\_\_\_\_ **A. dumosus**
    9. Mid-stem leaves usually wider than linear, usually averaging longer than 20 mm, 3–20 mm wide; leaves of head-bearing branchlets variable but often wider than linear-subulate.
      10. Leaves on the ultimate branchlets just below heads < 1 mm wide, scale-like \_\_\_\_\_ **A. oolentangiensis**
      10. Leaves on the ultimate branchlets just below heads 2 mm or more wide, not scale-like.
        11. Phyllaries usually not greatly differentiated in size, the outer smallest ones (1/3–)1/2 or more as long as the inner; disk corolla limb (= flaring portion above tube) not deeply divided, the lobes < 1/2 the length of limb; heads 10–25 mm in diam. when ligules fully extended; ray flowers 15–40, the ligules bluish white, lavender, or white.
        12. Reticulate brownish veins usually conspicuous on lower leaf surface (use lens), the enclosed areolae  $\pm$  isodiametric; ray flowers 15–25, the



*Artemisia ludoviciana* subsp. *mexicana* [GLE]



*Arnoglossum plantagineum* [BB2]



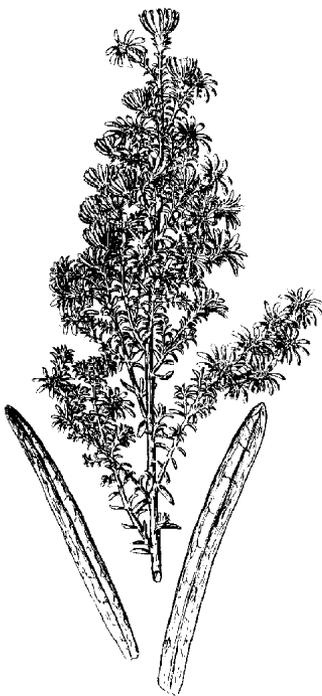
*Artemisia campestris* subsp. *caudata* [BB2]



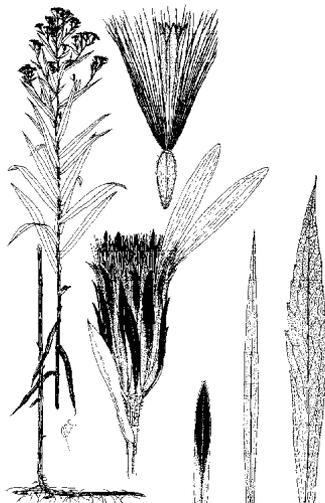
*Aster drummondii* var. *texanus* [HEA]



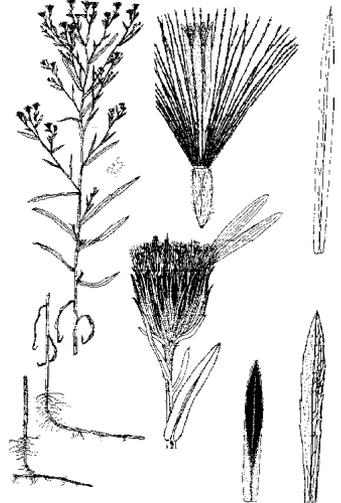
*Aster dumosus* [HEA]



*Aster ericoides* [DL]



*Aster lanceolatus* subsp. *hesperius* [UWA]



*Aster lanceolatus* subsp. *lanceolatus* [UWA]

- ligules usually bluish white or lavender (rarely white); achenes brown or purple at maturity; widespread in nc TX \_\_\_\_\_ **A. praealtus**
12. Reticulate brownish veins not conspicuous on the lower leaf surface, the inconspicuous areolae not isodiametric; ray flowers 20–40, the ligules usually white; achenes gray at maturity; apparently rare in nc TX \_\_\_\_\_ **A. lanceolatus**
11. Phyllaries more differentiated in size, the outer smaller ones 1/3 as long as the inner; disk corolla limb deeply divided, the lobes ca. 1/2–3/4 the length of the limb; heads small, 8–13 mm in diam. when ligules fully extended; ray flowers 9–15(–20), the ligules white \_\_\_\_\_ **A. lateriflorus**

**Aster drummondii** Lindl. var. **texanus** (E.S. Burgess) A.G. Jones, (sp.: for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America; var. of Texas), TEXAS ASTER. Perennial with short rhizomes; stem leaves ovate to cordate, large, 6–12(–15) cm long, 3–5(–6) cm wide, persistent, with broadly winged petioles; uppermost leaves reduced; involucre 5–6 mm high; ray flowers 10–20, the ligules usually deep purple to blue-lavender (rarely white); disk corollas cream to yellow, turning purple with age. Open woods and prairies; se and e TX w to West Cross Timbers and e edge of Edwards Plateau. Mostly Oct–Nov, rarely Mar–Apr. [*A. texanus* E.S. Burgess, *A. texanus* subsp. *texanus* (E.S. Burgess) A.G. Jones, *Symphyotrichum drummondii* (Lindl.) G.L. Nesom var. *texanum* (E.S. Burgess) G.L. Nesom]

**Aster dumosus** L., (bushy), BUSHY ASTER, RICE-BUTTON ASTER. Perennial, rhizomatous; stem leaves linear, 10–25(–34) mm long, 1–3(–5) mm wide, often falling early; leaves of the head-bearing branches numerous, minute, bract-like, linear-oblong; heads 8–15 mm in diam. when ligules are fully extended; involucre 3–5 mm high; ray flowers 4–7(–8) mm long, pink, lavender, bluish white, or sometimes white. Low areas, roadsides, sandy or clay soils; Lamar Co. in Red River drainage; mainly se and e TX. Aug–Oct. [*A. dumosus* var. *cordifolius* (Michx.) Torr. & A. Gray, *A. dumosus* var. *subulifolius* Torr. & A. Gray, *Symphyotrichum dumosum* (L.) G.L. Nesom] We are following Hatch et al. (1990) and Jones (1992) in not distinguishing varieties.

**Aster ericoides** L., (resembling *Erica*–heath), HEATH ASTER, WHITE PRAIRIE ASTER, WREATH ASTER. Perennial, rhizomatous, usually much branched; stem leaves linear or oblong, sessile, entire, usually lost before flowering time; leaves of branchlets 2–3 mm long and ca. 1 mm wide, persistent; heads crowded; involucre 4–7 mm broad; ray flowers with ligules white, slightly exceeding the pappus. Disturbed or open areas; widespread in TX. Sep–Oct(–Nov). [*Symphyotrichum ericoides* (L.) G.L. Nesom]

**Aster lanceolatus** Willd., (lanceolate, lance-shaped), PANICLED ASTER, TALL WHITE ASTER. Rhizomatous perennial; basal and larger stem leaves early deciduous; main stem leaves sessile or subsessile, elliptic or oblanceolate to linear-lanceolate (4–)6–15 cm long, (0.5–)1–2(–3.5) cm wide; ray flowers with ligules white (rarely pink). Low areas. Aug–Nov. Similar to and apparently hybridizes and intergrades with *A. praealtus* (Jones 1984; Jones 1992). Semple and Chmielewski (1987) separated the 2 nc TX subspecies as follows:

1. Outer phyllaries 2/3 length or more of inner ones; heads usually subtended by large leafy bracts \_\_\_\_\_ subsp. **hesperius**
1. Outer phyllaries 1/3–2/3 length of inner ones; heads not usually subtended by large leafy bracts \_\_\_\_\_ subsp. **lanceolatus**

subsp. **hesperius** (A. Gray) Semple & Chmiel., (of the west), SISKIYOU ASTER. Included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990) and range map in Semple and Chmielewski (1987); Semple and Chmielewski (1987) mapped this subspecies as occurring in

the ne 1/4 of TX. [*A. hesperius* A. Gray, *Symphotrichum lanceolatum* (Willd.) G.L. Nesom subsp. *hesperium* (A. Gray) G.L. Nesom]

subsp. **lanceolatus**. Dallas Co., also Tarrant Co. (BAYLU); Semple & Chmielewski (1987) map this subspecies as occurring over the w 2/3 of TX. [*A. simplex* Willd., *A. lanceolatus* var. *simplex* (Willd.) A.G. Jones, *Symphotrichum lanceolatum* (Willd.) G.L. Nesom]

**Aster lateriflorus** (L.) Britton, (with one-sided flower clusters), CALIFORNIA ASTER, CALICO ASTER, SIDE-FLOWER ASTER, STARVED ASTER, WHITE WOODLAND ASTER. Rhizomatous perennial; larger stem leaves persistent at least in part, sessile or subsessile, elliptic-oblongate or linear (3-)5-10(-15) cm long, (0.2-)1-2(-3.5) cm wide; heads small, 0.8-1.3 cm in diam. when ligules are fully extended; ray flowers with ligules ca. 3-4 mm long, white. Well-drained uplands; Fannin, Henderson, Hopkins, Kaufman, and Limestone cos; se and e TX w to e part of nc TX. Sep-Oct. [*A. lateriflorus* var. *flagellaris*, *A. lateriflorus* var. *indutus* Shinnery, *Symphotrichum lateriflorum* (L.) Á. Löve and D. Löve] Because of intergradation, we are following Correll and Johnston (1970), Hatch et al. (1990), and Jones (1992) in not distinguishing varieties in this species.

**Aster oblongifolius** Nutt., (oblong-leaved), AROMATIC ASTER, OBLONG-LEAF ASTER. Rhizomatous perennial; leaves numerous; stem leaves oblong to linear-lanceolate, often subclasping, some usually persistent throughout flowering; leaves of the branchlets 3-10 mm long, 1-2 mm wide; heads not crowded; involucre 8-12 mm broad; phyllaries glandular-pubescent apically; ray flowers with ligules usually blue or purple. Calcareous soils, prairies; Denton and Grayson cos. in East Cross Timbers w to Rolling Plains and s to Edwards Plateau. Sep-Nov. [*Symphotrichum oblongifolium* (Nutt.) G.L. Nesom]

**Aster oolentangiensis** Riddell, (of Oolentangy [Olentangy] River in Ohio), AZURE ASTER, SKY-BLUE ASTER. Perennial; rhizomes short; basal and lower stem leaves truncate or rounded (rarely cordate), persistent; petioles winged; head-bearing branchlets with minute leaves; heads 10-25 mm in diam. when ligules fully expanded; involucre 5-8 mm high; ray flowers 10-25, with ligules blue or violet-purple (rarely white); disk flowers yellow, turning purple with age. Dry, sandy areas; Grayson and Henderson cos.; e TX w rarely to nc TX. Sep-Nov. [*A. azureus* Lindl., *Symphotrichum oolentangiense* (Riddell) G.L. Nesom]

**Aster patens** Aiton, (spreading), SPREADING ASTER, LATE PURPLE ASTER, SKY-DROP ASTER. Rhizomatous perennial; stem leaves obovate or spoon-shaped, conspicuously clasping, grayish green; leaves of head-bearing branchlets different, small, appressed; flowering heads showy, 20-35 mm in diam. when ray flowers fully extended; involucre 7-15 mm broad; phyllary tips often glandular-pubescent; ray flowers 10-15(-17) mm long, the ligules usually blue or purple (rarely pink or white). Disturbed or open, often sandy areas. Aug-Nov. Three intergrading and often difficult to distinguish varieties are reported from nc TX and separated by Jones (1992) as follows:

1. Involucre 8-10 mm high, broadly turbinate; median phyllaries ovate-lanceolate, 1.2-1.5 mm in width, obtuse, not squarrose and not obviously glandular, although sometimes with minute glands on the abaxial surface that are obscured by a densely canescent-strigillose indument \_\_\_\_\_ var. **patentissimus**
1. Involucre usually < 8 mm high, campanulate or slenderly turbinate; median phyllaries linear-lanceolate, usually < 1.2 mm in width, acute or acuminate, often at least somewhat squarrose, and distinctly glandular.
  2. Plants robust; principal cauline leaves 3-6(-8) cm long and 1-2 cm wide; median phyllaries 1-1.2 mm in width, sparsely strigillose on the abaxial surface mainly along the midrib, the glandularity usually very pronounced \_\_\_\_\_ var. **patens**
  2. Plants slender-stemmed; principal cauline leaves 1-3(-4) cm long and 0.5-1(-1.5) cm wide; median phyllaries slender, usually < 1 mm in width, densely cinereous-puberulent on the abaxial surface, the glandularity less pronounced \_\_\_\_\_ var. **gracilis**

var. **gracilis** Hook., (graceful). Predominantly diploid ( $2n = 10$ ). Se and e TX w to West Cross Timbers; also Edwards Plateau; by far the most common of the 3 varieties in nc TX. [*Symphyotrichum patens* (Aiton) G.L. Nesom var. *gracile* (Hook.) G.L. Nesom]

var. **patens**. SKY-DROP ASTER. Mostly tetraploid ( $2n = 20$ ). Included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); se and e TX w to nc TX. [*Symphyotrichum patens* var. *patens*]

var. **patentissimus** (Lindl. ex DC.) Torr. & A. Gray, (much-spreading). Mostly tetraploid ( $2n = 20$ ). Included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se and e TX. [*Symphyotrichum patens* var. *patentissimum* (Lindl. ex DC.) G.L. Nesom]

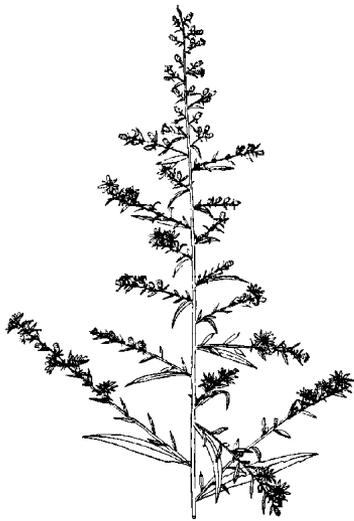
**Aster praealtus** Poir., (very tall), WILLOW-LEAF ASTER, WILL ASTER, TALL ASTER. Perennial, rhizomatous; stem leaves sessile, linear to narrowly elliptic, 4–12(–15) cm long, 0.3–1.5 cm wide; lower ones falling early; leaves of the head-bearing branchlets very small and subulate or linear subulate; flowering heads 15–20(–25) mm in diam. when the ray flowers are fully extended; involucre ca. 4–8 mm high; ray flowers with ligules bluish white or lavender (rarely white). Low disturbed areas; se and e TX w to Rolling Plains and Edwards Plateau. Oct–Nov. While intergrading varieties are sometimes recognized in this species (e.g., Hatch et al. 1990; Kartesz 1994), we have been unable to find clear differences in the available material. We are thus lumping all the nc TX taxa. [*A. coerulescens* DC., *A. praealtus* var. *coerulescens* (DC.) A.G. Jones. *A. praealtus* var. *texicola* Wiegand, *A. salicifolius* Aiton, *Symphyotrichum praealtum* (Poir.) G.L. Nesom]

**Aster pratensis** Raf., (of the meadows), SILKY ASTER. Rhizomatous perennial similar to *A. sericeus* and often treated as a variety of that species; ray flowers with ligules purple to violet (rarely pinkish or white). Open woods, open areas, usually sandy soils; se and e TX w to East Cross Timbers, also Edwards Plateau. Sep–Nov. [*A. sericeus* var. *microphyllus* DC., *Symphyotrichum pratense* (Raf.) G.L. Nesom] While this taxon is often recognized as a var. of *A. sericeus* (e.g., Kartesz 1994; J. Kartesz, pers. comm. 1997), we are following Nesom (1994b) in recognizing it at the specific level.

**Aster sericeus** Vent., (silky), SILKY ASTER. Perennial, rhizomatous; stem leaves mostly falling before flowering; leaves of the head-bearing branchlets persistent, elliptic, not reduced below heads; ray flowers with ligules purple to violet (rarely pinkish or white). Open areas, rocky calcareous soils; Coryell Co. in the Lampasas Cut Plain; also Edwards Plateau. Aug–Oct. [*Symphyotrichum sericeum* (Vent.) G.L. Nesom]

**Aster subulatus** Michx. var. **ligulatus** Shinnery, (sp.: awl-shaped; var.: ligulate, strap-shaped), WIREWEED, BLACKWEED, SALT MARSH ASTER, SLIM ASTER. Annual, glabrous, much-branched; leaves linear to subulate, 1–10(–20) cm long, 2–4(–7) mm wide, much reduced up the stem, soon deciduous except those of the head-bearing branchlets; flowering heads 10–12(–15) mm wide when ray flowers are fully extended; involucre 3–5(–7) mm high; ligules of ray flowers blue, purple, violet, pink or white. Weed in lawns, ditches, wet areas; throughout TX. Aug–Nov. [*A. divaricatus* (Nutt.) Torr. & A. Gray [nom. illeg.], *A. exilis* Elliott, *Symphyotrichum divaricatum* (Nutt.) G.L. Nesom] This is the most abundant *Aster* in the state.

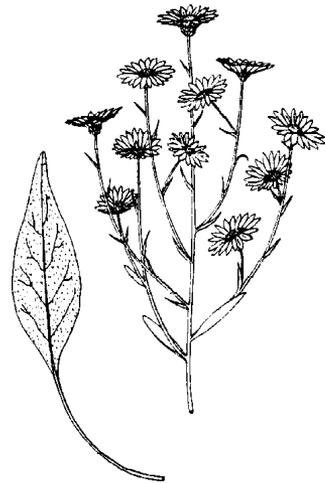
*Aster ×eulae* Shinnery, (for Eula Whitehouse, 1892–1974, of Southern Methodist Univ., TX collector, artist, and author of *Texas Flowers in Natural Color*), is cited by Kartesz (1994) as a hybrid, *Aster? ×eulae* Shinnery [*lancoelatus* × *praealtus*]. Most specimens at BRIT annotated as *A. eulae* seem very similar to *A. praealtus*. However, this entire complex of related asters, including *A. ×eulae*, *A. lancoelatus*, *A. lateriflorus*, and *A. praealtus*, is extremely difficult taxonomically. More work is needed to clarify these taxa. Jones et al. (1997) recognized *A. eulae* as a distinct species. Guy Nesom (1997 and pers. comm.) indicated that he believes *A. eulae* is a good



*Aster lateriflorus* [STR]



*Aster oblongifolius* [GLE]



*Aster oolentangiensis* [STR]



*Aster patens* var. *gracilis* [BB2]



*Aster patens* var. *patentissimus* [HEA]



*Aster patens* var. *patens* [STR]

species and that a study of this taxon is in progress. [*Symphyotrichum eulae* (Shinners) G.L. Nesom] Mahler (1988) separated *A. praealtus* and *A. eulae* as follows:

1. Stem leaves narrowly elliptical: outer phyllaries half as long as inner ones; involucre ca. 6 mm high \_\_\_\_\_ *A. praealtus*
1. Stem leaves elliptic to oblanceolate: outer phyllaries 1/3–1/4 as long as inner ones; involucre 4–5 mm high \_\_\_\_\_ *A. eulae*

### ASTRANTHIUM WESTERN DAISY

☞ A genus of 11 species endemic to the s United States and Mexico. (Greek, *astron*, star, and *anthos*, flower) (tribe Astereae)

REFERENCES: Larsen 1933; DeJong 1965.

***Astranthium integrifolium*** (Michx.) Nutt. subsp. ***ciliatum*** (Raf.) DeJong, (sp.: entire-leaved; subsp.: ciliate, fringed), WESTERN DAISY, BLUE DAISY. Low pubescent annual from a taproot; stems 10–40 cm tall; leaves alternate, the lowest with narrow, petiolar bases, the upper sessile; blades oblanceolate, entire; heads solitary at the ends of long peduncles, usually several per main stem; ray flowers 8–35, perfect, fertile, the ligules white to bluish white or pinkish white, not curling, 5–12 mm long; disk flowers perfect, fertile, yellow; disk rounded-conical; pappus absent or a minute ring or crown. Open woods, prairies, and roadsides, in sandy or silty clay soils; se and e TX w to Rolling Plains and Edwards Plateau. Mar–May. [*A. integrifolium* var. *ciliatum* (Raf.) Larsen, *A. integrifolium* var. *triflorum* (Raf.) Shinners] Barkley (1986) questioned the recognition of subsp. *ciliatum* by DeJong (1965).

### BACCHARIS GROUNDSELTREE

Shrubs or subshrubs, dioecious, pistillate and staminate plants with rather different appearance; leaves alternate, subulate to obovate, entire, serrate, or dentate, 1- or 3-nerved, glandular or punctate glandular; inflorescences somewhat paniculate or corymbose; involucre hemispheric to narrowly cylindrical; pistillate heads: ray flowers absent; disk flowers fertile; corollas filiform, yellowish white to brown; achenes 5–10-ribbed, yellow to reddish; pappus of numerous bristles; staminate heads: ray flowers absent; corollas funnelform, white to yellowish brown; ovary abortive; pappus of numerous bristles.

☞ An American genus of ca. 400 species of dioecious shrubs; some are used medicinally, while others are cultivated as ornamentals. Pistillate plants are necessary for definitive identification.

☠ The leaves and flowers of a number of species contain cardioactive glycosides and are considered dangerous, even fatal, to livestock (Hardin & Brownie 1993) (Name derived from Bacchus, god of wine) (tribe Astereae)

REFERENCES: Mahler 1955; Mahler & Waterfall 1964.

1. Leaf blades linear, ca. 1–2 mm wide; achenes 5–6-ribbed, 3–4.5 mm long, slightly to prominently glandular-scabrous; pistillate pappus of many series, light reddish brown; plants less than 1 m tall \_\_\_\_\_ **B. texana**
1. Leaf blades linear to oblanceolate, elliptic, rhomboid or obovate, usually > 2 mm wide (often much more); achenes 8–10-ribbed, 1–2 mm long, glabrous; pistillate pappus in 1–2 series, whitish or dull; plants usually 1–3(–6) m tall (but can flower at 0.5 m tall).
2. Leaf blades elliptic to rhomboid or obovate, the larger ones 22–37 mm wide, the upper leaves gradually reduced, narrower; pistillate involucre 4–6 mm long. \_\_\_\_\_ **B. halimifolia**
2. Leaf blades very narrowly elliptic to linear or oblanceolate, 2–8(–15) mm wide; pistillate involucre 4–8 mm long.
3. Pistillate involucre 5 mm or less long; leaves linear to very narrowly elliptic, usually 2–4(–5) mm wide; widespread in nc TX \_\_\_\_\_ **B. neglecta**



*Aster praealtus* [GLE]



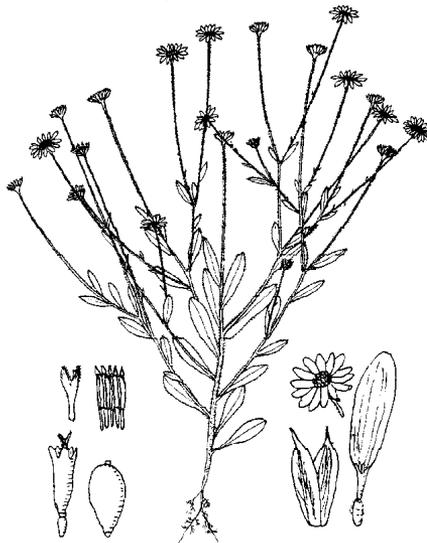
*Aster pratensis* [HEA]



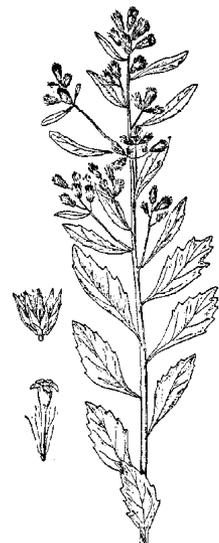
*Aster sericeus* [STE]



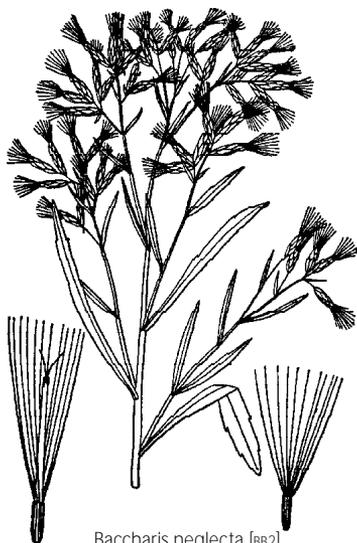
*Aster subulatus* var. *ligulatus* [BB2]



*Astrarthium integrifolium* [SM1, STE]



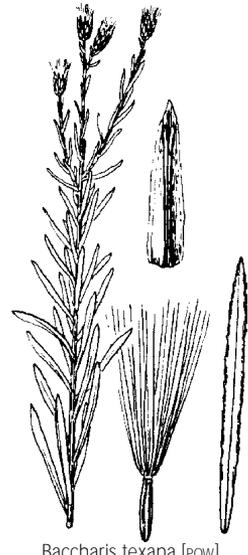
*Baccharis halimifolia* [GLE]



*Baccharis neglecta* [BB2]



*Baccharis salicina* [RVD]



*Baccharis texana* [POW]

3. Pistillate involucre 6–8 mm long; leaves oblanceolate, usually 4–8(–15) mm wide; w TX possibly e to w margin of nc TX \_\_\_\_\_

**B. salicina**

**Baccharis halimifolia** L., (with leaves like *Halimium* of the Cistaceae), EASTERN BACCHARIS, SEAMYRTLE, CONSUMPTION-WEED, TREE-GROUNDSSEL, GROUNDSELTREE, MANGLIER, SALTBUSH, SILVERLING. Shrub 1–6 m tall; leaves alternate; leaf blades punctate, entire in lower half, the upper half entire or with few to several teeth, with 1 prominent nerve and 2 lateral nerves, petiolate; achenes 1.0–1.7 mm long; pistillate pappus 9–14 mm long. Wet fields, edges of swamps and marshes, along creeks in woods; Dallas, Fannin, Henderson, and Lamar cos., also Hopkins Co. (Mahler & Waterfall 1964); mainly se and e TX. Oct–Nov. Salt tolerant. This species is a serious invasive pest in Tridens Prairie and similar areas in Lamar Co. Potentially toxic to livestock (Duncan et al. 1957; Burlage 1968). ☹

**Baccharis neglecta** Britton, (neglected, overlooked), ROOSEVELT-WEED, NEW DEAL WEED, JARA DULCE. Shrub 1–3 m tall; leaves sessile or short petiolate; leaf blades punctate, the upper entire, the lower entire to serrate, 1-nerved with lateral nerves obscure; achenes ca. 1.2 mm long; pistillate pappus 7–12 mm long. Calcareous soils; widely distributed in TX except e TX and Plains Country. Sep–Nov. This is the common *Baccharis* in most of nc TX.

**Baccharis salicina** Torr. & A. Gray, (resembling *Salix*—willow), SEEP-WILLOW, WATER-WILLOW, WATER-WALLY, JARA, WILLOW BACCHARIS. Shrub 1–3 m tall; leaves nearly sessile; leaf blades serrate, the wider ones 3-nerved; achenes 1.2–2 mm long; pistillate pappus to 12 mm long. Alluvial, often sandy or saline soils; included based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990); possibly no further e than Taylor and Wichita cos.; mainly Trans-Pecos and Plains Country. Sep–Nov.

**Baccharis texana** (Torr. & A. Gray) A. Gray, (of Texas), PRAIRIE BACCHARIS. Rhizomatous subshrub or shrub 0.25–0.6 m tall; leaves sessile, punctate, essentially linear, minutely undulate, 1-nerved; pistillate involucre 7–10 mm high; pistillate pappus 11–13 mm long. Calcareous soils, prairies; Bell, Callahan, Jack, Palo Pinto, and Tarrant cos., also Dallas Co., but not collected there since Bush in 1900 where he stated it was common (Mahler 1988); widespread in TX except e TX. Jul–Oct.

## BERLANDIERA GREENEYES

Pubescent, herbaceous to suffrutescent perennials; leaves alternate, the margins toothed to lyrate-pinnatifid; heads 1–several in corymbose clusters; ray flowers with ligules yellow to orange with conspicuous green or red to maroon veins on lower surface; disk flowers in ours reddish to maroon; pappus absent or inconspicuous.

☞ A genus of 4 species native to the s United States and Mexico. The disk flowers are subtended by green receptacular bracts giving the disk a green appearance—hence the name common name GREENEYES. (Named for Jean Louis Berlandier, 1805–1851, French botanist who explored TX, NM, and Mexico, and one of the first botanists to make extensive collections in TX). (tribe Heliantheae)

REFERENCES: Turner & Johnston 1956; Pinkava 1967; Nesom & Turner 1998.

- Ligules of ray flowers with veins on lower (= abaxial) surface red to maroon; at least some leaves lyrate-pinnatifid; peduncles scabrous to subscabrous; stems arising from a persistent basal rosette; known in nc TX only from Brown and Callahan cos. on extreme w margin of area \_\_\_\_\_ **B. lyrata**
- Ligules of ray flowers with veins on lower surface green; leaves variously toothed, not lyrate-pinnatifid; peduncles with spreading or matted hairs; stems not arising from a persistent basal rosette; scattered in n and e parts of nc TX.

- 2. Middle stem leaves usually with evident petioles, the blades ovate; peduncles with matted hairs; stems not densely leafy, the internodes often 3 cm or more long; e margin of nc TX \_\_\_\_\_ **B. pumila**
- 2. Middle stem leaves sessile or with inconspicuous short petioles, the blades ovate to triangular; peduncles with ± spreading hairs; stems very densely leafy, with most internodes 3 cm or less long; in nc TX from Dallas Co. n and w \_\_\_\_\_ **B. betonicifolia**

**Berlandiera betonicifolia** (Hook.) Small, (with leaves like *Betonica*—betony, now = *Stachys* in Lamiaceae), TEXAS GREENEYES. Plant weakly suffrutescent; stems to 1 m tall, producing a new crop of flowering branches from summit after spring blooming period; leaf blades 4–15 cm long, 2–6 cm wide; leaves evenly distributed or crowded near summit; leaf blades stiffly hirsute to subscabrous or loosely hairy but not velvety, the margins toothed; central stem leaves sessile or short-petioled; ray flowers with ligules 10.5–17 mm long; achenes 4.5–6 mm long, 3–5 mm wide. Sandy soils, post oak woods, ± open areas; Cooke, Dallas, Montague, and Wise cos.; also a single collection apparently as an introduced weed in Grayson Co.; also se and c TX and in the Panhandle. Jun–Sep. [*B. texana* DC.] We are following Nesom and Turner (1998) for nomenclature of this species. The name *B. betonicifolia* must be used since the type collection of *B. betonicifolia* (named in 1835) is of the same species as *B. texana* (named in 1836) (Nesom & Turner 1998). Plants from se TX which had previously gone under the name *B. ×betonicifolia* (Hook.) Small are now being recognized as a distinct variety of *B. pumila*

**Berlandiera lyrata** Benth., (lyre-shaped), LYRE-LEAF GREENEYES; BERLANDIER'S DAISY, CHOCOLATE DAISY, GREEN-EYED LYRE-LEAF. Perennial herb; stems to 1.2 m tall; leaves crowded toward base of plant; leaf blades velvety; ray flowers with ligules 10–14 mm long, sometimes the entire lower surface red to maroon; achenes 4.5–6 mm long, 2.7–3.7 mm wide. Dry rocky limestone areas, roadsides; Callahan Co., also Brown Co. (Stanford 1971); w margin of nc TX s and w to w TX. Nearly throughout the growing season. The flowers have a chocolate-like aroma (Kirkpatrick 1992).

**Berlandiera pumila** (Michx.) Nutt., (dwarf), SOFT GREENEYES. Plant herbaceous to suffrutescent; stems to 0.7 m tall; leaf blades velvety; central stem leaves often with long petioles; ray flowers with ligules 12–20 mm long; achenes 4.5–6 mm long, 3–4 mm wide. Roadsides, open wooded areas, often in sandy soils; Henderson Co. near extreme e margin of nc TX, also Hunt, Navarro, and Williamson cos. (Nesom & Turner 1998); mainly se and e TX. Spring–summer(–fall). [*B. dealbata* (Torr. & A. Gray) Small]

**BIDENS** BEGGAR-TICKS, BUR-MARIGOLD, TICKSEED-SUNFLOWER

Annual, biennial, or perennial herbs; leaves opposite, simple, divided, or compound; phyllaries in 2 series, the outer phyllaries herbaceous, the inner series hyaline- or yellow-margined; ray flowers present or absent, neuter, or pistillate and infertile; corollas in ours yellow or whitish; disk flowers perfect, fertile, yellow or orange-yellow; pappus of 1–4 usually barbed awns or sometimes reduced or absent; those with retrorse barbs are dispersed by attaching to hair or clothing.

☛ A genus of ca. 240 species, cosmopolitan, but especially in Mexico; a few are cultivated ornamentals while a number are considered weeds. (Latin: *bis*, twice, and *dens*, a tooth, in allusion to the two awns on the achenes of some species) (tribe Heliantheae)

REFERENCES: Sherff 1937; Sherff & Alexander 1955; Hall 1967; Lipscomb & Smith 1977; Mesfin et al. 1995a, 1995b.

- 1. Leaves simple, unlobed, serrate or nearly entire; ray flowers large and conspicuous, the ligules 15–30 mm long (rarely absent) \_\_\_\_\_ **B. laevis**
- 1. Leaves incised, lobed, or pinnatifid; ray flowers absent or small and inconspicuous or ligules large, 10–25 mm long.

2. Ray flowers well-developed, the ligules 10–25 mm long; pappus awns usually absent or reduced to a crown, if present, not retrorsely barbed \_\_\_\_\_ **B. aristosa**
2. Ray flowers absent or very small, the ligules 2–5 mm long; pappus awns present, retrorsely barbed.
3. Achenes linear, shaped like a fat needle, quadrangular, longer than inner phyllaries, usually 10–18 mm long; leaves 2–3 times pinnately dissected or compound with numerous segments; ray flowers with ligules yellowish white, inconspicuous and not exceeding the disk flowers; pappus of (2–)3–4 awns; outer phyllaries 3–7 mm long \_\_\_\_\_ **B. bipinnata**
3. Achenes narrowly wedge-shaped, flattened, equaling or shorter than phyllaries, 5–8(–10) mm long; leaves usually once pinnately or ternately divided or compound with 3–5 segments; ray flowers absent or present, if present ligules golden yellow, 2–3.5 mm long; pappus of 2 awns; outer phyllaries often 30–50 mm long \_\_\_\_\_ **B. frondosa**

**Bidens aristosa** (Michx.) Britton, (bearded), BEARDED BEGGAR-TICKS, AAWNLESS BEGGAR-TICKS, TICKSEED-SUNFLOWER. Annual or biennial, 0.3–1(–1.5) m tall; leaves 1–2-pinnate, the segments linear to lanceolate or narrowly ovate; petioles to 25 mm long; outer phyllaries 12–20, linear, 7–25 mm long, conspicuously hispid-ciliate; ray flowers ca. 8, golden yellow; achenes flat, 5.5–7.5 mm long, 3–3.5 mm wide; pappus awns absent or slightly developed and with erect-hispid teeth. Low moist areas; Fannin and Lamar cos. in Red River drainage; mainly se and e TX. Apr–Oct. [*B. polylepis* S.F. Blake]

**Bidens bipinnata** L., (twice-pinnate), SPANISH-NEEDLES. Annual, 0.3–1.5 m tall; stems ± square; leaves 2–3 times pinnately dissected or compound with numerous segments, the segments deltoid-lanceolate; petioles 20–50 mm long; outer phyllaries 7–10, linear, 3–7 mm long; inner phyllaries 5–9 mm long; achenes linear, quadrangular, usually 10–18 mm long, 0.6–1 mm in diam.; pappus awns 2–4 mm long. In moist soils; Bell, Dallas, Grayson, and Hopkins cos., also Tarrant Co. (R. O'Kennon, pers. obs.); se and e TX w to nc TX and Edwards Plateau; rare in Trans-Pecos. Aug–Oct. [*B. bipinnata* var. *bitematoides* Sherff] Jones et al. (1997) recognized TX material of this species as variety *bitematoides* Sherff.

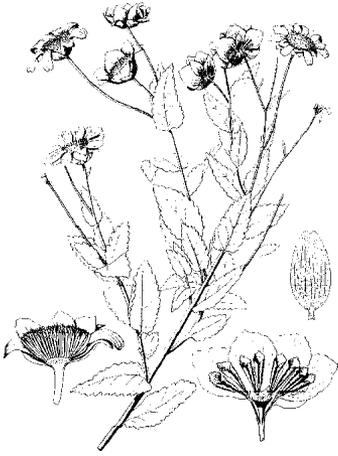
**Bidens frondosa** L., (leafy), BEGGAR-TICKS, STICKTIGHTS, DEVIL'S BEGGAR-TICKS. Annual 0.2–1.2 m tall; leaves once pinnately or ternately divided or compound, the 3–5 segments lanceolate, serrate; petioles 10–60 mm long; outer phyllaries 5–10, linear-spatulate, conspicuously ciliate, often very long (to 30–50 mm); inner phyllaries shorter, to 5–7 mm long; disk flowers with corollas orange-yellow; achenes 1-nerved on each face, flattened, narrowly wedge-shaped, 5–8(–10) mm long, 2.5–4 mm wide; pappus awns 3–4.5 mm long. Moist areas; se and e TX w to Rolling Plains and Edwards Plateau. Sep–Oct.

**Bidens laevis** (L.) Britton, Sterns, & Poggenb., (smooth), SMOOTH BEGGAR'S-TICKS, WILD GOLDENGLow. Annual or perennial, 0.3–1 m tall; leaves sessile, simple, linear to lanceolate or rarely narrowly ovate, serrate or nearly entire; outer phyllaries 6–8, linear-lanceolate, usually not longer than the head; ray flowers 7–8 (rarely absent), golden yellow, sometimes red-tinged, 15–30 mm long; achenes wedge-shaped, 6–9 mm long, to ca. 2 mm wide; pappus awns 2–4, 3–5 mm long, retrorsely barbed. In wet areas, ponds, streams; Bell and Dallas cos.; e TX w to nc TX and Edwards Plateau. Jun–Oct.

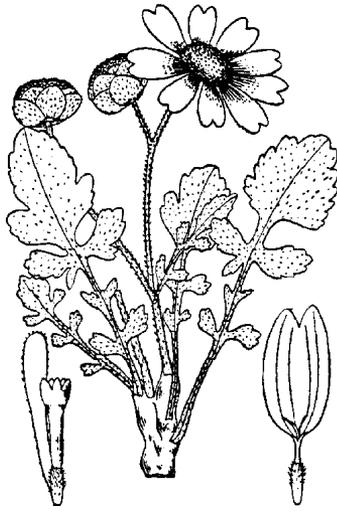
## BIGELOWIA

☛ A genus of 2 species native to se United States. (Named for Dr. Jacob Bigelow, 1787–1879, Boston physician who assisted George Engelmann on the U.S.–Mexican boundary mission and collected regularly while visiting his patients in the Boston area on horseback) (tribe Astereae)

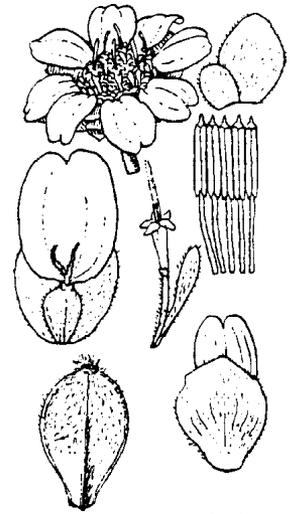
REFERENCES: Anderson 1970, 1977.



*Berlandiera betonicifolia* [DEL]



*Berlandiera lyrata* [BB2]



*Berlandiera pumila* [SM1]



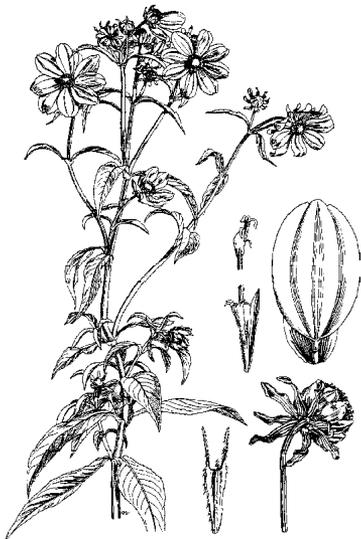
*Bidens aristosa* [BB2]



*Bidens bipinnata* [REE]



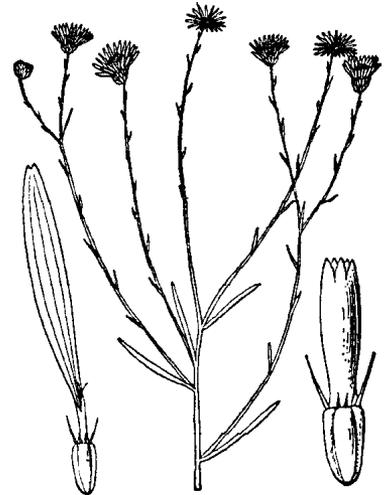
*Bidens frondosa* [REE]



*Bidens laevis* [MAS]



*Bigelovia nuttallii* [HEA]



*Boltonia diffusa* [BB2]

**Bigelovia nuttallii** L.C. Anderson, (for Sir Thomas Nuttall, 1786–1859, English–American botanist), SLENDER BIGELOWIA, RAYLESS-GOLDENROD. Perennial, rhizomatous, growing in colonies or clumps; stems rigidly erect, 0.5–1 m tall, unbranched except in head-bearing region; leaves alternate, sessile, linear, entire, often resinous; heads crowded in a corymb-like arrangement; involucre 6–8 mm long, to 2.2 mm wide; phyllaries in several series, imbricate; ray flowers absent; disk flowers 4–6 per head; corollas ca. 4.5 mm long, yellow, with 5 lobes; achenes with stiff antrorse hairs; pappus of numerous bristles, ca. 3.8 mm long. Open, sandy or rocky areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990), this possibly based on a Fayette Co. record to the se of nc TX; mainly se and e TX. Aug–Nov [*B. virgata* of authors, not (Nutt.) DC.]

## BOLTONIA

☛ A genus of ca. 5 species of c and e North America and e Asia; some are cultivated as ornamentals. (Named for James Bolton, 1758–99, English botanist) (tribe Astereae)  
REFERENCES: Fernald 1940b; Morgan 1966.

**Boltonia diffusa** Elliott, (diffuse, spreading), SMALL-HEAD BOLTONIA, DOLL'S DAISY. Perennial, ± glabrous herb 0.2–1(–1.5) m tall; leaves alternate, linear, entire, sessile; inflorescences diffusely branched; heads small, solitary at ends of branches; involucre 2–4 mm high with phyllaries in 3 series; receptacles 3–6 mm wide, naked; ray flowers 15–20, pistillate, fertile, the corollas 5–8 mm long, white (can be pink upon drying) or lilac; disk flowers perfect, fertile, the corollas 1.5–2 mm long, yellow; achenes ca. 1.5 mm long; laterally flattened, with 2 wings or in ray achenes with 3 wings; pappus awns < 1 mm long or absent. Disturbed areas, pond margins, moist sand; Limestone and Milam cos. near e margin of nc TX; mainly se and e TX. Jul–Oct.

A similar species, *B. astenoides* (L.) L'Hér., (WHITE BOLTONIA, LARGE-FLOWER DOLL'S DAISY), occurs in se and e TX just e of nc TX. It differs in having ray corollas usually 8–15 mm long, receptacles 6–10 mm wide, and pappus awns ca. 1 mm long.

## BRICKELLIA (INCLUDING *KUHNIA*) BRICKELLBUSH, FALSE BONESET

Perennial herbs or shrubs; stems solitary to several; leaves alternate or opposite; leaf blades in ours resin-dotted and usually reticulate-veined beneath; phyllaries in several series; ray flowers absent; achenes 10-ribbed, cylindrical; pappus of bristles.

☛ A New World genus of 100 species native from w United States, Mexico, and Central America to Argentina; some are cultivated as ornamentals. Several taxa were previously treated in *Kuhnia*. (Named for Dr. John Brickell, 1749–1809, of Savanna, GA, amateur botanist and helpful correspondent of Muhlenberg, Fraser, and others) (tribe Eupatorieae)  
REFERENCES: Robinson 1917; Shinnery 1946d, 1971; Turner 1989.

1. Pappus bristles scabrous, not feathery, the side branches ca. as long as the width of the central bristle axis (use lens); lowest phyllaries lanceolate to ovate, usually only 1–3 times as long as wide; heads usually in a ± elongated racemose or panicle arrangement \_\_\_\_\_ **B. cylindracea**
1. Pappus bristles feathery (= plumose), with conspicuous (using lens) side branches many times longer than the width of the central bristle axis; lowest phyllaries linear to subulate, many times as long as wide; heads in ± hemispherical or flat-topped, corymbose groups \_\_\_\_\_ **B. eupatorioides**

**Brickellia cylindracea** A. Gray & Engelm., (cylindrical, long and round), GRAVEL-BAR BRICKELLBUSH. Perennial herb or small shrub from a woody base, to 1.2 m tall; leaves sessile or with petioles 1–3(–5) mm long; leaf blades lanceolate to ovate, usually coriaceous, the margins crenate to serrate; inflorescences usually with leafy bracts; involucre usually reddish-tinged,

the outer phyllaries much shorter than inner; disk corollas yellowish cream; pappus of ca. 30–35 bristles, usually white or nearly so. Various habitats, but often on rocky limestone soils; Bell and Somervell (Fossil Rim Wildlife Center) cos.; c part of nc TX s and w to Trans-Pecos. Aug–Nov. According to Correll and Johnston (1970), this is a very variable species.

**Brickellia eupatorioides** (L.) Shinnars, (resembling *Eupatorium*—boneset). Herbaceous perennial 0.4–1.3 m tall, from woody taproots; leaf blades lanceolate to broadly rhombic-lanceolate, the margins entire to serrate; petioles to 1 cm long; disk flowers cream to yellowish cream; pappus of 10–20 brownish to white bristles. This species is quite variable vegetatively. Aug–Nov. [*Kuhnia eupatorioides* L.]

1. Middle and outer phyllaries mostly < 3/4 as long as the inner ones, acute or acuminate, appressed.
  2. Involucres 8.7–15 mm high; heads with 14–35 flowers; widespread in nc TX \_\_\_\_\_ var. **corymbulosa**
  2. Involucres 7–11 mm high; heads with 6–15 flowers; e margin of nc TX \_\_\_\_\_ var. **eupatorioides**
1. Middle and outer phyllaries elongate, at least some of them 3/4 to fully as long as the inner ones, with conspicuous sickle-shaped or twisted, filliform tips \_\_\_\_\_ var. **texana**

var. **corymbulosa** (Torr. & A. Gray) Shinnars, (with flowers in small corymbs), PLAINS KUHNIA. Sandy soils, post oak woodland; Archer, Dallas, Denton, Fannin, Kaufman, Milam, and Montague cos.; nc TX s to Edwards Plateau and w to Panhandle.

var. **eupatorioides**. FALSE BONESET. Sandy soils, open oak woods; Henderson, Lamar, and Milam cos.; mainly e, se and s TX.

var. **texana** (Shinnars) Shinnars, (of Texas), PRAIRIE KUHNIA. Limestone soils, prairies; Blackland and Grand prairies s to Edwards Plateau and w to Panhandle.

## CALYPTOCARPUS

☛ A genus of 3 species native from TX to Guatemala. (Presumably from Greek: *calypto*, covered, and *carpos*, fruit, referring to the “corticate” achene) (tribe Heliantheae)

**Calyptocarpus vialis** Less., (of the wayside), PROSTRATE LAWNFLOWER, HIERBA DEL CABALLO, HORSE HERB. Small, trailing, pubescent, perennial herb 5–30 cm tall; leaves opposite, petioled; leaf blades ovate to ovate-lanceolate or deltoid, 1–3(–4) cm long, toothed; heads short-peduncled, solitary in leaf axils, small; ray flowers 3–8, the corollas 1–4 mm long; phyllaries 4–5, subequal in length, obtuse, overlapping laterally; ray and disk corollas yellow or yellow-orange; pappus of 2 awns and sometimes also 1–3 rudimentary awns. Lawn weed; Bell, Brown, Dallas, and Grayson cos., also Hood, Somervell, and Tarrant cos. (R. O’Kennon, pers. obs.); e 1/2 of TX, more common to the s. Apr–Jul. This sometimes troublesome lawn weed is occasionally purposely planted in shady situations to provide ground cover.

## CARDUUS THISTLE, PLUMELESS-THISTLE

Ours annual or biennial herbs; leaves alternate, pinnatifid with prickly margins, decurrent as spiny wings along stem; phyllaries many, imbricated, the tips prickly; ray flowers absent; disk corollas pink to deep pink (rarely purple); pappus of numerous hair-like bristles, these not plumose, sometimes barbellate with short projections to ± as long as width of bristle axis, the bristles joined basally and deciduous as a ring.

☛ A genus of 91 species native to Eurasia, the Mediterranean, and e Africa mountains. According to some authors (Correll & Johnston 1970), *Carduus* should probably be enlarged to include *Cirsium* which is similar except for the pappus. (The ancient Latin name) (tribe Cardueae)

REFERENCES: Desrochers et al. 1988; McGregor 1985b.

1. Heads usually ± solitary at the ends of branches, 30–50(–70) mm in diam.; some outer phyllaries spreading or reflexed \_\_\_\_\_ **C. nutans**
1. Heads usually in close clusters of 3–10 at the ends of branches, 5–15(–20) mm in diam.; phyllaries usually ascending \_\_\_\_\_ **C. tenuiflorus**

**Carduus nutans** L. subsp. **macrocephalus** (Desf.) Nyman, (sp.: nodding; subsp.: large-headed), MUSK-THISTLE, NODDING-THISTLE. Extremely prickly, stout winter annual or biennial 0.3–2(–3) m tall; larger leaves 15–40 cm long; leaves ± glabrous or with long hairs mainly along the veins below, deeply lobed, coarsely spiny-toothed, sessile, decurrent as spiny wings 0.5–2 cm wide; heads nodding, large; flowers numerous; corollas slender, to 3 cm long; achenes 3–5 mm long; pappus to 20 mm long. Roadsides, weedy areas; a noxious weed now spreading in nc TX; Collin and Grayson cos.; also Edwards Plateau. Jun–Sep. Native of Mediterranean region. [*C. macrocephalus* Desf.] This species was apparently first collected in TX in Sutton Co. on the Edwards Plateau in 1939; it was supposedly introduced through a shipment of hay from California (Cory 1940). McGregor (1986) questioned the validity of distinguishing subspecies. McGregor (1985b) indicated that this species is an official noxious weed in KS; he gave a detailed account of its invasion. ☞

**Carduus tenuiflorus** Curtis, (slender-flowered), SLENDER BRISTLE-THISTLE. Prickly annual or biennial 0.3–1 m tall; stems with wings to 1 cm wide; corollas 10–14 mm long; achenes 4–5 mm long; pappus 11–13 mm long. Roadsides, fields, weedy areas; Parker Co., also Bell, Brown, Comanche, Coryell, Hamilton, Mills (J. Stanford, pers. comm.), Somervell, and Tarrant (R. O'Kennon, pers. obs.) cos.; also Edwards Plateau. Apr–May. Native of s Europe. Unknown in nc TX until ca. 1990; this species has the potential of becoming a problematic pernicious weed much like *C. nutans*. ☞

## CARTHAMUS SAFFLOWER

Annual herbs; leaves usually alternate, spiny, somewhat clasping, sessile; heads terminal, solitary or corymbose; at least inner phyllaries spiny or spine-tipped, outer phyllaries spreading, conspicuously leafy; receptacle scaly; ray flowers absent; disk flowers tubular, in ours yellow to orange (rarely whitish); pappus of scales or absent.

☛ A genus of 17 species native from the Mediterranean area to c Asia. (From Arabic or Hebrew: *quarhami*, to paint, alluding to the dye obtained from the flowers of *C. tinctorius*) (tribe Cardueae)

REFERENCES: Shinnars 1958; Kessler 1987.

1. Leaves ± pinnatifid, coarsely and conspicuously spine-toothed; filaments bearded; achenes (at least outer) rugose; pappus present on inner achenes \_\_\_\_\_ **C. lanatus**
1. Leaves usually simple (rarely pinnatifid), entire or inconspicuously spine-toothed; filaments glabrous; achenes ± smooth; pappus usually absent (rarely present) \_\_\_\_\_ **C. tinctorius**

**Carthamus lanatus** L., (woolly), DISTAFF-THISTLE, SAFFRON-THISTLE. Plant glandular, and sometimes with woolly, spider-web-like pubescence; stems 0.4–1.2 m tall; leaves alternate; corollas yellow with red veins (rarely whitish); achenes straw-colored, 5–6 mm long; pappus of ± rigid, flat, bristle-like, ciliate scales to 1 cm long as well as some outer short scales. Disturbed roadsides; Coryell Co. (Fort Hood–Sanchez 1997); nc TX and Edwards Plateau. Jun. Native of Mediterranean region. Kessler (1987), who documented its first occurrence in OK, indicated it is a potentially serious pest plant. ☞

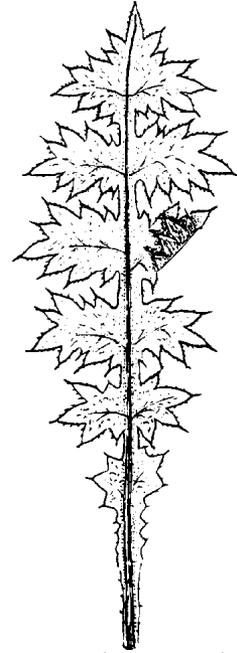
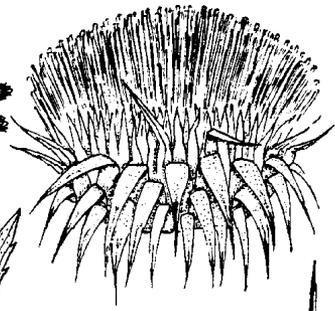
**Carthamus tinctorius** L., (belonging to the dyers, of dyes), SAFFLOWER, FALSE SAFFRON, BASTARD SAFFRON. Plant a ± glabrous taprooted herb; stems 0.3–1 m tall; leaves alternate to subopposite above, elliptic to ovate or oblong; heads in a cymose arrangement; corollas bright orange to yel-



*Brickellia cylindracea* [MGH]



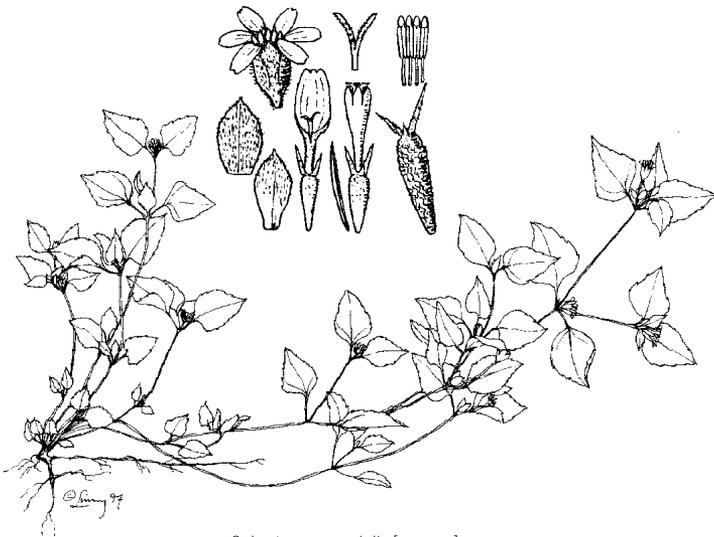
*Brickellia eupatorioides* var. *corymbulosa* [BB2]



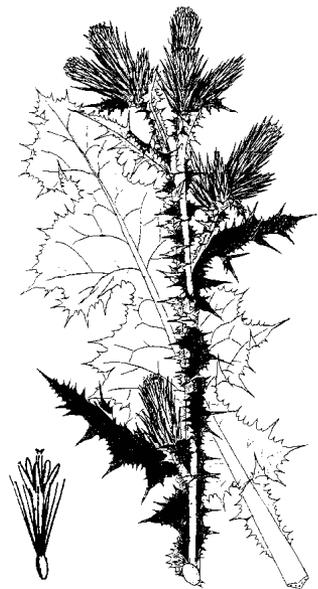
*Carduus nutans* subsp. *macrocephalus* [MIR]



*Brickellia eupatorioides* var. *eupatorioides* [GLE]



*Calyptocarpus vialis* [HEA, SM1]



*Carduus tenuiflorus* [SM]

low-orange; achenes glabrous, ivory white, ca. 6 mm long and 4 mm wide; pappus usually absent (rarely with rudimentary or well-developed bristle-like scales). Yard weed, possibly from seeds in bird feeder; collected in 1996 in Tarrant Co. (Fort Worth; *Sylvester s.n.*); this is apparently the first report from TX. Summer. Native of Old World, possibly from the Near East. Cultivated since ancient times as a dye plant (orange from the flowers used in dyeing food and for rouge) and now for its edible oil (from the seeds); seeds were found in the tomb of Tutankhamun and mummy wrappings were sometimes dyed with this plant (Hepper 1990). ☞

### CENTAUREA BASKET-FLOWER, STAR-THISTLE, KNAPWEED

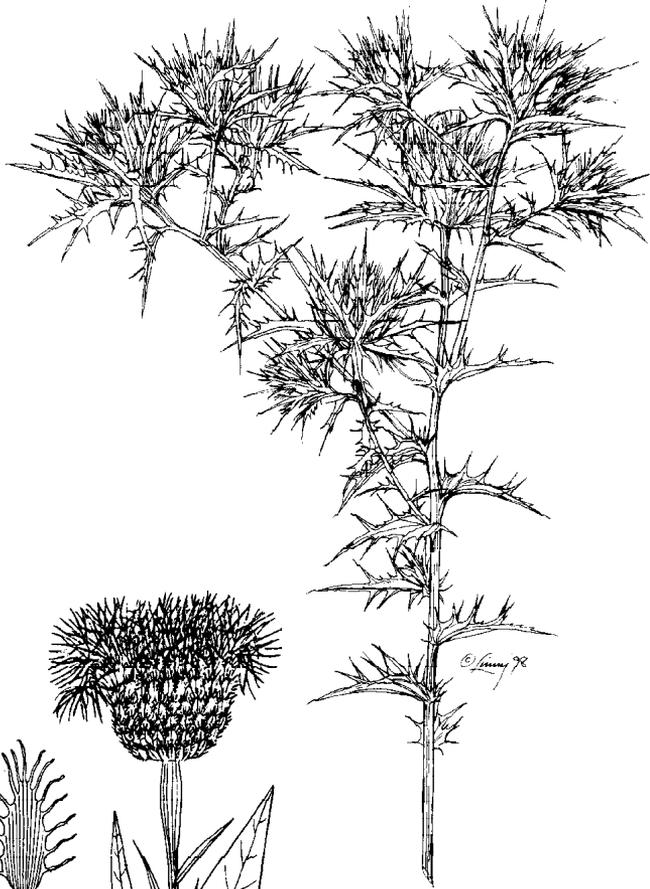
Annuals (rarely biennials); leaves alternate, simple, entire, toothed or pinnatifid, not prickly; heads solitary or corymbose-paniculate; ray flowers absent; outer disk corollas enlarged, simulating rays; corollas deeply (4–)5-lobed, the lobes linear; anthers with elongated appendages; achenes obliquely attached; pappus of bristles.

☞ A large genus (ca. 500 species) of herbs and subshrubs native to the Mediterranean, Turkey, the Near East, n Eurasia, tropical Africa, Australia, and North America; some are cultivated as ornamentals. ☞ *Centaurea maculosa* Lam. (SPOTTED KNAPWEED), a European native now naturalized and invasive in parts of the U.S., is suspected of being carcinogenic; a field worker in Idaho developed tumors in his fingers after pulling plants of this species and apparently getting sap in breaks in his skin (Jerry Niefoff, pers. comm.); as a precaution, gloves should be worn when handling *Centaurea* species; some species are known to cause toxic effects in horses (Kingsbury 1964; James & Welsh 1992). The stamens of many *Centaurea* species are touch-sensitive; when touched by visiting insects, they contract suddenly resulting in pollen being forced out the tube formed from the fusion of the anthers (Wills & Irwin 1961). (Greek: *kentaur*, centaur; the centaur Chiron in Greek mythology was said to know the medicinal value of plants) (tribe Cardueae)

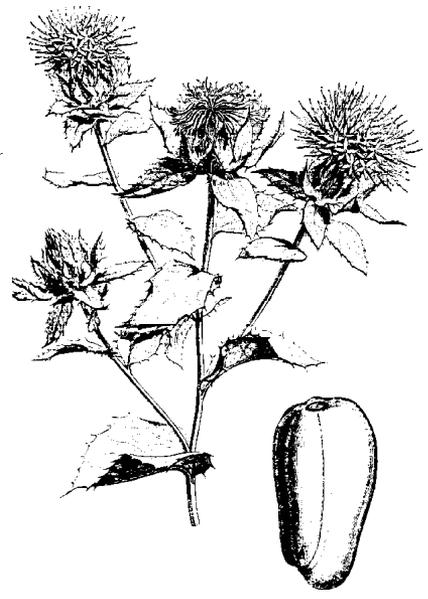
REFERENCE: Moore 1972.

1. Heads large, the involucre of well-developed heads 3–6+ cm wide; pappus bristles (5–)6–14 mm long, barbed; phyllaries without a sharp spine at tip (but margins pectinately dissected); native species \_\_\_\_\_ **C. americana**
1. Heads small, the involucre 2.5 cm or less wide; pappus bristles 2–6 mm long, barless; phyllaries without OR with a sharp spine at tip; introduced species.
  2. Corollas blue, purple, pink, or white; involucre of well-developed heads 1.5–2.5 cm wide; phyllaries without a sharp spine at tip (margins with teeth or narrow lobes) \_\_\_\_\_ **C. cyanus**
  2. Corollas yellow; involucre ca. 1 cm wide (not including spines); phyllaries with a conspicuous sharp spine at tip.
    3. Spiny tip of phyllaries 3–9 mm long, often darker than phyllary body \_\_\_\_\_ **C. melitensis**
    3. Spiny tip of phyllaries 10–17 mm long, straw-colored, usually lighter than phyllary body \_\_\_\_\_ **C. solstitialis**

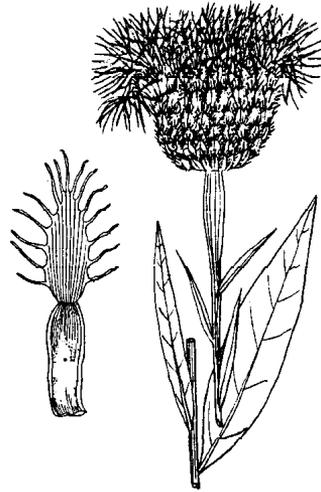
***Centaurea americana*** Nutt., (of America), BASKET-FLOWER, AMERICAN BASKET-FLOWER, POWDERPUFF THISTLE, THORNLESS-THISTLE, CARDO DEL VALLE, AMERICAN KNAPWEED, STAR-THISTLE. Annual; stems 0.3–2 m tall; leaves sessile, ± entire, glabrous or sparsely scabrous and gland-dotted; heads solitary at the ends of branches, large, (3–)4–8(–10) cm across including the corollas, quite showy, 1–few per plant; phyllaries appressed, imbricate, of 2 distinct parts, the lower part light green, entire, the upper part straw-colored and pectinately dissected into narrow lobes; corollas pink to occasionally deep purple-red (rarely white); marginal corollas larger, to 5 cm long; central corollas to 3.2 cm long. Disturbed areas; widespread in TX. May–Jul. Sometimes cultivated. The basket-like appearance of the overlapping dissected phyllaries gives this species its common name. The stamens are reported to be sensitive to touch; when touched by insects they suddenly contract and push pollen out onto the pollinator (Kirkpatrick 1992). ☞/82



*Carthamus lanatus* [HEA]



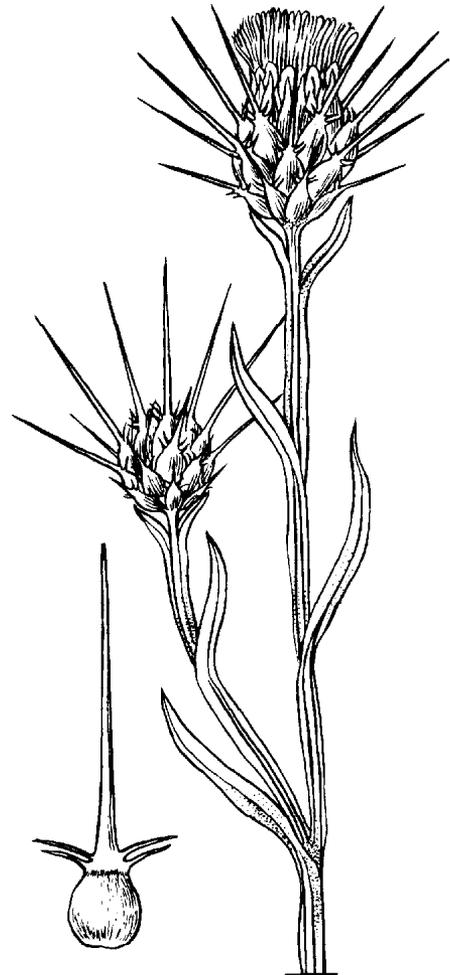
*Carthamus tinctorius* [EN2]



*Centaurea americana* [GLE, STE]



*Centaurea cyanus* [GAR, M&F]



*Centaurea melitensis* [M&F]

**Centaurea cyanus** L., (blue), BACHELOR-BUTTON, CORNFLOWER, BLUEBOTTLE. Annual; stems 0.2–1 m tall; basal and lower leaves oblanceolate, pinnately lobed or toothed; upper stem leaves narrowly oblanceolate, entire to toothed, white woolly below, decurrent; phyllaries with numerous small teeth, the margins often darker; marginal corollas enlarged; pappus 0.2–3.5 mm long. Cultivated, naturalized in disturbed areas, roadsides; Clay, Dallas, Grayson, and Kaufman cos.; also Rolling Plains, Edwards Plateau, and Post Oak Savannah. Apr–Jun. Native of Mediterranean region. 🌿

**Centaurea melitensis** L., (of Malta), STAR-THISTLE, MALTA CENTAUREA, MALTA STAR-THISTLE, TOCALOTE. Annual or rarely biennial; stems 0.1–0.8 m tall; basal and lower leaves pinnately lobed, the lobes rounded; upper stem leaves linear, decurrent; pappus 2–6 mm long. Disturbed calcareous soils; Lampasas Co., also Fort Hood (Bell or Coryell cos.—Sanchez 1997); widespread in TX but especially on Edwards Plateau. Native of Europe. Cory (1940) reported that this species was first collected in TX in Bexar Co. in 1934. 🌿

**Centaurea solstitialis** L., (the summer solstice), YELLOW STAR-THISTLE, BARNABY'S STAR-THISTLE. Annual; stems 0.3–0.7 m tall; basal leaves pinnatifid; upper stem leaves linear, decurrent; pappus 2–4 mm long. Disturbed areas, roadsides; Dallas (Flyr, 1962) and Tarrant cos.; also Edwards Plateau. Jul–Oct. Native of Eurasia. Reportedly causes brain lesions and a nervous syndrome, “chewing disease,” in horses; the toxic principle is not known (Kingsbury 1964). First noted in Tarrant Co. in 1993 and now rapidly spreading on levees along the Trinity River and along highway embankments; it has the potential of becoming a problematic weed. 🌿

### CHAETOPAPPA LEAST DAISY

Small annuals or perennials; leaves alternate; heads solitary at the ends of the upper branches; ray flowers pistillate and fertile, usually white; disk flowers perfect and fertile, yellow; achenes 5-nerved.

☛ A genus of 10 species endemic to sw North America; including the previously recognized monotypic genus *Leucelene*. (Greek: *chaite*, a bristle, and *pappos* down, fuzz, pappus) (tribe Astereae)

REFERENCES: Shinnars 1946a, 1946b; Van Horn 1973; Nesom 1988.

1. Plants taprooted annuals; leaves usually neither crowded nor conspicuously overlapping; ray flowers 5–13; pappus of 5 short scales alternating with as many awns 1–3 mm long or the awns absent; involucre 2–3 mm wide \_\_\_\_\_ **C. asteroides**
1. Plants perennials from creeping subligneous roots; leaves crowded and conspicuously overlapping; ray flowers 12–24; pappus of 20–30 capillary bristles 4.5–5.5 mm long; involucre 5–10 mm wide \_\_\_\_\_ **C. ericoides**

**Chaetopappa asteroides** Nutt. ex DC., (resembling *Aster*), COMMON LEAST DAISY. Plant very small, 5–15(–25) cm tall; stem pubescence appressed to spreading; basal rosette leaves narrowly obovate to orbicular; stem leaves narrower than basal, usually 5–10 mm long; floral bracts linear to subulate; involucre 3.5–4.5 mm high, cylindrical; phyllaries imbricated; ray flowers with ligules 2–4 mm long, white, turning bluish, violet, or pinkish, curling under at night or in age; disk flowers yellow; achenes 1.6–2 mm long, pubescent. Sandy open areas; se and e TX w to Rolling Plains and Edwards Plateau. Apr–Jun, sporadically later.

**Chaetopappa ericoides** (Torr.) G.L. Nesom, (resembling *Erica*—heath), BABY WHITE ASTER, WHITE ASTER, ROSE-HEATH. Plant very small, 10–15(–20) cm tall, tufted, forming patches from creeping roots; leaves crowded, alternate, narrowly oblanceolate, 2–12(–15) mm long, 2 mm or less wide, entire; heads terminating the numerous erect branches; involucre 5–7 mm high; ray flowers with ligules 2–3 mm long, white or withering rosy, rather showy, curling under at night or in

age; disk flowers yellow; achenes 2–3 mm long. Sandy or gravelly prairies or rock outcrops; Palo Pinto Co.; Panhandle to Trans-Pecos e locally to West Cross Timbers. Apr–Sep. [*Aster arenosus* (A. Heller) S.F. Blake, *Leucelene ericoides* (Torr.) Greene]

### CHAPTALIA SUNBONNETS

☛ A genus of ca. 60 species of warm areas of the Americas. (Named for J.A.C. Chaptal, 1756–1831, agricultural chemist, who invented the wine-making process of chaptalization, which makes the wine more alcoholic by adding sugar at the same time as squeezing the grape) (tribe Mutisieae)  
REFERENCES: Vuilleumier 1969b; Simpson 1978; Nesom 1995.

**Chaptalia texana** Greene, (of Texas), SILVERPUFF. Acaulescent perennial herb; leaves in a rosette, 6–15 cm long, 2.4–4 cm wide, oblanceolate- or obovate-lyrate, narrowed to a subpetiolar base; lower surface of leaf blades conspicuously whitish tomentose, in striking contrast to green upper surface; peduncles 10–60 cm long, naked or with 1–2 minute bracts; heads solitary, with ca. 150 flowers, nodding in flower, erect in fruit; phyllaries whitish tomentose except often glabrous and darker (sometimes purplish) at apex; peripheral flowers pistillate, ray-like, the upper lip absent, creamy, maturing to crimson, 0.2–0.8 mm wide; inner pistillate flowers with filiform corollas; central flowers perfect; achenes 0.7 mm thick, 9–16 mm long, 2/3 of which is the filiform beak; pappus conspicuous, of numerous buffy-white, hair-like bristles ca. 13–14 mm long. Calcareous areas; Burnet Co. (C. Sexton, pers. comm.); also citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990); also Travis Co. just s of nc TX; se TX w through Edwards Plateau to Trans-Pecos; endemic to TX. Sep–Nov. [*C. nutans* (L.) Polák. var. *texana* (Greene) Burkart] 📍

### CHLORACANTHA MEXICAN DEVILWEED, SPINY-ASTER

☛ The genus is composed of a single species occurring from the sw U.S. to Central America (Nesom et al. 1991). It is distinctive, but of uncertain phylogeny, and has been placed in a variety of genera including *Aster*, *Erigeron*, and *Leucosyris*; based on DNA evidence, *C. spinosa* seems more closely related to *Boltonia* and *Heterotheca* than to either *Aster* or *Erigeron*; it is thus recognized in its own genus (Nesom et al. 1991). (Greek: *chlōn*, green, and *acanthos*, spine or thorn, in reference to the evergreen thorny stems) (tribe Astereae)  
REFERENCES: Nesom et al. 1991; Sundberg 1991; Nesom 1994b.

**Chloracantha spinosa** (Benth.) G.L. Nesom, (spiny), MEXICAN DEVILWEED, SPINY-ASTER, DEVILWEED-ASTER. Coarse, nearly leafless rhizomatous perennial, the plant superficially rush-like in appearance, sometimes in dense clumps; stems glabrous or glabrate, green and glaucous, photosynthetic, strictly erect, 0.5–1.5(–2.5) m tall, freely branched, alive for up to ca. 4 growing seasons; branchlets sometimes modified into thorns 10–20 mm long; usually ± leafless or leaves early deciduous or with a few small or minute subulate leaves; heads numerous; involucre 3.5–7.5 mm high; ray flowers ca. 10–33; ligules to ca. 5.5 mm long, white, sometimes bluish-tinged. Low disturbed or weedy areas, roadsides; Milam and Limestone cos. on e margin of nc TX w to West Cross Timbers; widespread in TX but more common in s and w parts of the state. Jun–Oct. [*Aster spinosus* Benth., *Leucosyris spinosa* (Benth.) Greene]

### CHRYSOPSIS GOLDEN-ASTER

Taprooted annual herbs; leaves alternate; ray flowers pistillate, fertile, yellow; disk flowers yellow; pappus of bristles and sometimes small scales.

☛ A genus of 10 species native from the se United States (especially Florida) to Mexico and the Bahamas; including the previously recognized monotypic genus *Bradburia*. *Chrysopsis* has sometimes been treated in *Heterotheca*. Generic boundaries for the GOLDEN-ASTERS has long been problematic. Semple (1977, 1981) and Nesom (1991a, 1991b) gave convincing justification

for the delineation followed here; more recently Semple (1996) transferred *C. pilosa* to *Bradburia*, making it a genus of 2 species of annuals; he indicated (pers. comm.) that while "... the two genera are most likely more closely related than any of the other GOLDEN-ASTER genera, it remains to be seen whether the ( $x = 3,4$ ) *pilosa-hirtella* lineage is derived from within the *Chrysopsis* lineage ( $x = 4,5$ ) or whether the two share an immediate common ancestor ( $x = 5$ ).” Until these relationships are clarified, we are following Nesom (1991a, 1997b) and J. Kartesz (pers. comm. 1997) in treating the 2 nc TX species in *Chrysopsis* (Greek: *chrysoḥ* gold, and *opsis* aspect, from the golden inflorescences) (tribe Astereae)

REFERENCES: Shinnery 1951b; Harms 1968, 1974; Semple 1977, 1981, 1996; Semple et al. 1980; Semple & Chinnappa 1984; Nesom 1991a, 1991b, 1997b.

1. Phyllaries with conspicuous pilose pubescence and sometimes glandular; ray flowers with an inner pappus of bristles and an outer pappus of small scales; disk flowers fertile, with a pappus of numerous bristles, similar to pappus of the ray flowers; widespread in nc TX \_\_\_\_\_ **C. pilosa**
1. Phyllaries glabrous or nearly so; ray flowers with a pappus of bristles, without an outer pappus of small scales; disk flowers infertile, with a pappus of 1–2 slender bristles or awns, very different from pappus of the ray flowers; possibly present on s margin of nc TX \_\_\_\_\_ **C. texana**

**Chrysopsis pilosa** Nutt., (pilose, with long soft hairs), SOFT GOLDEN-ASTER. Plant with pubescence of sparse to dense soft pilose hairs and short glandular hairs; stems 15–90(–160) cm tall; leaves entire or the larger coarsely toothed or shallowly lobed, the lowermost sessile or short petiolate; heads pedunculate, terminating the branches, the central one often overtopped by the laterals; ray flowers ca. 13–21, the ligule to ca. 10 mm long, remaining straight, becoming erect at night; disk flowers perfect, fertile. Sandy woods, old fields, and roadsides; se and e TX w to East Cross Timbers, also Montague Co. May–Oct.  $n = 4$ . [*Bradburia pilosa* (Nutt.) Semple, *Heterotheca pilosa* (Nutt.) Shinnery]

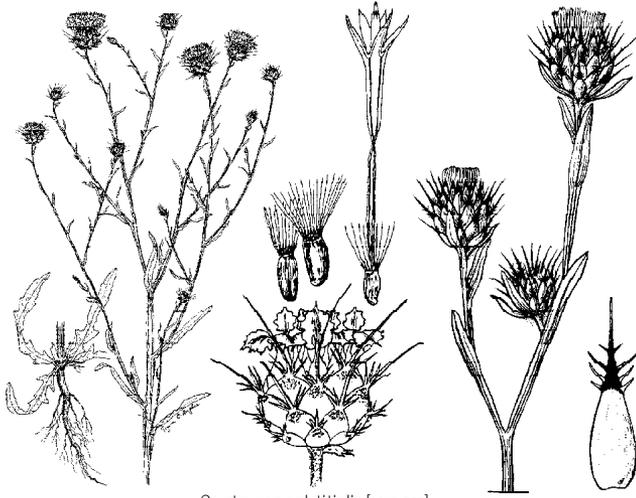
**Chrysopsis texana** G.L. Nesom, (of Texas), MAUCHIA. Plant pilose-hispid; stems 10–70 cm tall; basal leaves toothed or short lobed, usually withered before flowering; stem leaves sessile, linear to narrowly oblanceolate, entire; heads pedunculate, solitary at ends of branches; disk flowers perfect but infertile. Open, disturbed areas, usually on sand or gravel; included based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990); se and s TX n to at least Travis Co. just s of nc TX (Semple & Chinnappa 1984); endemic to TX (waifs present in Louisiana). Sometimes recognized in the genus *Bradburia* [as *B. hirtella* Torr. & A. Gray]. [not *C. hirtella* DC.] ↘

## CICHORIUM CHICORY

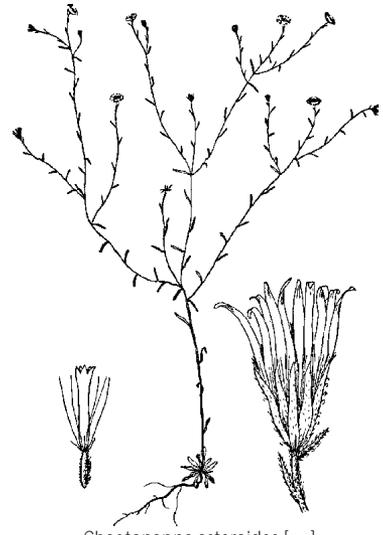
☞ A genus of 7 species native to Europe, the Mediterranean, and Ethiopia. The Old World *C. endivia* L., ENDIVE, has long been cultivated for its edible leaves. (Name of disputed origin; according to Pliny from Egyptian and to Forsskål from Arabic; according to Theophrastes and Dioscorides from Greek: *kichorion*, of the fields (Vuilleumier 1973)) (tribe Lactuceae)

REFERENCE: Vuilleumier 1973.

**Cichorium intybus** L., (old generic name, from Latin for endive or succory), COMMON CHICORY, BLUE-SAILORS, SUCCORY, WITLOOF, RAGGED-SAILORS. Glabrous perennial herb with deep taproot; sap milky; stems 0.3–1(–1.7) m tall; basal leaves toothed or pinnately lobed, oblong-lanceolate; stem leaves alternate, much reduced; heads sessile and axillary, or terminating naked branchlets, the interrupted inflorescences raceme-like; phyllaries in 2 series, the outer much shorter, all with hardened, whitish bases and loose, green tips; flowers all ligulate; corollas lavender-blue, rarely white or pink, open during the morning, later on cloudy days; ligules 15–25 mm long; achenes 2–3 mm long; pappus a minute crown of scales ca. 0.2 mm long. A cool-climate species, rare in TX; roadsides; Grayson and Rockwall cos.; a few scattered records elsewhere in the Panhandle, Trans-Pecos, and Edwards Plateau. Jun–Oct. Native of Eurasia. The



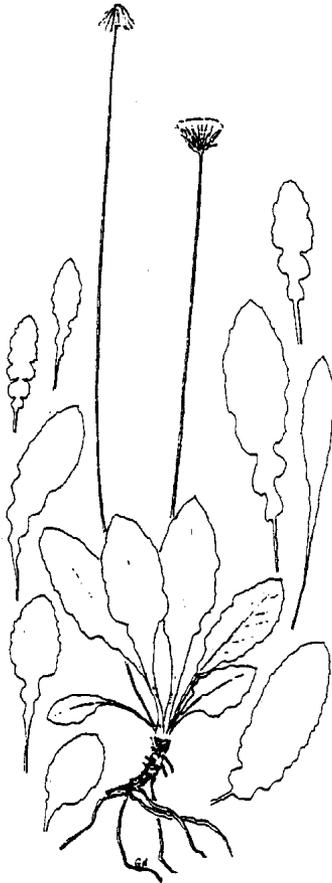
*Centaurea solstitialis* [M&F, REE]



*Chaetopappa asteroides* [GLE]



*Chaetopappa ericoides* [BB2]



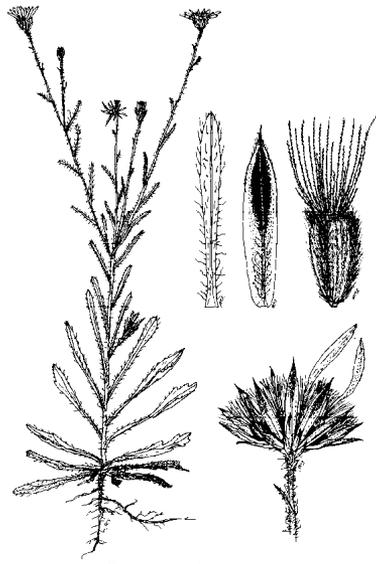
*Chaptalia texana* [PHY]



*Chloracantha spinosa* [ABR]



*Chrysopsis pilosa* [GLE]



*Chrysopsis texana* [SVS]

roots, when ground and roasted, are the chicory often mixed with coffee; the blanched leaves are reported to be edible (Mabberley 1987). ☞

### CIRSIUM THISTLE, PLUMED THISTLE, TRUE THISTLE

Erect biennial or perennial herbs; leaves alternate, prickly-toothed or -lobed, glabrate to often strikingly white or gray tomentose on one or both sides; phyllaries many, imbricated, the outer successively shorter, the tips prickly; ray flowers absent; disk flowers perfect; corollas purplish, lavender, white, or rarely yellow, long tubular, the lobes linear; pappus of numerous plumose bristles united at base and deciduous as a unit.

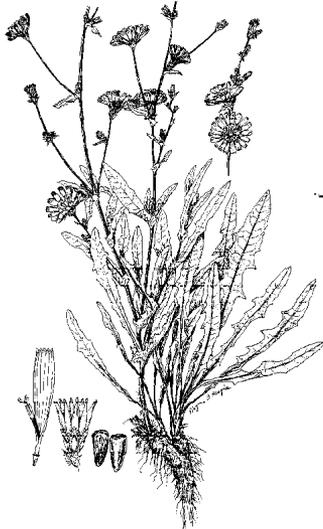
☛ A n temperate genus of ca. 250 species; some are problematic weeds; similar to *Carduus* except for the pappus. (Greek *cirsium*, thistle, from *cirso*, a swollen vein, for which thistle was a reputed remedy) (tribe Cardueae)

REFERENCES: Howell 1959; Moore & Frankton 1969; O'Kennon & Nesom 1988.

1. Upper surface of leaf blades with numerous short, yellowish, appressed prickles; leaf blades decurrent along stem; rare introduced species \_\_\_\_\_ **C. vulgare**
1. Upper surface of leaf blades glabrous to variously pubescent but without prickles; leaf blades decurrent along stem OR not so; common native species.
  2. Involucres subtended by a false involucre (= whorl of spiny-pinnatifid, leafy bracts equaling or exceeding the phyllaries present just below the phyllaries); leaves green, glabrous or thinly pubescent beneath \_\_\_\_\_ **C. horridulum**
  2. Involucres without basal whorl of spiny leafy bracts (= false involucre) just below the phyllaries, the heads thus ± naked at base or with a few linear or narrow bracts shorter than the phyllaries; leaves gray or white with woolly pubescence (= tomentose), at least beneath.
  3. Involucres 2.5–4.5 cm high, oblong or urceolate-oblong, higher than broad in flower (broader in age).
    4. Upper stem leaves with broad, clasping or decurrent bases; perennial from creeping rootstocks; upper leaf surface woolly-pubescent, gray.
    5. Leaf blades mostly shallowly pinnatifid, not decurrent or decurrent for 1 cm or less; prickle tips of middle and outer phyllaries 1–5 mm long; widespread in nc TX \_\_\_\_\_ **C. undulatum**
    5. Leaf blades uniformly deeply pinnatifid, middle and upper decurrent as wings on stem for > 1 cm; prickle tips of middle and outer phyllaries (5–)7–15 mm long; on extreme w edge of nc TX \_\_\_\_\_ **C. ochrocentrum**
  4. Upper stem leaves narrowed at base and short-petioled; winter annual or biennial, with out creeping rootstocks; upper leaf surface dark green, often nearly glabrous.
    6. Stem leaves entire to shallowly pinnatifid (divided half way to midrib or less); roots coarsely fibrous, not tuberous; flowering mainly mid-Jun–Sep \_\_\_\_\_ **C. altissimum**
    6. Stem leaves (except uppermost) deeply pinnatifid, divided 1/4–3/4 to midrib; usually some roots with tuberous enlargement; flowering May–Jul \_\_\_\_\_ **C. engelmannii**
3. Involucres 1.4–2.2 cm high, nearly as broad as high or broader in flower, much broader in age \_\_\_\_\_ **C. texanum**

**Cirsium altissimum** (L.) Hill, (very tall), IOWA THISTLE, TALL THISTLE, ROADSIDE THISTLE. Winter annual, biennial, or perennial 0.5–1.5+ m tall; leaf blades varying from unlobed to deeply lobed (on lower leaves), strikingly white-tomentose beneath, glabrescent above; corollas lavender, to 32 mm long; pappus bristles to 25 mm long. Open stream bottom thickets and pastures, often calcareous soils; Post Oak Savannah w to Tarrant and Wise cos. Jun–Sep. [*Cirsium iowense* sensu Mahler, not (Pammel) Fernald]

**Cirsium engelmannii** Rydb., (for George Engelmann, 1809–1884, German-born botanist and physician of St. Louis), BLACKLAND THISTLE. Biennial or weak perennial 0.5–1(–1.5) m tall; leaf



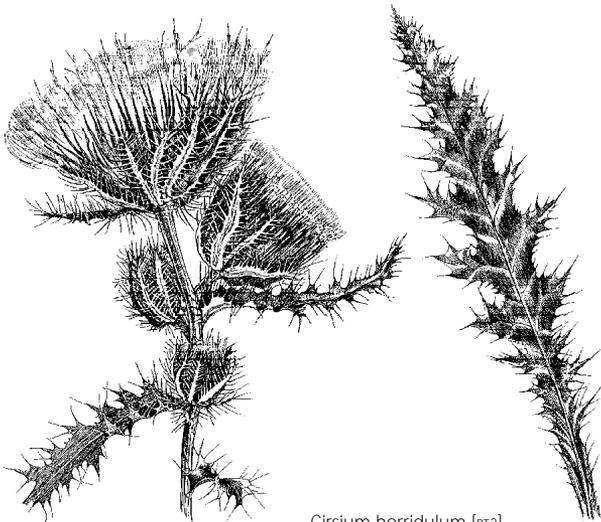
*Cichorium intybus* [REE]



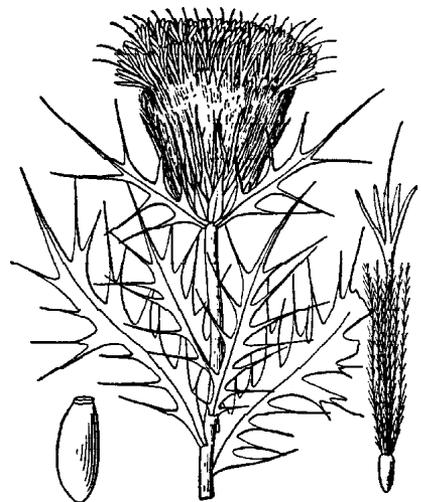
*Cirsium engelmannii* [HEA]



*Cirsium altissimum* [BB2]



*Cirsium horridulum* [BT3]



*Cirsium ochrocentrum* [BB2]

blades nearly all deeply lobed, strikingly white-tomentose beneath, green and moderately hairy to often glabrescent above; corollas deep rosy lavender, to 36 mm long; pappus bristles to 25 mm long. Prairies, in calcareous clay, rarely sandy soils; Blackland Prairie w to Grand Prairie and s to Edwards Plateau; endemic to TX and adjacent LA and OK. May-Jul. [*Cirsium terrae-nigrae* Shinnery]

**Cirsium horridulum** Michx., (prickly, horribly armed), BULL THISTLE, YELLOW THISTLE, HORRID THISTLE. Coarse, thinly pubescent or glabrous, winter annual or biennial, beginning to flower when as low as 25 cm, becoming as much as 2 m tall; leaf blades green on both surfaces; flowering stems usually with a solitary terminal head, rarely branched above; involucre wider than long, 4–8 cm wide, immediately subtended by a conspicuous false involucre of ca. 10–12 spiny bracts; corollas rosy lavender, rarely yellow (in se TX). Damp open woods, low areas; Fannin Co. (Talbot property) in Red River drainage, also Denton Co. (G. Diggs, pers. obs.); mainly se and e TX. Mar–May. Jones et al. (1997) recognized TX material of this species as var. *elliottii* Torr. & A. Gray. ☒/84

**Cirsium ochrocentrum** A. Gray, (yellow-centered), YELLOW-SPINE THISTLE. Biennial or perennial 0.2–1(–1.5) m tall, extremely spiny; leaf blades strikingly white-tomentose beneath, with some tomentum above, the upper surface grayish, often much darker in appearance than lower; corollas rosy lavender or purplish, rarely white. Sandy or rocky prairies and roadsides; Clay and Callahan cos. at w edge of nc TX, s and w to w TX. May–Oct.

**Cirsium texanum** Buckley, (of Texas), TEXAS THISTLE, SOUTHERN THISTLE. Biennial or perennial 0.5–2 m tall, with deep taproot; leaf blades green and glabrous or thinly tomentose above, thinly grayish or whitish tomentose beneath; upper leaves reduced, sessile, slightly clasping; branches long, erect or ascending; involucre small (1.4–2.2 cm high) in comparison with other nc TX species; corollas pink to deep rosy lavender. Prairies and roadsides; nearly throughout the state except extreme e TX. May–Jun. Goldfinches are reported to use the plumose pappus bristles to line their nests (Ajilvsgi 1984). ☒/84

**Cirsium undulatum** (Nutt.) Spreng., (undulated, wavy), WAVY-LEAF THISTLE, PASTURE THISTLE. Rhizomatous low perennial 0.2–1(–2) m tall; leaf blades sometimes nearly as white-tomentose above as below, sometimes undulate; corollas purplish, lavender or white. Prairies, pastures, and roadsides; Blackland Prairie s and w to w TX. May–Jul. ☒/84

**Cirsium vulgare** (Savi) Ten., (common), BULL THISTLE. Biennial; stems 0.5–2 m tall; leaf blades green above, green or with grayish pubescence below; involucre 2–3 cm high; corollas dark purple, 27–35 mm long. Roadsides, pastures, waste areas; Tarrant Co. (R. O'Kennon, pers. obs.); also n Red River Co. (R. O'Kennon, pers. obs.); also Edwards Plateau; first collected in TX in Gillespie Co. in 1987 (O'Kennon & Nesom 1988). Jul–Sep. Native of Eurasia. ☒

## CONYZA

Annual herbs; stems glabrous to pubescent; leaves alternate, entire or toothed; phyllaries in 4 series, imbricate, the inner ones larger; ray flowers pistillate, fertile; corollas whitish, cream or pinkish, the ligules inconspicuous, shorter than the tubes and scarcely if at all surpassing the pappus, the tubes filiform; disk flowers perfect, fertile; corollas cream-colored to yellowish or pinkish; achenes 2-ribbed, ± hirsute; pappus of hair-like bristles.

☛ A genus of ca. 60 species of temperate and warm areas; similar to *Erigeron* and previously lumped with that genus by some authorities; not sharply distinct. (From Greek name for safflower) (tribe Astereae)

REFERENCES: Cronquist 1943; Shinnery 1949e; Nesom 1978, 1990b.

1. Plants unbranched or branching well above base, erect, (30–)100–200+ cm tall; larger leaves 4–13 cm long, > 2 mm wide; stems glabrous or with widely spreading hairs \_\_\_\_\_ **C. canadensis**

1. Plants branching from near base, not obviously erect, low, 10–30(–40) cm tall; larger leaves

1–2(–4) cm long, 2 mm or less wide; stem pubescence appressed \_\_\_\_\_ **C. ramosissima**

**Conyza canadensis** (L.) Cronquist, (of Canada), HORSEWEED. Leaves many, subsessile, narrowly lanceolate or oblanceolate, to 14 mm wide, entire or toothed; heads many, small, in a narrow terminal panicle-like inflorescence; involucre 3–4 mm high; ray flowers numerous (20–40). Eroding or disturbed ground; various soils. May–Oct.

1. Stems with widely spreading hairs \_\_\_\_\_ var. **canadensis**

1. Stems glabrous \_\_\_\_\_ var. **glabrata**

var. **canadensis**. HORSE-TAIL CONYZA, CANADA FLEABANE. Leaf blades prominently pilose on margins. Clay, Comanche, and Dallas cos., also Tarrant and Somervell cos. (R. O'Kennon, pers. obs.); nc TX and Plains Country. [*Erigon canadensis* L.]

var. **glabrata** (A. Gray) Cronquist, (somewhat smooth or hairless, becoming hairless). Leaf blades pilose or nearly glabrous on margins. Common and widespread in nc TX; throughout TX. [*Erigon canadensis* var. *glabratus* A. Gray]

**Conyza ramosissima** Cronquist, (much-branched), LOW FLEABANE, LOW CONYZA, SPREADING FLEABANE. Stem hairs antrorsely appressed; leaves linear, entire; heads numerous, similar to those of *C. canadensis*; involucre 3–4(–5) mm high. Clay soils, disturbed habitats. lawns; Collin, Dallas, Erath, Grayson, and Tarrant cos.; nc TX and Plains Country. Jun–Oct. [*Erigon divaricatus* Michx.]

### COREOPSIS GOLDEN-WAVE, TICKSEED, COREOPSIS

Herbaceous annuals or perennials, glabrous or minutely pubescent; leaves usually opposite, simple or pinnately compound; heads pedunculate, solitary or corymbose; inner phyllaries united at base into a cup with outer phyllaries distinct and different in appearance; ray flowers ca. 8, sterile, the ligules yellow, sometimes with a reddish brown basal spot; disk flowers yellow or reddish brown; achenes flattened, winged or wingless; pappus of 2 awns, sometimes obsolete.

☛ An American genus of 50 species; some are cultivated as ornamentals; closely related to *Bidens*. (Greek: *coris*, a bug, and *opsis*, appearance, from the form of the achene) (tribe Heliantheae)

REFERENCES: Sherff 1936; Sherff & Alexander 1955; Smith & Parker 1971; Smith 1974, 1976; Crawford & Smith 1982, 1984; Jansen et al. 1987; Crawford et al. 1992; Mesfin et al. 1995a, 1995b.

1. Disk corollas reddish brown (at least apically); ray flowers with ligules yellow but typically with a reddish brown spot at base.

2. Outer phyllaries equal to or longer than the inner, ca. 4–11 mm long, linear; disk corollas apically 5-lobed; anthers 5; ray flowers with ligules 4–5-toothed \_\_\_\_\_ **C. wrightii**

2. Outer phyllaries very small, much shorter than the inner, ca. 2 mm long, linear-oblong to triangular; disk corollas apically 4-lobed; anthers 4; ray flowers with ligules bluntly 3-toothed (middle tooth sometimes notched) \_\_\_\_\_ **C. tinctoria**

1. Disk corollas yellow; ray flowers with ligules completely yellow.

3. Stems with leaves crowded near base (most on lower 1/2 of stem); leaves much reduced upwards; flowering peduncles usually > 15 cm long; most leaves undivided or with 1 or 2 short side lobes (rarely more divided), the blades or divisions 5–30 mm wide \_\_\_\_\_ **C. lanceolata**

3. Stems with well-developed leaves nearly to the top; leaves only slightly reduced upwards; flowering peduncles usually < 15 cm long (rarely longer); most leaves 3–5 parted or divided to the midrib, the divisions 1–10 mm wide \_\_\_\_\_ **C. grandiflora**

**Coreopsis grandiflora** T. Hogg ex Sweet var. **longipes** (Hook.) Torr. & A. Gray, (sp.: large-flowered; var.: long-stalked), Perennial or annual; stems 0.3–1 m tall; leaves pinnately compound, the lower terminal leaflets linear, becoming filiform apically; outer phyllaries ± lanceolate, shorter to equaling inner phyllaries, to ca. 10 mm long; disk corollas apically 5-lobed; anthers 5; ray flowers with ligules 1.3–2.5 cm long, 4–5-toothed; achenes winged, the wings entire. Sandy woods, also cultivated as an ornamental and spreading; se and e TX w to West Cross Timbers. May.

**Coreopsis lanceolata** L., (lanceolate, lance-shaped), LANCE COREOPSIS. Perennial; stems 0.3–0.7 m tall; outer phyllaries ± lanceolate, shorter to equaling inner phyllaries, 5–10 mm long; disk corollas apically 5-lobed; anthers 5; ray flowers with ligules 1.5–3 cm long, 4–5 toothed; achenes with thin flat wings. Apparently planted and spreading along highways; Cooke, Dallas, Grayson, Tarrant, and Williamson cos., also Somervell Co. (R. O'Kennon, pers. obs.); mainly se and e TX. Apr–May.

**Coreopsis tinctoria** Nutt., (of dyes), PLAINS COREOPSIS, CARDAMINE COREOPSIS, MANZANILLA SILVESTRE, CALLIOPSIS. Annual; stems 0.6–1.2 m tall; leaves pinnately compound, the lower terminal leaflets linear, becoming filiform apically; outer phyllaries very small; ray flowers with ligules 1–1.5 cm long; achenes winged or wingless. Low moist areas, often sandy soils; widely cultivated for its very showy flowers; nearly throughout TX, more abundant in e 1/2. May–Sep. [*C. cardaminaefolia* (DC.) Torr. & A. Gray] This species has been used as a source of a range of red and yellow dyes—hence the specific epithet (Tveten & Tveten 1993). ☒/85

**Coreopsis wrightii** (A. Gray) H.M. Parker, (for Charles Wright, 1811–1885, TX collector), ROCK COREOPSIS. Annual; leaves pinnately compound; middle and upper leaves with narrow segments, the terminal leaflet of middle leaves > 3 times as long as wide, 1–3 mm wide; achenes wingless. Calcareous soils; prairies; Grand Prairie to West Cross Timbers, s to Edwards Plateau; endemic to c and nc TX and s OK. May–Jun. [*C. basalis* (A. Dietr.) S.F. Blake var. *wrightii* (A. Gray) S.F. Blake]

*Coreopsis basalis* (A. Dietr.) S.F. Blake, (basal), GOLDEN-MANE COREOPSIS, cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), occurs just to the e (Freestone and Van Zandt cos.) and s of nc TX (Smith 1976). It differs from the similar *C. wrightii* in having the middle and upper leaves with broad segments, the terminal leaflet of the middle leaves usually < 3 times as long as wide (ca. 5–15 mm wide).

*Coreopsis nuecensis* A. Heller, (presumably of the Nueces River area of TX), with disk corollas yellow, ray flowers with ligules yellow, commonly with several reddish brown flecks a little above the base, inner phyllaries dorsally pubescent, and median and lower stems commonly glabrous or sometimes sparsely pubescent, was cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2). This TX endemic apparently occurs only to the e and s of nc TX (Smith 1976). ↘

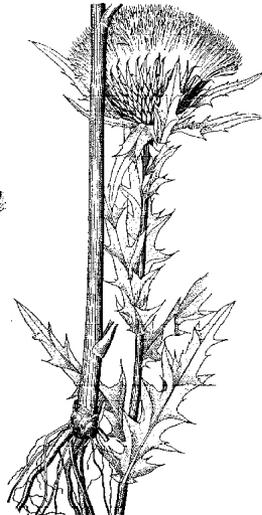
*Coreopsis nuecensoides* E.B. Sm., (resembling *C. nuecensis*), CROWN COREOPSIS, with disk corollas yellow, ray flowers with ligules yellow, commonly with several reddish brown flecks a little above the base, inner phyllaries dorsally pubescent, and median and lower stems commonly densely pubescent or sometimes sparsely pubescent, is cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2). It apparently occurs only to the e and s of nc TX (Smith 1976).

### CREPIS HAWK'S-BEARD

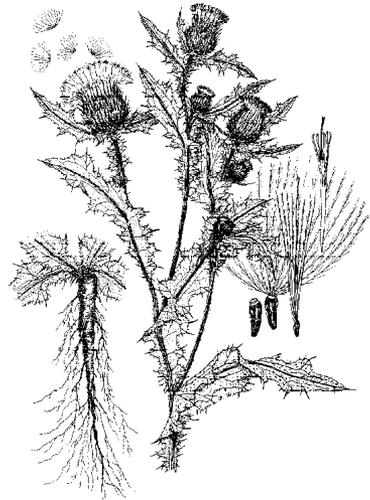
☛ A genus of ca. 200 species of the n hemisphere, s Africa, and South America; a number of weeds and a few are cultivated as ornamentals. (Greek: *crepis*, a classical Greek name of some plant that also meant sandal or boot, possibly alluding to the shape of the achene) (tribe Lactuceae)



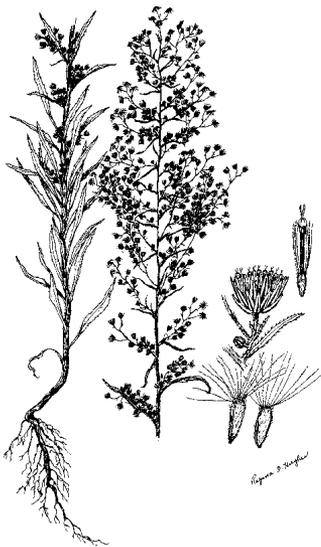
*Cirsium texanum* [HEA]



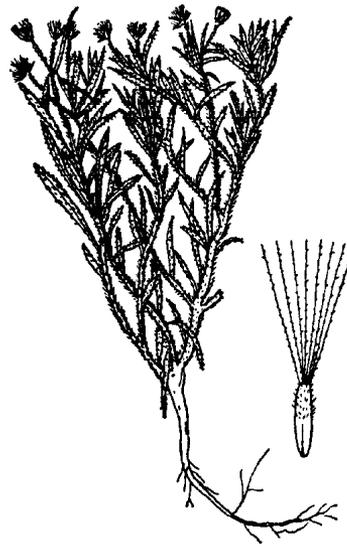
*Cirsium undulatum* [GLE]



*Cirsium vulgare* [REE]



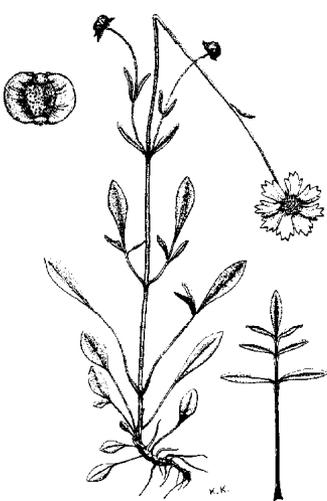
*Conyza canadensis* var. *canadensis* [REE]



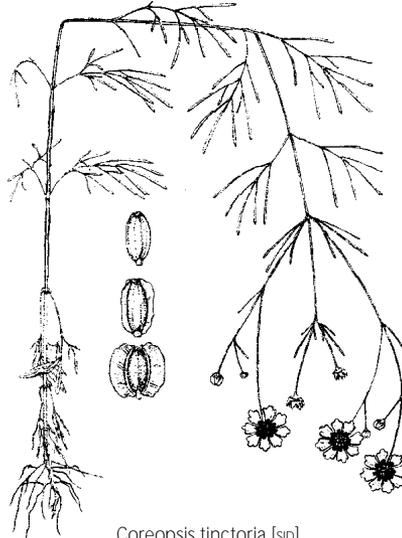
*Conyza ramosissima* [BBZ]



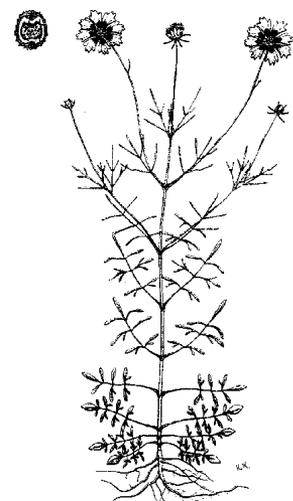
*Coreopsis grandiflora* var. *longipes* [CUR]



*Coreopsis lanceolata* [SID]



*Coreopsis tinctoria* [SID]



*Coreopsis wrightii* [SID]

REFERENCES: Babcock 1947; Clausen 1949; Stebbins 1949; Vuilleumier 1973.

**Crepis pulchra** L., (handsome), SHOWY HAWK'S-BEARD. Taprooted annual 0.3–1 m tall; stem pubescence glandular; sap milky; leaves more basally, alternate and reduced up the stem, with glandular pubescence like the stems, oblanceolate or spatulate, toothed or pinnatifid; heads numerous; involucre 8–12 mm high, glabrous; flowers all ligulate, yellow; achenes 4–6 mm long, narrowly columnar, 10–12 ribbed; pappus of numerous hair-like bristles. Disturbed and weedy areas; Dallas, Grayson, Hunt, and Tarrant cos.; mainly e TX. Apr–May. Native of Eurasia. 🇺🇸

### CROPTILON SCRATCH DAISY

Ours annual, usually glandular-pubescent herbs; stems not leafy to the top, the leaves decreasing in size up the stem to small bracts near the top (but leafy to top in species outside nc TX); leaves alternate, sessile, narrowly oblanceolate to linear, toothed to entire; heads in an open panicle; ray flowers pistillate, fertile, with yellow ligules; disk flowers perfect, fertile, the corollas yellow; achenes unribbed, 2–3 mm long; pappus of persistent bristles.

☛ A genus of 3 species of the se United States; previously treated by some in *Haplopappus* (According to Rafinesque, author of the genus, the name means “col. feather,” possibly colored feather, from the off white or rusty white pappus) (tribe Astereae)

REFERENCES: Hall 1928; Smith 1965, 1981; Nesom 1991b.

1. Ray flowers 5–11; ligules 3.9–6 mm long; receptacles 2.5–4 mm in diam., usually ca. 3 mm; e TX w to e edge of nc TX \_\_\_\_\_ **C. divaricatum**
1. Ray flowers 13–21; ligules 6–12 mm long; receptacles 3.5–7 mm in diam., usually 4.7–5.4 mm; e Blackland Prairie w through nc TX to e Rolling Plains \_\_\_\_\_ **C. hookerianum**

**Croptilon divaricatum** (Nutt.) Raf., (spreading, widely divergent), SLENDER GOLDENWEED, SCRATCH DAISY, SPREADING GOLDEN-ASTER. Stems erect, 20–70(–115) cm tall; basal leaves 7–14 cm long, 1.5–2 cm wide, the upper leaves smaller; peduncles with stalked glandular hairs. Disturbed areas, sandy soils; Henderson and Limestone cos.; also Fannin, Lamar, and Milam cos. (Smith 1965); e TX w to e edge of nc TX. Aug–Oct. [*Haplopappus divaricatus* (Nutt.) A. Gray]

**Croptilon hookerianum** (Torr. & A. Gray) House, (for William Jackson Hooker, 1785–1865, director of Kew Gardens). Stems erect, 30–75 cm tall; basal leaves 6–10 cm long, 1.2–3 cm wide, the upper leaves smaller. Disturbed areas, sandy soils. Jul–Oct.

1. Ligules (2.4–)2.6–3.3 mm wide; peduncles never hispid, with short-stalked glandular pubescence (longest hairs ca. 0.2–0.3 mm long, including gland); probably only to the s of nc TX \_\_\_\_\_ var. **hookerianum**
1. Ligules 1.8–2.8(–3.1) mm wide; peduncles often slightly hispid just below heads, with long-stalked glandular pubescence (longest hairs ca. 0.4–0.5 mm long including gland); Blackland Prairie w to e Rolling Plains \_\_\_\_\_ var. **validum**

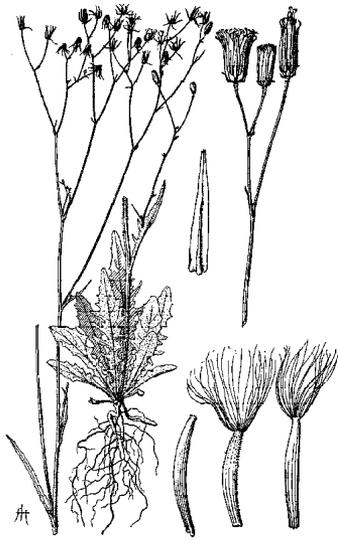
var. **hookerianum**, cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), is a coastal plain taxon that apparently occurs just s of nc TX (Smith 1965). [*C. divaricatum* var. *hookerianum* (Torr. & A. Gray) Shinnery, *Haplopappus divaricatus* (Nutt.) A. Gray var. *hookerianus* (Torr. & A. Gray) Waterfall]

var. **validum** (Rydb.) E.B. Sm., (strong). Blackland Prairie w to e Rolling Plains. [*Haplopappus validus* (Rydb.) Cory, *Haplopappus validus* subsp. *torreyi* E.B. Sm.]

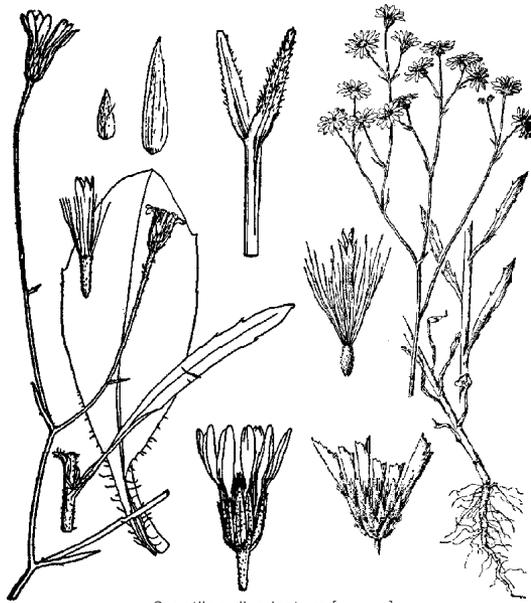
### DRACOPIS CLASPING CONEFLOWER

☛ A monotypic North American genus; sometimes cultivated as an ornamental. (Greek: *drakon*, dragon, in allusion to appendages on the style) (tribe Heliantheae)

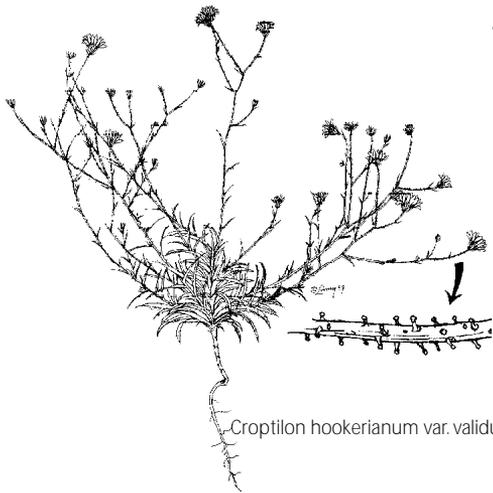
REFERENCES: Cox & Urbatsch 1990, Urbatsch & Jansen 1995.



*Crepis pulchra* [UCP]



*Croptilon divaricatum* [GLE, HAL]



*Croptilon hookerianum* var. *validum* [HEA]



*Dracopis amplexicaulis* [BB2]



*Dysodiopsis tagetoides* [HEA]

**Dracopis amplexicaulis** (Vahl) Cass., (stem-clasping), CLASPING CONEFLOWER, CLASPING-LEAF CONEFLOWER, BLACK-EYED-SUSAN, CONEFLOWER. Annual herb 0.3–0.7 m tall, essentially glabrous; leaves alternate, oblong to ovate, cordate-clasping basally, toothed or entire, acute or acuminate; heads peduncled, short cylindrical; receptacles elongated, chaffy, the scales green-tipped; ray flowers 5–10, neuter, infertile; ligules all yellow or yellow with reddish brown or brownish purple blotch basally, ca. 10–25 mm long; disk flowers perfect, fertile, the corollas purplish or brownish; achenes cylindrical to clavate; pappus absent. Disturbed habitats, particularly moist areas; e 2/3 of TX. May. [*Rudbeckia amplexicaulis* Vahl] ☒/87

### DYSODIOPSIS DOGWEED, FOETID-MARIGOLD

☛ A monotypic genus native to the s United States (Karis & Ryding 1994); previously recognized in *Dyssodia* we are following Karis and Ryding (1994), Kartesz (1994), and J. Kartesz (pers. comm. 1997) in treating it separately. (Presumably from related genus *Dyssodia*, Greek: *dysodia*, an ill smell, and *opsis*, aspect or appearance) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCES: Johnston 1956; Johnston & Turner 1962; Strother 1969, 1986; Karis & Ryding 1994.

**Dysodiopsis tagetoides** (Torr. & A. Gray) Rydb., (resembling *Tagetes*—marigold), MARIGOLD DOGWEED. Annual or short-lived perennial 0.4–0.9 m tall, glabrous; leaves mostly alternate, linear, 2–6 mm wide, with conspicuous, yellowish-brown or orange, dot-like glands, aromatic, the margins with coarse, conspicuous teeth; involucre 9–12 mm high; ray flowers 7–12, with ligules 10–15 mm long, bright yellow; disk corollas brownish yellow; achenes 3–3.5 mm long; pappus of 10–12 scales with 1 to 3 awns per scale;  $x = 13$ . Calcareous soils; Bell, Dallas, and Grayson cos. w to West Cross Timbers and s to c TX. Jun–Aug. [*Dyssodia tagetoides* Torr. & A. Gray, *Hymenatherum tagetoides* (Torr. & A. Gray) A. Gray]

### ECHINACEA CONEFLOWER, PURPLE CONEFLOWER

Perennial herbs; leaves alternate, the lower long-petioled; leaf blades simple, entire or subentire, narrowly lanceolate to oblong or ovate, often with 3–5 prominent veins; heads large, solitary, terminal, long-peduncled; ray flowers sterile, with ligules long, narrow, spreading to reflexed, purple to pink or white; disk flowers fertile; disk with stiff, sharp-pointed, brownish to dark reddish purple scales; pappus a short crown.

☛ A genus of 9 species of the e United States; according to McGregor (1968b), considerable natural hybridization occurs. *Echinacea* species were widely used medicinally by Native Americans for a variety of purposes and are still valued today as herbal medicines; they apparently act as immune system stimulants; unfortunately wild populations are under pressure from over-collecting (Foster 1991). (Greek: *echinos*, hedgehog, from the prickly scales of the disk which protrude beyond the disk flowers) (tribe Heliantheae)

REFERENCES: McGregor 1968a, 1968b; Cox & Urbatsch 1990; Baskin et al. 1993; Urbatsch & Jansen 1995.

1. Leaf blades abruptly contracted to the petiole, often rounded at base, broadly to narrowly ovate, the basal and lower ones 2–3(+) times as long as wide, 1–15 cm wide, usually toothed; cultivated species native to the e of nc TX. \_\_\_\_\_ **E. purpurea**
1. Leaf blades gradually tapering to base, lanceolate to lanceolate-linear or narrowly elliptic, the basal and lower ones usually > 5 times as long as wide, 1–4 (+) cm wide, entire; native species.
  2. Ligules dark purple (rarely lighter), strongly recurved-reflexed so their tips nearly touch the peduncle, 2–3.5 cm long. \_\_\_\_\_ **E. atrorubens**
  2. Ligules light purple to pink or white, spreading to drooping but not recurved-reflexed, 2–9 cm long.

3. Ligules when fully expanded (3-)4-9 cm long, clearly drooping, 1.5-2.5 times as long as breadth of disk; plants 0.5-1 m tall; pollen white \_\_\_\_\_ **E. pallida**
3. Ligules when fully expanded 2-4 cm long, spreading, 1-1.5 times as long as breadth of disk; plants 0.2-0.7 m tall; pollen yellow \_\_\_\_\_ **E. angustifolia**

**Echinacea angustifolia** DC., (narrow-leaved), BLACKSAMSON. Ligules light pink to light purplish or white. Gravelly or rocky limestone prairies (on mixed sand and gravel farther w); Blackland Prairie w to Plains Country and s to Edwards Plateau. May-Jun. [*E. pallida* var. *angustifolia* (DC.) Cronquist] Barkley (1986) indicated that this species grades into *E. pallida* to the e; Cronquist (1980) and Gandhi and Thomas (1989) treated it as a variety of *E. pallida*. We are following McGregor (1968a) and Baskin et al. (1993) in recognizing it at the specific level. It is sometimes split into 2 varieties based on pubescence characters (e.g., McGregor 1968a; Kartesz 1994; Jones et al. 1997). Variety *strigosa* McGregor is said to differ in having consistently strigose or strigose-hirsute leaves and upper stems. While numerous individuals annotated as both variety *angustifolia* and variety *strigosa* are known from nc TX, virtually all are ± strigose or strigose-hirsute. We are thus not distinguishing varieties.

**Echinacea atrorubens** Nutt., (dark red). Stems 0.3-0.9 m tall; pollen yellow. Limestone hillsides; Cooke, Denton, Red River, and Tarrant cos.; endemic to a narrow band from se TX n through nc TX to Ardmore, OK and Topeka, KN. May-Jul.

**Echinacea pallida** (Nutt.) Nutt., (pale), PALE ECHINACEA. Ligules purplish pink to whitish. Sandy open woods and prairies; Grayson, Lamar, and Tarrant cos., also Fannin Co. (McGregor 1968a); e TX w to East Cross Timbers. May-Jun.

**Echinacea purpurea** (L.) Moench, (purple). Stems 0.6-1.8 m tall; ligules 3-8 cm long, drooping, reddish purple (rarely pink or white); pollen yellow. Cultivated in nc TX and persists or spreads; Tarrant Co. (R. O'Kennon, pers. obs.); e TX. May-Sep.

*Echinacea sanguinea* Nutt., (blood red), of se and e TX, occurs just e of nc TX (c Henderson Co.). It can be distinguished from *E. angustifolia* and *E. pallida* using the following characters: it has nearly hemispheric heads (10-20 mm high) vs. conical (15-40 mm high), smaller achenes (ca. 3 mm long vs. 3.5-5 mm long), ligules 4-7 cm long, and pollen yellow. [*E. pallida* var. *sanguinea* Nutt.] Gandhi & R.D. Thomas]

## ECLIPTA

☛ A genus of 4 species found in warm areas of the world. (Greek: *ecleipo*, to be deficient or lack, alluding to the absence of pappus) (tribe Heliantheae, can also be keyed using Astereae key)

**Eclipta prostrata** (L.) L., (prostrate, flat to the ground), PIEPLANT, YERBA DE TAGO. Low, prostrate to erect, appressed-scabrous-pubescent annual, usually freely branched; leaves opposite, sessile or short petiolate, lanceolate to narrowly elliptic, entire or slightly toothed, dark green; heads small, short-peduncled, terminal and in upper leaf axils, rather inconspicuous; ray flowers numerous, fertile, with ligules linear, very short (ca. 1 mm long), white; disk flowers perfect; disk corollas minute, whitish; achenes 2-2.5 mm long; pappus none or very obscure. Ditches, shorelines, stream banks; throughout TX. Jun-Nov. [*E. alba* (L.) Hassk.] Gandhi and Thomas (1989) explained why the correct name is *E. prostrata*. This species has been introduced into the Old World and in India is used as a blackish dye for hair and tattooing (Mabberley 1997).

## ELEPHANTOPUS ELEPHANT'S-FOOT

☛ A mainly tropical and warm area genus of ca. 30 species. (Greek: *elephas*, elephant, and *pous*, foot; translation of aboriginal name) (tribe Vernonieae)

REFERENCES: Gleason 1906, 1922; Clonts & McDaniel 1978; Jones 1982.

**Elephantopus carolinianus** Raeusch., (of Carolina), LEAFY ELEPHANTOPUS. Pubescent perennial herb, 30–90 cm tall; basal leaves absent at flowering time; leaves alternate, oblanceolate-elliptic, 5–18 cm long, to 9 cm wide; 3 foliaceous bracts subtending glomerules of heads ovate, acute; involucre subcylindric, the phyllaries stramineous; ray flowers absent; disk flowers 3 or 4 per head, the corollas pinkish white to lavender, 5-lobed; achenes cylindrical, antrorsely pubescent; pappus bristles persistent, basally dilated and indurated. Low wooded areas; se and e TX w to Grand Prairie, also Edwards Plateau. Aug–Oct.

### ENGELMANNIA ENGELMANN'S DAISY, CUT-LEAF DAISY

☛ A monotypic genus native to North America; sometimes cultivated as an ornamental. (Named for Dr. George Engelmann, 1809–1884, German-born botanist and physician of St. Louis) (tribe Heliantheae)

REFERENCES: Turner & Johnston 1956; Goodman & Lawson 1992.

**Engelmannia peristenia** (Raf.) Goodman & C.A. Lawson, (possibly from Greek: *perisso*, beyond the regular number or size, odd in number, and *tenia*, band, ribbon), ENGELMANN'S DAISY, CUT-LEAF DAISY. Densely hispid-pubescent perennial with woody taproot; stems spreading to erect, 0.2–1 m tall; leaf blades 8–30 cm long, pinnately divided nearly to midrib, the lobes again lobed or toothed; inflorescences of several long-peduncled heads; involucre 6–10 mm high; ray flowers with ligules ca. 1 cm long, yellow, curling under during daytime, expanded from late afternoon to mid-morning; disk corollas numerous, dark yellow; pappus of a few scales. Clayey or occasionally sandy prairies and limestone outcrops; nearly throughout TX except forested sandy areas of e part of state. Apr–Jul (rarely later). [*E. pinnatifida* Torr. & A. Gray] Goodman and Lawson (1992) documented that *E. peristenia* is an older name (published 1832) than the long established *E. pinnatifida* (published 1840). Farmers and ranchers refer to this as an “ice cream” plant because it is preferred by livestock; it is therefore now rarely seen except along roadsides or other areas inaccessible to grazing animals (J. Stanford, pers. comm.).

### ERECHTITES BURNWEED, FIREWEED

☛ A genus of 15 species native to the Americas; some contain alkaloids. (An ancient Greek name, *erechthites*, used by Dioscorides for some species of *Senecio*—groundsel) (tribe Senecioneae)

REFERENCES: Belcher 1956; Vuilleumier 1969a; Barkley & Cronquist 1978.

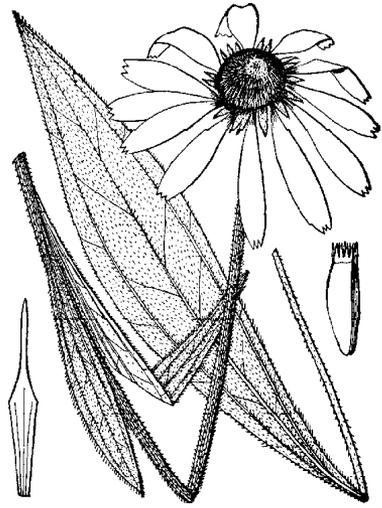
**Erechtites hieraciifolia** (L.) Raf. ex DC., (with leaves like *Hieracium*—hawkweed), AMERICAN BURNWEED, FIREWEED. Annual herb, glabrescent or with sparse, jointed hairs; stems 0.1–2.5 m tall; leaves alternate, numerous, elliptic to lanceolate or oblanceolate, 3–20 cm long, sharply doubly serrate and sometimes irregularly lobed, sometimes clasping, well-distributed up stem, the uppermost reduced; inflorescence an elongate to corymbose cyme of few-many heads; involucre cylindrical; main phyllaries ca. 12–14, in 1 series, ± equal, 9–17 mm long, with a few, very small bracts at base; heads of disk-like flowers only; ligulate ray flowers absent; flowers whitish or cream-white; peripheral flowers pistillate, with tubular-filiform corollas; central flowers perfect; achenes all alike, ribbed, columnar, ca. 2–3 mm long; pappus of numerous capillary bristles, deciduous. Wet areas; Fannin (Talbot property) and Lamar cos. in Red River drainage, also Fort Hood (Bell or Coryell cos.—Sanchez 1997); mainly se and e TX. Aug–Nov. [*E. hieraciifolia* var. *intermedia* Fernald, *Senecio hieraciifolia* L.]

### ERIGERON FLEABANE, DAISY FLEABANE, DAISY

Annual to perennial herbs; leaves alternate, sessile or the lower petioled, oblong or oblanceolate to linear, entire or toothed; heads solitary or corymbose; ray flowers numerous, often 30–150,



*Echinacea purpurea* [GLE]



*Echinacea angustifolia* [BB2]

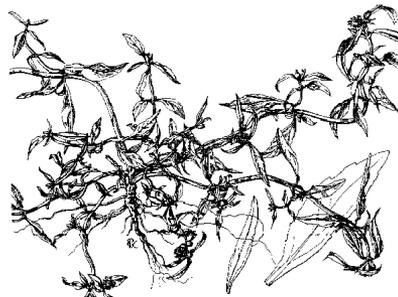
*Echinacea atrorubens* [HEA]



*Echinacea pallida* [GLE]



*Eclipta prostrata* [MAS]



pistillate, fertile, the ligules narrow (to ca. 1.2 mm wide), white to blue, lavender or pink, never yellow, curling under at night or in age; disk flowers usually perfect and fertile, the corollas yellow; achenes flattened, usually strongly 2-ribbed; pappus various, of hair-like bristles or of 2 whorls (bristles and small bristles or scales).

☛ A cosmopolitan genus (especially North America) of ca. 413 species (G. Nesom, pers. comm.) including a number of cultivated ornamentals. Closely related to *Conyza* (Cronquist 1947) and not sharply distinguished from it. *Erigeron* species are sometimes difficult to distinguish. Barkley (1986) indicated, "As with many widespread genera in the Asteraceae, the species boundaries are not always sharp, and morphological intermediates are to be expected." Guy Nesom (pers. comm.) indicated, however, that very few *Erigeron* species hybridize. (Greek: *eri*, early, and *geon*, old man; the ancient name of an early-flowering plant with fluffy white seed heads) (tribe Astereae)

REFERENCES: Cronquist 1943, 1947; Shinnars 1947a; Van Vleet 1951; Nesom 1978, 1989a.

1. Plants small, 10–30 cm tall; with distinct taproot (obviously longer than lateral roots).
  2. Plants annuals; spring form with peduncles less than 4 cm long; usually in sandy habitats; taproot neither noticeably enlarged nor woody \_\_\_\_\_ **E. geiseri**
  2. Plants perennials; spring form with peduncles 4–12 cm long; usually in calcareous habitats; taproot typically enlarged and woody \_\_\_\_\_ **E. modestus**
1. Plants of various heights, but often much > 30 cm tall; with shallow, stubby crown and fibrous roots.
  3. Upper and middle stem leaves widest basally or nearly so, clasping, 4–20 mm wide, 2–4 times as long as wide; lower leaves on broadly margined or winged petioles; pappus of disk flowers of a single whorl of ca. 20–30 bristles \_\_\_\_\_ **E. philadelphicus**
  3. Upper and middle stem leaves narrowed basally, slightly or not clasping, usually 1–10 mm wide, 4–10 times as long as wide; lower leaves on narrowly winged or wingless petioles; pappus of disk flowers of 2 whorls, the inner of 10–15 bristles, the outer of small scales.
  4. Ray flowers with ligules purplish or bluish or white above and colored beneath; ray flowers with pappus of long hairs similar to disk flowers; stems 10–40 cm tall, with 7–15 leaves below inflorescence on well-developed plants; basal leaves usually 15 mm wide or less \_\_\_\_\_ **E. tenuis**
  4. Ray flowers with ligules white, rarely bluish; ray flowers with minute pappus, the disk flowers with pappus of long hairs; stems 30–150 cm tall, with 17–25 leaves below inflorescence on well-developed plants (some of the leaves quite reduced); basal leaves to 70 mm wide.
  5. Upper stem pubescence of mostly incurved or appressed hairs; stems 30–70 cm tall; stem leaves typically well-developed, linear to lanceolate, entire or the lower or middle slightly toothed, the teeth usually with rounded sides; widespread in nc TX \_\_\_\_\_ **E. strigosus**
  5. Upper stem pubescence, at least some, long and spreading; stems 60–150 cm tall; stem leaves often rather reduced, lanceolate or wider, all except the upper toothed, often conspicuously so, the teeth straight-sided; rare in nc TX (known only in Red River drainage) \_\_\_\_\_ **E. annuus**

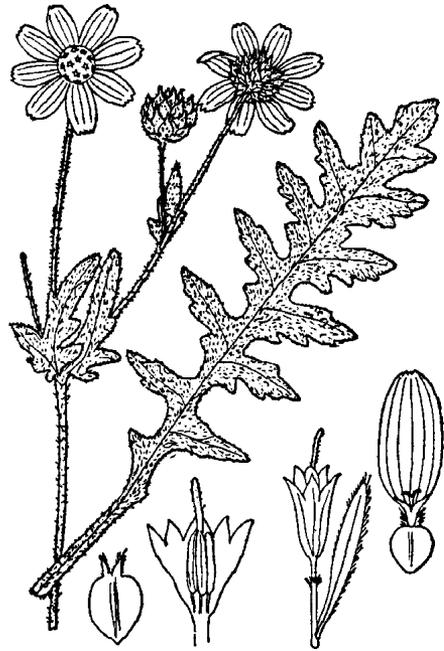
**Erigeron annuus** (L.) Pers., (annual), ANNUAL FLEABANE. Annual; involucre 3–5 mm high; disks 6–10 mm across; ray flowers with ligules ca. 5–10 mm long. Prairies or open ground, various soils; in nc TX known only from Grayson Co.; also scattered in e TX and Edwards Plateau. Apr–Jun.

**Erigeron geiseri** Shinnars, (for Samuel Wood Geiser, 1890–1983, professor at Southern Methodist Univ.), BASIN FLEABANE. Stems erect, 7–30 cm tall; ligules white to rosy or lavender; pappus of 2 whorls—10 scabrous bristles and as many small scales. Sandy prairies; Archer, Clay, Dallas, Falls, Palo Pinto, and Young cos.; se TX w to Edwards Plateau and n to nc TX and Rolling Plains. Late Mar–Jun.

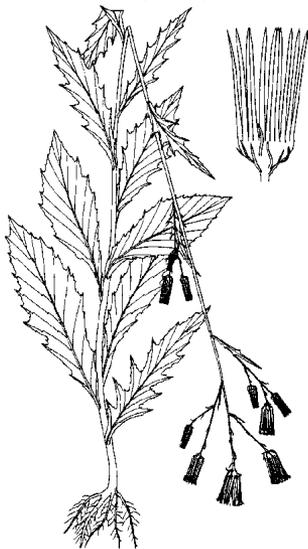
**Erigeron modestus** A. Gray, (modest), PLAINS FLEABANE. Perennial, often grayish pubescent; stems 10–20(–30) cm tall; producing two crops of stems: first one beginning to flower in late



*Elephantopus carolinianus* [BB2]



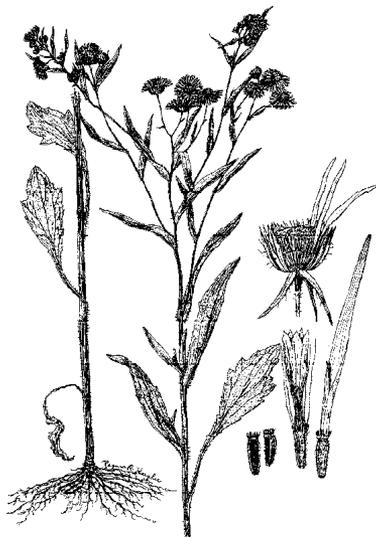
*Engelmanna peristenia* [BB2]



*Erechites hieracifolia* [PNW]



*Erigeron geiseri* [HEA]



*Erigeron annuus* [REE]



*Erigeron modestus* [HEA]

Mar–Apr, with crowded, deeply lobed basal leaves and long, naked peduncles; from Apr–Jun developing into a much-branched plant with narrowly oblanceolate or linear-lanceolate leaves (the basal ones withered); by fall (Sep–Nov) producing a bushy-branched mass of often sprawling or decumbent stems with narrow leaves only, and shorter-peduncled heads; ray flowers with ligules ca. 4–8 mm long; pappus with 2 whorls—bristles and much shorter bristles or scales. Gravelly or rocky limestone; Cooke to Burnet cos. s and w to w TX (ca. w 1/2 of nc TX). Apr–Oct.

**Erigeron philadelphicus** L., (of the Philadelphia region), PHILADELPHIA FLEABANE. Perennial without rhizomes; stems 15–70 cm tall; involucre 4–6 mm high; disk 6–15 mm across; ray flowers with ligules ca. 5–10 mm long, usually white to light pink. Low prairies and stream banks; calcareous clay; se and e TX w to West Cross Timbers and Edwards Plateau. Mar–May.

**Erigeron strigosus** Muhl. ex Willd., (strigose, with stiff bristles). Erratic as to duration: commonly biennial, sometimes annual, occasionally perennial; ray flowers with ligules to ca. 6 mm long. Prairies, open woods, pastures, roadsides; se and e TX w to West Cross Timbers; in Red River drainage to e Rolling Plains (Wichita Co.), s to Llano Co. in c TX. Apr–Jun, sporadically to Oct. Sometimes 2 varieties are recognized; Cronquist (1980) considered them ill-defined.

1. Inflorescences diffuse (= widely spreading), subnaked; heads tiny, the involucre 2–3 mm tall

\_\_\_\_\_ var. **beyrichii**

1. Inflorescences not diffuse, or if so, then somewhat leafy; heads usually larger, the involucre (2–)

2.5–5 mm tall \_\_\_\_\_

\_\_\_\_\_ var. **strigosus**

var. **beyrichii** (Fisch. & C.A. Mey.) Torr. & A. Gray ex A. Gray, (for Heinrich Karl Beyrich, 1796–1834, Prussian botanist who collected in GA, SC, and TX). Similar to variety *strigosus* and sometimes lumped with that variety (Correll & Johnston 1970).

var. **strigosus**. PRAIRIE FLEABANE, WHITETOP.

**Erigeron tenuis** Torr. & A. Gray, (slender, thin), SLENDER FLEABANE. Annual or biennial (rarely perennial?); ray flowers with ligules ca. 2.5–5 mm long. Sandy open woods and roadsides; se and e TX w to West Cross Timbers and e Edwards Plateau. Mar–May. There is evidence of introgressive hybridization between this species and *E. strigosus* (Cronquist 1947).

## EUPATORIUM BONESET, THOROUGHWORT

Ours herbaceous perennials (1 species a shrub); leaves mostly opposite or in *E. capillifolium* mostly alternate; heads corymbose; ray flowers absent; disk flowers white, blue, pink, or purplish; achenes blackish, 5-ribbed; pappus of persistent bristles.

☛ The genus is mainly American with some Old World species. It is variously treated as including up to 1,200 species or segregated into a number of smaller genera (*Eupatorium* sensu stricto 45 species); if split according to some authorities (e.g., Robinson & King 1985; King & Robinson 1987; Bremer et al. 1994; Jones et al. 1997), the 6 nc TX species go in 4 different genera, *Ageratina*, *Conoclinium*, *Eupatorium* in a strict sense, and *Fleischmannia*. It is difficult to know how to treat this group; for practical reasons, we are following Cronquist (1980), McVaugh (1982), and Gandhi and Thomas (1989) in treating the genus in the traditional broad sense; however, appropriate synonymy is given below. In referring to this group, Stebbins (1993) argued that, “While microscopic characters should by no means be overlooked, their use to establish new genera that are not distinct on the basis of any other characteristics should be discouraged.” However, based on the cladistic analysis of the Eupatorieae by Bremer et al. (1994), *Eupatorium* sensu lato is apparently polyphyletic. The common name BONESET is apparently derived from the historic use in treating dengue fever, also known as break-bone fever (Tveten &

Tveten 1993). (Named for Mithridates Eupator, 132–63 B.C., King of Pontus, who is said to have used a species of the genus in medicine or as an antidote for poison) (tribe Eupatorieae)

REFERENCES: Grant 1953; King & Robinson 1970a, 1970b, 1970c, 1970d, 1987; Clewell & Wooten 1971; Wooten & Clewell 1971; Sullivan 1975; Cronquist 1980; McVaugh 1982; Robinson & King 1985; Warnock 1987b; Gandhi & Thomas 1989; Bremer et al. 1994.

1. Leaves connate-perfoliate (= united in pairs around the stem); in nc TX known only from Red River drainage \_\_\_\_\_ **E. perfoliatum**
1. Leaves distinct, not united; including species widespread in nc TX.
  2. Leaves or their segments finely dissected into filliform (= thread-like) segments < 1 mm wide \_\_\_\_\_ **E. capillifolium**
  2. Leaves not finely dissected into filliform segments.
    3. Plant a rounded, much-branched shrub with deltoid leaves and pinkish-white to white flowers; mainly rocky limestone areas on Edwards Plateau, in nc TX known only from s part of Lampasas Cut Plain (segregate genus *Ageratina*) \_\_\_\_\_ **E. havanense**
    3. Plant herbaceous (but stems can be coarse in some species); leaves narrowly elliptic to ovate or deltoid; flowers white to pink, blue, or purplish blue; widespread in nc TX.
      4. Leaves narrowly elliptic, prominently 3-nerved, sessile or with petioles 1–2 mm long \_\_\_\_\_ **E. altissimum**
      4. Leaves ovate to deltoid, if 3-nerved, at base only, distinctly petiolate.
        5. Corollas blue or purplish blue; receptacles conical (segregate genus *Conoclinium*) \_\_\_\_\_ **E. coelestinum**
        5. Corollas white or pink; receptacles flat.
          6. Corollas pink or whitish with the distal portion pink (distal portion rarely lavender-pink or white); stems weak, sprawling or scandent; involucre 5–6 mm long (segregate genus *Fleischmannia*) \_\_\_\_\_ **E. incarnatum**
          6. Corollas white; stems usually erect or ascending; involucre 3–5 mm long.
            7. Phyllaries clearly varying in length, obviously pubescent, resin-dotted (under magnification) \_\_\_\_\_ **E. serotinum**
            7. Phyllaries all about the same length, nearly glabrous or with pubescent tips, not resin-dotted (segregate genus *Ageratina*) \_\_\_\_\_ **E. rugosum**

**Eupatorium altissimum** L., (very tall), TALL EUPATORIUM, TALL THOROUGHWORT. Rhizomatous perennial; leaves mostly opposite; leaf blades narrowly elliptic; petioles 0–2 mm long; involucre 3.8–4.3 mm high; phyllaries rounded apically; corollas white. Prairies; Collin, Denton, Fannin, Grayson, Lamar, and Tarrant cos; also e TX. Aug–Oct.

**Eupatorium capillifolium** (Lam.) Small, (hair-leaved), DOGFENNEL, DOGFENNEL EUPATORIUM, CYPRESSWEED. Erect perennial to 3 m tall; leaves mostly alternate, dissected; involucre 2–3 mm high; corollas white. Disturbed areas, sandy soils; Dallas, Lamar, and Tarrant cos; mainly se and e TX. Sep–Nov.

**Eupatorium coelestinum** L., (sky-blue), MISTFLOWER, BLUE BONESET. Rhizomatous perennial; leaves opposite; leaf blades deltoid; petioles 3–20 mm long; involucre 3–5 mm high; phyllaries linear-subulate; corollas blue or purplish blue. Moist situations, often wooded areas, sandy or calcareous soils; East and West cross timbers; se and e TX w to nc TX and Edwards Plateau. Aug–Nov. Sometimes (e.g., Jones et al. 1997) recognized in the genus *Conoclinium* [as *C. coelestinum* (L.) DC.]. If segregated, *Conoclinium* is a genus of 3 species of the e United States and Mexico (Mabberley 1997).

**Eupatorium havanense** Kunth, (of Havana), SHRUBBY BONESET. Rounded, much-branched shrub (0.3–)0.6–1.5(–2) m tall; leaves opposite; leaf blades deltoid, (2–)3–5(–7) cm long; petioles 3–10 (–15) mm long; involucre 4–6 mm high; phyllaries linear; corollas pinkish-white to white. Rocky limestone areas; in nc TX known only from Bell (Fort Hood–Sanchez 1997) and Burnet

(C. Sexton, pers. comm.) cos. in s part of Lampasas Cut Plain; mainly Edwards Plateau. (Sep–) Oct–Nov. Despite the epithet, this species is native to TX; it also occurs in Mexico and on Caribbean islands. [*E. ageratifolium* DC. var. *texense* Torr. & A. Gray, *E. texense* (Torr. & A. Gray) Rydb.] Now sometimes (e.g., Kartesz 1994; Jones et al. 1997) recognized in the segregate genus *Ageratina* [as *A. havanensis* (Kunth) R.M. King & H. Rob.]. If segregated, *Ageratina* is a genus of ca. 290 species of the e United States and c and w South America (Mabberley 1997). *Eupatorium wrightii* A. Gray, a somewhat similar rounded shrub of the Trans-Pecos, has been implicated in the sudden death of cattle (appearing as though “shot and instantly killed”); feeding experiments also resulted in death (Kingsbury 1964). The smaller leaf blades (1–2 cm long) and shorter petioles (2–5 mm long) distinguish *E. wrightii* from *E. havanense*. ☞

***Eupatorium incarnatum*** Walter, (flesh-colored), PINK EUPATORIUM, PINK BONESET. Perennial from fibrous-rooted crown, scandent, to 2 m tall; leaves opposite; leaf blades deltoid; petioles 2 mm or more long; involucre 5–6 mm high; phyllaries lance-subulate; corollas whitish, with pink or lilac apically. Bottomlands, woodlands; Dallas, Fannin, Grayson, Hunt, Kaufman, Limestone, Rockwall, and Tarrant cos.; se and e TX w to nc TX. Oct–Nov. Sometimes (e.g., Jones et al. 1997) recognized in the genus *Fleischmannia* [as *F. incarnata* (Walter) R.M. King & H. Rob.]. If segregated, *Fleischmannia* is a genus of 80 species of North America and w South America (Mabberley 1997).

***Eupatorium perfoliatum*** L., (perfoliate, with leaf surrounding the stem), BONESET, THOROUGHWORT, AGUEWEED. Rhizomatous perennial; leaves opposite, lanceolate, perfoliate; involucre 3–5 mm high; corollas whitish. Sandy soils; Grayson and Lamar cos. in Red River drainage; mainly se and e TX. Aug–Nov. This species contains the glucoside, eupatorin, and has been variously used medicinally (Duke 1985).

***Eupatorium rugosum*** Houtt., (rugose, wrinkled), WHITE SNAKEROOT, SNAKEROOT, RICHWEED, FALLPOISON. Perennial from a fibrous crown; leaves opposite; leaf blades deltoid-ovate to lance-ovate; petioles about 1/3 as long as blades; involucre 4–5 mm high; corolla lobes pubescent dorsally. Low woods; Grayson Co. in Red River drainage (Hagerman N.W.R.); mainly se and e TX; also Edwards Plateau. Sep–Nov. Now sometimes (e.g., Kartesz 1994; Jones et al. 1997) recognized in the segregate genus *Ageratina* [as *A. altissima* (L.) R.M. King & H. Rob.]. All parts of WHITE SNAKEROOT contain tremetol, a complex alcohol, and glycosides; it is poisonous to livestock. During colonial times cows eating SNAKEROOT passed the poison through their milk causing “milk sickness” in humans (Hardin & Arena 1974); numerous deaths resulted, in some areas the human population was reduced to less than 1/2 the original number, and whole villages were abandoned (Kingsbury 1964); in livestock the condition is known as “trembles” (Stephens 1980). Other species are not known to contain the toxin. ☞

***Eupatorium serotinum*** Michx., (late-flowering), LATE EUPATORIUM, LATE-FLOWERING THOROUGHWORT, FALL BONESET. Rhizomatous; leaves mostly opposite; leaf blades narrowly ovate; petioles 10–30 mm long; involucre 3–5 mm high; phyllaries linear; flowers whitish. Open areas, disturbed sites; se and e TX w to Rolling Plains and Edwards Plateau. Aug–Nov.

## EUTHAMIA FLAT-TOPPED-GOLDENROD

☞ A North American genus of 8 species; similar to and often lumped into *Solidago* as a section or subgenus (Sieren 1981); some authors (e.g., Cronquist 1980) suggest the genus may be more closely related to *Gutierrezia*. (Possibly either from Greek: *eu*, well, and [?], crowded, from dense inflorescences (Semple 1993), or Greek: *euthemon*, neat or pretty) (tribe Astereae)

REFERENCES: Cronquist 1980; Sieren 1981; Taylor & Taylor 1983; Semple 1992.

***Euthamia gymnospermoides*** Greene, (gymnosperm-like), VISCID EUTHAMIA, FLAT-TOPPED-GOLDENROD. Rhizomatous, ± glabrous perennial; stems to 1 m tall; basal and lower stem leaves early



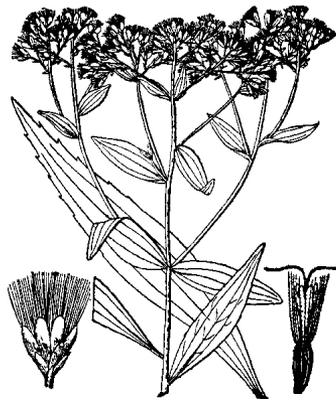
*Erigeron philadelphicus* [GLE]



*Erigeron strigosus* var. *strigosus* [BB2]



*Erigeron tenuis* [GLE]



*Eupatorium altissimum* [BB2]



*Eupatorium capillifolium* [REE]



*Eupatorium coelestinum* [CO1]



*Eupatorium havanense* [HEA]



*Eupatorium incarnatum* [BB2]



*Eupatorium perfoliatum* [GWO]

deciduous; persistent stem leaves numerous, alternate, linear or linear-lanceolate, 4–9 cm long, 1.5–4(–8) mm wide, entire, strongly glandular-punctate, sessile; inflorescences broad, cymose, with numerous, ± sessile, small heads; involucre 4–6.5 mm high; flowers with sweet fragrance; ray flowers pistillate and fertile; ligules yellow, 1–3 mm long; disk flowers fewer than ray flowers, perfect and fertile, the corollas yellow; achenes hairy; pappus of numerous whitish, hair-like bristles. Open woods, prairies; Lamar and Montague cos; also se and e TX and Plains Country. Oct–Nov. [*E. camporum* Greene, *E. pulverulenta* Greene, *Solidago gymnospermoide*(Greene) Fernald, *Solidago gramifolia*(L.) Nutt. var. *gymnospermoide*(Greene) Croat]

### EVAX RABBIT'S-TOBACCO, COTTON-ROSE

Very small annuals with taproots, usually less than 10(–15) cm tall, densely and conspicuously white- to gray-pubescent with woolly hairs; stems usually branched; leaves alternate or uppermost crowded and apparently whorled, small (ca. 2–15 mm long), linear or oblanceolate, entire; heads sessile, in dense clusters, axillary or terminal, small and inconspicuous, woolly-pubescent; true involucre absent; ray flowers absent; pappus absent.

☛ A genus of ca. 15–20 species (Mabberley 1987) native from the Mediterranean to c Asia, also North America; sometimes lumped into *Filago* (e.g., Anderberg 1991; Mabberley 1997). We are following Jones et al. (1997) and J. Kartesz (pers. comm. 1997) in maintaining it as a separate genus. (Derivation of generic name not explained by original author) (tribe Inuleae)  
REFERENCES: Shinners 1951e; Anderberg 1991; Morefield 1992.

1. Clusters of heads axillary, distributed along the elongate stems; central flowers of heads usually fertile \_\_\_\_\_ **E. candida**
1. Clusters of heads nearly all terminal at the branch tips; central flowers of head usually infertile.
  2. Bracts among the heads shorter than or equal to the heads in length (bracts thus largely concealed by dense, woolly pubescence associated with the heads); ultimate clusters of heads subtended by leaves 3–10 mm long that simulate an involucre \_\_\_\_\_ **E. verna**
  2. Bracts among the heads exceeding the heads in length (bracts thus conspicuously visible protruding from between the crowded heads); ultimate clusters of heads subtended by leaves 6–12 mm long that simulate an involucre \_\_\_\_\_ **E. prolifera**

**Evax candida** (Torr. & A. Gray) A. Gray, (pure white, shining), SILVER EVAX. Clusters of heads mostly sessile in the leaf axils. Sandy open woods, prairies, fields, and roadsides; Bell, Burnet, Dallas, Henderson, Limestone, and Parker cos.; also Hood, Somervell, and Tarrant cos. (R. O'Kennon, pers. obs.); se and e TX rarely w to nc TX and Edwards Plateau. Apr–May. [*Filago candida* (Torr. & A. Gray) Shinners]

**Evax prolifera** Nutt. ex DC., (producing offshoots), BIG-HEAD EVAX. Clayey or rocky ground on limestone; widespread in TX from Blackland Prairie w. Apr–Jun. [*Filago prolifera* (Nutt. ex DC.) Britton]

**Evax verna** Raf., (of Spring), MANY-STEM EVAX. Sandy or eroding silty or rocky ground; nearly throughout TX. Apr–Jun. [*E. multicaulis* DC., *Filago verna* (Raf.) Shinners]

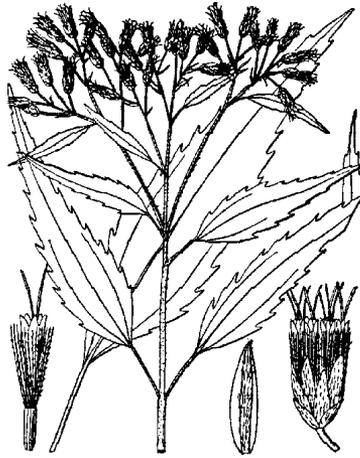
### FACELIS

☛ A South American genus of 3 species. (Derivation of generic name unknown) (tribe Inuleae)  
REFERENCE: Anderberg 1991.

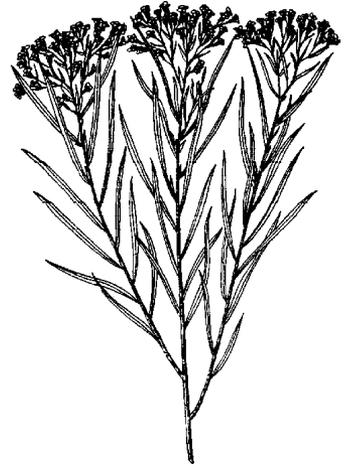
**Facelis retusa** (Lam.) Sch.Bip., (retuse, notched slightly at a rounded apex). Annual herb from a taproot; stems 6–20(–30) cm tall, erect or with decumbent branches, white-gray woolly; leaves alternate, simple, entire, linear-spatulate, 7–20(–30) mm long, 1.5–4 mm wide, ± sessile; heads in a terminal cluster; involucre 8–11 mm high; phyllaries mostly scarious or partly greenish, the



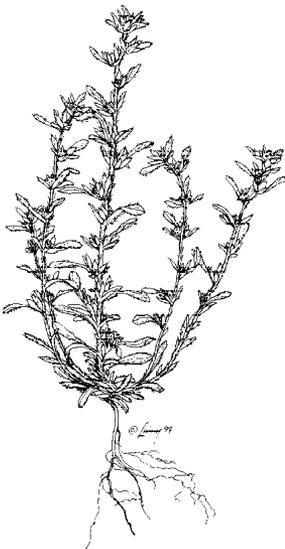
*Eupatorium rugosum* [REE]



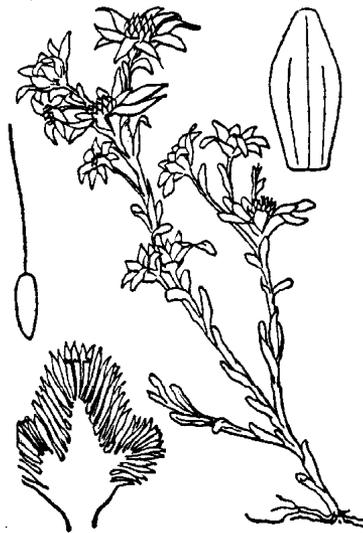
*Eupatorium serotinum* [BB2]



*Euthamia gymnospermoides* [STE]



*Evax candida* [HEA]



*Evax prolifera* [BB2]



*Evax verna* [SHI]



*Facelis retusa* [MAR]



*Gaillardia aestivalis* var. *aestivalis* [BB1]



*Gaillardia aestivalis* var. *flavovirens* [STE]

inner of ten pigmented near tip; ray flowers absent; disk flowers of 2 types: the central ca. 3–5 perfect and fertile, with corollas 5-toothed, white; the peripheral 10–25 pistillate, with corollas filiform, truncate or obscurely toothed, white; achenes white hairy; pappus of numerous whitish, strongly plumose, hair-like bristles 10–11 mm long, surpassing the corollas. Lawn weed, roadsides, disturbed areas; Dallas and Tarrant cos.; mainly e TX. Apr–May. Native of South America. [*Gnaphalium retusum* Lam.] 

### GAILLARDIA INDIAN-BLANKET, BLANKET-FLOWER

Low, pubescent annuals or perennials; leaves basal or alternate, entire, toothed, or lobed, petioled to ± clasping; heads large, solitary or corymbose; phyllaries herbaceous or with hardened base, narrow, loose; ray flowers infertile; ligules widened and lobed apically, yellow to dark orange or red, or ligules absent; disks rounded-conical to subglobose, the perfect disk flowers usually intermixed with bristles or slender toothed scales; disk corollas yellow to reddish purple or reddish brown; pappus of awned scales, the awns ca. as long as the scale body.

☛ A genus of 28 species native to North America and temperate South America; includes cultivated ornamentals. (Named for M. Gaillard de Charentoneau, 18th century French magistrate and patron of botany) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCES: Biddulph 1944; Turner & Whalen 1975; Heywood & Levin 1984.

1. Leaves ± all basal; ray flowers with ligules very short and inconspicuous or absent \_\_\_\_\_ **G. suavis**
1. Leaves conspicuously extending up the stem, alternate; ray flowers with ligules usually present (sometimes absent), the ligules short to long, often showy.
  2. Ligules of ray flowers usually reddish tipped with orangish yellow; lobes of disk corollas narrowly triangular-acuminate, short, much < 1/2 as long as the corolla tube (note: the margins of the disk corolla lobes have long, moniliform, often purplish red hairs which can obscure the lobe shape); receptacles (look between the disk flowers) with well-developed bristles ca. as long as the achenes \_\_\_\_\_ **G. pulchella**
  2. Ligules of ray flowers usually yellow or yellow with red at base; lobes of disk corollas narrowed to linear tip, very long, the lobes ca. 1/2 as long as the corolla tube or longer (margins of lobes can have hairs as in *G. pulchella*); receptacles naked or nearly so \_\_\_\_\_ **G. aestivalis**

**Gaillardia aestivalis** (Walter) H. Rock, (summer), PRAIRIE GAILLARDIA. Annual or short-lived perennial 12–65 cm tall, as broad as tall or usually narrower, with slender to stout taproot, usually single-stemmed; leaves mostly sessile; disks 15–25 mm across; ray flowers usually with ligules (8–)10–15 mm long or ligules sometimes absent; achenes ca. 2 mm long; pappus scales 5–6 mm long, with a slightly longer awn. Sandy open woods, sandy prairies, disturbed areas. May–Oct.

1. Disks purple-brown; ray flowers with ligules partly red or wholly yellow or absent \_\_\_\_\_ var. **aestivalis**
1. Disks yellow; ray flowers with ligules yellow \_\_\_\_\_ var. **flavovirens**

var. **aestivalis**. LANCE-LEAF GAILLARDIA, PRAIRIE GAILLARDIA, YELLOW INDIAN-BLANKET. Se and e TX w to East and West cross timbers and Edwards Plateau. [*G. fastigiata* Greene, *G. lanceolata* Michx.]

var. **flavovirens** (C. Mohr) Cronquist, (yellow-green), YELLOW INDIAN BLANKET. Included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); mainly se and e TX. [*G. lanceolata* Michx. var. *flavovirens* C. Mohr]

**Gaillardia pulchella** Foug., (handsome), INDIAN-BLANKET, FIRE-WHEELS, ROSE-RING GAILLARDIA. **State wildflower of Oklahoma** (Tyril et al. 1994). Low annual 10–60 cm tall, pubescent to hispid-pilose, developing wide-spreading branches; leaves oblong to ovate-lanceolate, the upper clasping, entire or the lower toothed or lobed; ray corollas with ligules 10–20 mm long, reddish with

narrow to wide orangish yellow zone at tip, or rarely all yellow; disk corollas dark red-brown, rarely yellow; achenes ca. 2 mm long; pappus scales 5–6 mm long, with an awn of ca. equal length. Prairies, disturbed areas; nearly throughout TX. May–Jun, sporadically later. Very showy and often abundant on roadsides; one of the most common wildflowers in nc TX. ☒/90

**Gaillardia suavis** (A. Gray & Engelm.) Britton & Rusby, (sweet), RAYLESS GAILLARDIA, FRAGRANT GAILLARDIA, GLOBE-FLOWER, PERFUME-BALL. Perennial 30–80 cm tall forming beds from obliquely branching roots; leaves slightly fleshy, oblanceolate or obovate, varying from entire to deeply lobed; disk flowers with heavy, sweet scent; ray flowers with ligules very short or absent, if present orange brownish, inconspicuous; achenes ca. 2.5 mm long; pappus scales ca. 4–5 mm long, with an awn of ca. equal length. Sandy or rocky prairies and roadsides; Blackland Prairie w through 2/3 of TX. Apr–May, sporadically later.

### GAMOCHAETA CUDWEED, EVERLASTING

Annual or biennial herbs, whitish to grayish with felty or woolly pubescence; leaves alternate, linear to narrowly oblong, oblanceolate, spatulate or obovate, sometimes ± glabrous above, sessile or with narrow petiolar base; heads disciform, nearly sessile in the upper axils, together spike-like in appearance; phyllaries scarious, sometimes pink-tinged; flowers inconspicuous; pappus bristles deciduous as a ring.

☛ A genus of 52 species; mainly South American, with 5–6 in North America, and a few in other parts of the world (Nesom 1990a; Anderberg 1991). *Gamochaeta* was previously included in *Gnaphalium*, and while distinct from that genus, a more narrowly defined *Gamochaeta* is still possibly paraphyletic (Anderberg 1991). (Greek: *gama*, marriage, and *chaeto*, bristle, in allusion to the pappus bristles falling together) (tribe Inuleae)

REFERENCES: Nesom 1990a; Anderberg 1991.

1. Leaves obovate or spatulate to oblanceolate, 5–20 mm wide, less densely pubescent on upper surface, strongly to weakly bicolored (= the 2 sides different in color); basal leaves present or absent at flowering time.

2. Leaves whitened or silvery beneath with tight, felty-woolly pubescence, green or brownish and sparsely pubescent above; involucre densely woolly at base, otherwise nearly glabrous

\_\_\_\_\_ **G. purpurea**

2. Leaves gray-green on both surfaces, loosely woolly beneath, greener and less pubescent above; involucre abundantly loose-woolly, often buried in tangle of hairs, the hairs not limited to the base

\_\_\_\_\_ **G. pensylvanica**

1. Leaves linear to narrowly oblanceolate, 1–6(–9) mm wide, ± equally gray-green pubescent on both surfaces, not bicolored; basal leaves absent at flowering time

\_\_\_\_\_ **G. falcata**

**Gamochaeta falcata** (Lam.) Cabrera, (falcate, sickle-shaped). Annual similar to *G. purpurea*; involucre 4–6 mm high. Sandy or rocky ground; Burnet, Denton, Fannin, and Palo Pinto cos.; se and e TX w to nc TX and Edwards Plateau. Apr–Jun. Native of se South America. [*Gnaphalium falcatum* Lam.] ☒☒

**Gamochaeta pensylvanica** (Willd.) Cabrera, (of Pennsylvania), CUDWEED. Annual or biennial; stems 10–40 cm tall; similar to *G. purpurea*; leaves weakly bicolored; inflorescences usually interrupted; involucre 3–5 mm high. Sandy roadsides, fields, and woods; se and e TX w to West Cross Timbers and Edwards Plateau. Mar–Jun. [*Gnaphalium pensylvanicum* Willd., *Gnaphalium peregrinum* Fernald]

**Gamochaeta purpurea** (L.) Cabrera, (purple), PURPLE CUDWEED. Annual; stems 10–30 cm tall; leaves strongly bicolored; inflorescences usually continuous; involucre 4–6 mm high. Sandy

woods and roadsides; se and e TX w to East Cross Timbers and Edwards Plateau Apr–May. [*Gnaphalium purpureum* L.]

### GRINDELIA GUMWEED, TARWEED, ROSINWEED, GUMPLANT

Annual to perennial herbs, usually glutinous; leaves alternate, simple, sessile, serrate to spiny-toothed; receptacles naked; phyllaries linear to linear-subulate; ray flowers 0–45, pistillate, fertile, the corollas yellow; disk flowers perfect, the central sometimes sterile, the peripheral fertile, the corollas yellow; achenes glabrous; pappus similar, of 2–numerous bristles or awns.

☛ A genus of ca. 55 species of w North America and South America; some are used as cultivated ornamentals and others as medicinal herbs. We are following Nesom et al. (1993), Jones et al. (1997), and J. Kartesz (pers. comm. 1997) in including the monotypic genus *Prionopsis*; according to Nesom et al. (1993), the only morphological character distinguishing the genera is a difference in the pappus; molecular data (Suh 1989) indicated that *Grindelia* is paraphyletic when *Prionopsis* is excluded. However, while noting that *Grindelia* and *Prionopsis* are sister groups in all of their analyses including molecular data, Lane and Hartman (1996) indicated there are other morphological characters separating the two and that other genera should possibly be included in the clade. They stated, “... we believe the distinct status of these genera should be maintained until data are obtained that unequivocally support one or another of the possible mergers.” (Named for professor David Hieronymus Grindel, 1776–1836, a European botanist from Riga) (tribe Astereae)

REFERENCES: Hall 1928; Steyermark 1934; Suh 1989; Nesom 1990c, 1992b; Nesom et al. 1993.

1. Ray flowers absent \_\_\_\_\_ **G. nuda**
1. Ray flowers present.
  2. Pappus bristles numerous per achene, united in a ring at base, ± persistent but upon full maturity falling as a unit or in groups \_\_\_\_\_ **G. papposa**
  2. Pappus bristles or awns only 2–8 per achene, not united at base, falling off at the slightest touch.
    3. Middle stem leaves oblong, with 13–30 teeth per side; upper part of phyllaries usually spreading to squarrose (= spreading rigidly at right angle or more) to reflexed; rare in nc TX \_\_\_\_\_ **G. squarrosa**
    3. Middle stem leaves lanceolate to deltoid, with 7–15 teeth per side OR oblong, with 25–60 small teeth per side; upper part of phyllaries ascending to spreading, but neither squarrose nor reflexed; wide-spread in nc TX.
      4. Middle stem leaves lanceolate to deltoid, with 7–15 teeth per side; plants perennial \_\_\_\_\_ **G. lanceolata**
      4. Middle stem leaves oblong, with 25–60 teeth per side; plants annual \_\_\_\_\_ **G. adenodonta**

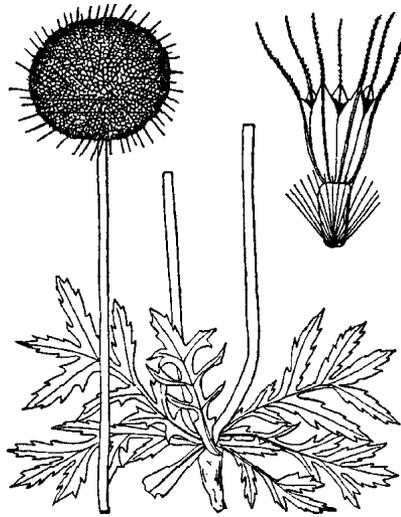
**Grindelia adenodonta** (Steyerm.) G.L. Nesom, (sticky tooth), LITTLE-HEAD GUMWEED, GLAND-TOOTH GUMWEED. Taprooted annual 1–1.5 m tall, glandular pubescence usually absent; leaves not much reduced towards the heads; mature achenes ca. as broad as long. Clay soils; se and s TX n to nc TX and w to Edwards Plateau. Jun–Nov. While often recognized as [*G. microccephala* DC. var. *adenodonta* Steyerm.] (e.g., Kartesz 1994), we are following Nesom (1992b), Jones et al. (1997) and J. Kartesz (pers. comm. 1997) in recognizing it at the specific level.

**Grindelia lanceolata** Nutt., (lanceolate, lance-shaped), GULF GUMWEED. Biennial or perennial from woody crown; stems 0.3–1.5 m tall; leaves 4–10 cm long, 1–3 cm wide, tapered to apex, gradually reduced towards the heads; ray flowers 20–30, the ligules ca. 10–16 mm long; achenes longer than broad, 2–5 mm long. Calcareous soils; se and e TX w to Rolling Plains and Edwards Plateau. Summer(–fall).

**Grindelia nuda** A.W. Wood, (nude), RAYLESS GUMWEED. Similar to and sometimes treated as a variety of *G. squarrosa*; taprooted annual; leaves gradually reduced towards the heads; middle



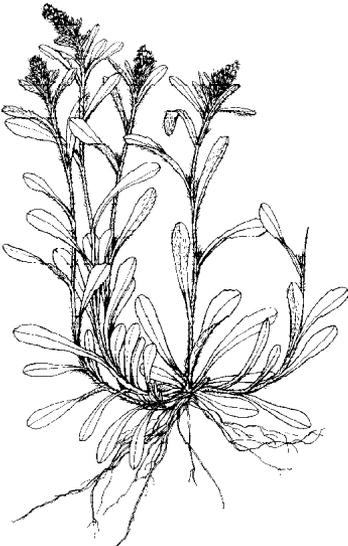
*Gaillardia pulchella* [JON]



*Gaillardia suaveis* [BB2]



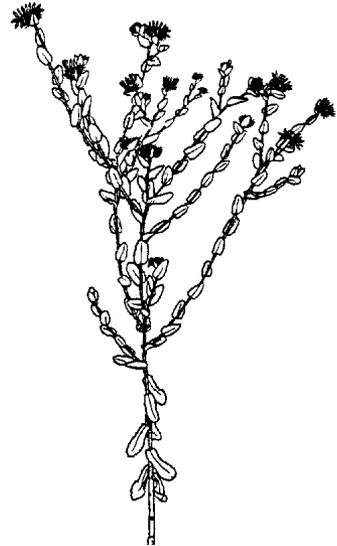
*Gamochaeta falcata* [HEA]



*Gamochaeta pennsylvanica* [HEA]



*Gamochaeta purpurea* [MAR, SM1]



*Grindelia adenodonta* [AMB]



*Grindelia lanceolata* [BB2]



*Grindelia nuda* [HEA]



*Grindelia papposa* [HAL]

stem leaves oblong, with 13–30 teeth per side; phyllaries usually spreading to squarrose or reflexed; achenes oblong, longer than broad, 2.3–3 mm long. Disturbed areas; widespread in n and w parts of TX, most frequent in Plains Country. Summer–fall. [*G. squarrosa* (Pursh) Dunal var *nuda* (A.W. Wood) A. Gray]

***Grindelia papposa*** G.L. Nesom & Y.B. Suh, (named for its conspicuous pappus), SAW-LEAF DAISY, GOLDENWEED. Stout annual, glabrous, resinous-glandular; stems 0.5–1.5+ m tall, usually unbranched except near top; leaves oblong, to 5 cm long and 1 cm wide, coarsely spiny-toothed; heads few, terminating the branches; receptacles 10–30 mm wide; involucre 10–15 mm high; ray flowers ca. 45, the ligules 10–13 mm long. Disturbed areas; widespread in TX. Aug–Sep. Previously recognized in the monotypic genus *Prionopsis* [as *P. ciliata* (Nutt.) Nutt.]. [*Haplopappus ciliatus* (Nutt.) DC., not *Grindelia ciliata* Spreng.] Avoided by grazing livestock. ☒/91

***Grindelia squarrosa*** (Pursh) Dunal, (with recurved tips), CURLY-CUP GUMWEED. Taprooted annual or biennial 0.1–1 m tall; leaves gradually reduced towards the heads; achenes longer than broad, 2.3–3 mm long. Open or disturbed areas; Clay, Montague, Tarrant, and Wise cos., also Brown, Hamilton, and Mills cos. (HPC); also Plains Country. Summer–fall. Used medicinally by Native Americans and in folk remedies; however, it contains the carcinogen, safrole (Duke 1985). ☒

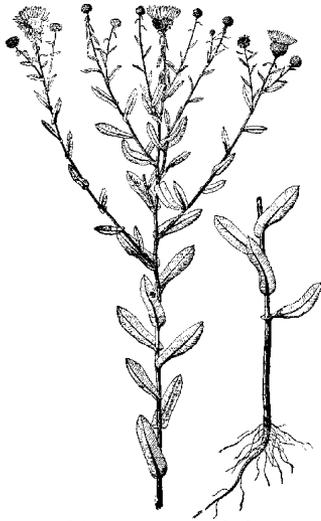
### GUTIERREZIA BROOMWEED, SNAKEWEED

Annuals or perennials, herbaceous or woody, often glutinous (with a gluey or sticky exudate); leaves alternate, essentially sessile, linear to narrowly lanceolate or narrowly elliptical, entire; inflorescences paniculate or corymbose; phyllaries in several series, usually green-tipped; ray flowers pistillate, fertile or sterile, the corollas yellow; disk flowers perfect, fertile or sterile, the corollas yellow; pappus absent, of scales, or a low crown.

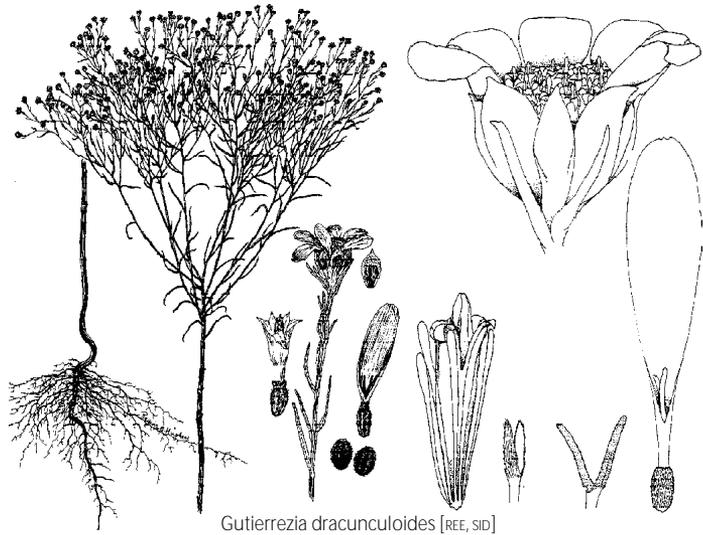
☞ A genus of 27 species (number depending on circumscription) of w North America and warm South America. The species treated here have been variously placed in *Amphiachyris*, *Gutierrezia*, and *Xanthocephalum*. Shinnars (1951c), Correll and Johnston (1970), and Mahler (1988) placed all in *Xanthocephalum*. Based on chromosome number and morphological data, *Gutierrezia* (including *Amphiachyris*) ( $x = 4$  or 5) appears more closely related to a number of other genera than to *Xanthocephalum* sensu stricto ( $x = 6$ ) (Lane 1982). Molecular data (Suh & Simpson 1990) also showed that *Gutierrezia* is not closely related to *Xanthocephalum* (which is more closely related to *Grindelia*). Lane (1979, 1982) argued that *G. amoena* and *G. dracunculoides* should be segregated into the genus *Amphiachyris*. We, however, follow Barkley (1986) and Taylor (1997) in not segregating *Amphiachyris* from *Gutierrezia*. The molecular analysis of Suh and Simpson (1990) indicated that the 2 species sometimes segregated as *Amphiachyris* form a sister group (with 1 other species—*G. triflora* which is sometimes put in the monotypic genus *Thuovia*) to the rest of *Gutierrezia*. Therefore, *Amphiachyris* (and *Thuovia*) can be either lumped with *Gutierrezia* or split depending on other considerations. Because of striking morphological similarity and because *Gutierrezia* is still monophyletic with the inclusion of these three species, the recognition of one monotypic genus (*Thuovia*) and a second genus with only 2 species (*Amphiachyris*) does not seem justified. ☒ Several species are toxic to grazing livestock due to saponins or unknown toxins (Kingsbury 1964; James & Welsh 1992); they increase under overgrazing. (Named in 1816 for Pedro Gutierrez, correspondent of the botanical garden of Madrid) (tribe Astereae)

REFERENCES: Shinnars 1951c; Solbrig 1960, 1961; Ruffin 1974; Lane 1979, 1980, 1982, 1985; Barkley 1986; Suh & Simpson 1990; Nesom 1991c.

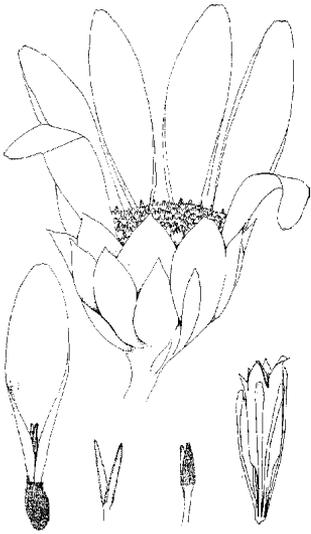
1. Heads campanulate, about as long as broad, with 7–15 ray flowers; annuals with stems typically branching from ca. the middle upward; widespread in nc TX.
2. Disk flowers sterile (staminate), not producing achenes; disk pappus usually of 5 long, narrowly



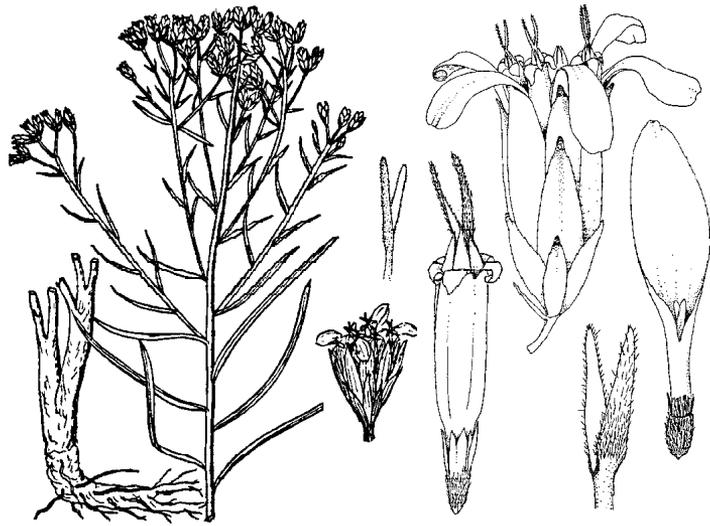
*Grindelia squarrosa* [KN]



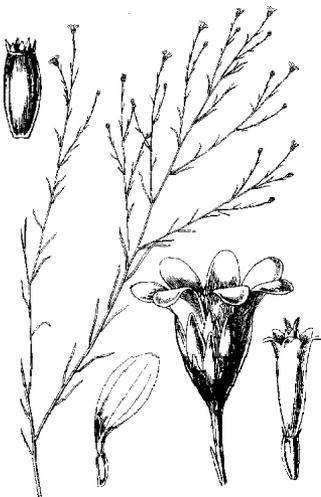
*Gutierrezia dracunculoides* [REE, SID]



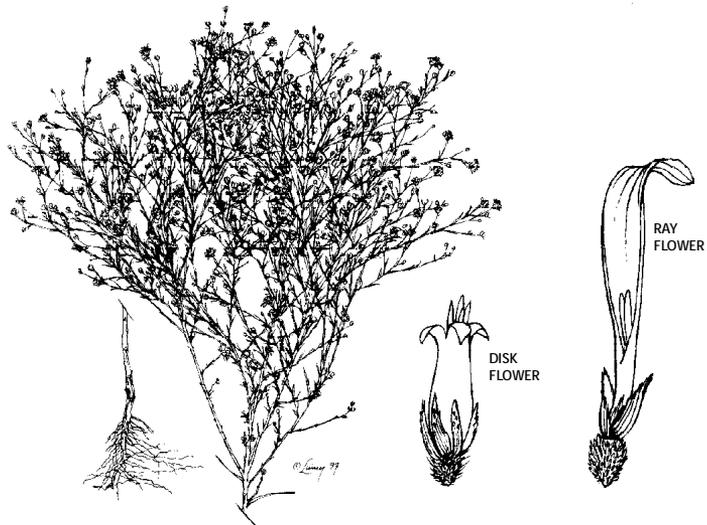
*Gutierrezia amoena* [SID]



*Gutierrezia sarothrae* [BB2, SID]



*Gutierrezia microcephala* [PL]



*Gutierrezia sphaerocephala* [HEA]

spatulate scales as long as or longer than the corollas, united from base to ca. 1/4 their length; ray pappus of several acute scales; phyllaries appear ± without nerves, varnished, shining.

3. Plants 30–40(–60) cm tall; heads scattered in open panicles; achenes long setulose; stamens included; leaves 0.2–1(–2) mm wide; receptacles with hooked, swollen-based hairs; mainly s 1/2 of nc TX \_\_\_\_\_ **G. amoena**

3. Plants 30–100 cm or more tall; heads many to very numerous in crowded corymbs; achenes short setulose; stamens exerted; leaves 0.5–6 mm wide; receptacles glabrous; throughout nc TX \_\_\_\_\_ **G. dracunculoides**

2. Disk flowers fertile, producing achenes; disk pappus of several short pointed scales usually < 1/2 as long as the corollas; ray pappus greatly reduced or nearly absent; phyllaries appear nervate (1 or 3 nerves), neither varnished nor shining.

4. Pappus of ray flowers inconspicuous to absent; disk flowers 7–13 per head; achenes puberulent by short purplish hairs, the achene surface not concealed; widespread in nc TX \_\_\_\_\_ **G. texana**

4. Pappus of ray flowers of small scales; disk flowers 18–37 per head; achenes densely long pubescent by white hairs, the achene surface concealed; a w TX species possibly occurring as far e as w margin of nc TX \_\_\_\_\_ **G. sphaerocephala**

1. Heads ± cylindrical, longer than broad, with 1–7(–8) ray flowers; perennials with stems usually branching from the base upwards; extreme w part of nc TX.

5. Ray flowers (2–)3–5(–8) per head; disk flowers (2–)3–5(–9) per head, producing achenes; involucre 3–6 mm high; phyllaries 8–14(–21) \_\_\_\_\_ **G. sarothrae**

5. Ray flowers 1 (very rarely 2) per head; disk flowers 1 (very rarely 2) per head, not producing achenes; involucre 2–4 mm high; phyllaries 4–6(–8) \_\_\_\_\_ **G. microcephala**

**Gutierrezia amoena** (Shinners) Diggs, Lipscomb, & O'Kennon, comb. nov. BASIONYM: *Xanthocephalum amoenum* Shinners, Field & Lab. 19:77. 1951. TYPE: TEXAS. Comal Co.: rocky prairies of the Guadalupe, north of New Braunfels, 1846, *Lindheimer 422*, (HOLOTYPE: BRIT/SMU), (charming), ANNUAL BROOMWEED, BROOMWEED. Main stem usually 5 mm or less in diam.; leaves linear (rarely linear-lanceolate), 0.5–2.5(–3.5) cm long, 0.2–1(–2) mm wide; phyllaries to 3–4 mm long and 1–2 mm wide; achenes 2–3 mm long, purple-black with 4–6 greenish stripes. Calcareous soils on or near limestone outcrops; c to nc TX and the w part of e TX. Late Sep–Oct. [*Amphiachyris amoena* (Shinners) Solbrig, *Xanthocephalum amoenum* Shinners, *X. amoenum* var. *intermedium* Shinners]

**Gutierrezia dracunculoides** (DC.) S.F. Blake, (resembling *Artemisia dracunculus* L.—taron), COMMON BROOMWEED. Main stem 0.3–1(–2) cm in diam.; leaves narrowly to broadly lanceolate, 0.5–6 cm long, 0.5–6 mm wide; phyllaries to 2–3 mm long and 1–2 mm wide; achenes 1.2–2.2 mm long, purple-black with 7–9 greenish stripes. Calcareous, clay or sandy soils, disturbed habitats, often in large populations particularly in overgrazed areas; nearly throughout TX. Jul–Nov. [*Amphiachyris dracunculoides* (DC.) Nutt., *Xanthocephalum dracunculoides* (DC.) Shinners] This species can cause contact dermatitis in humans, eye inflammation in humans and livestock, and gastrointestinal upsets in cattle (Gates 1945; Ajilvsgi 1984). The plants were tied to sticks by early settlers and used as brooms (Ajilvsgi 1984). ☞

**Gutierrezia microcephala** (DC.) A. Gray, (small-headed), THREAD-LEAF SNAKEWEED. Much branched subshrub 0.3–1 m tall; leaves linear, 1–4 mm wide; pappus of disk flowers of several acute scales; pappus of ray flowers similar but shorter. Open sandy or limestone soils; included based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990); mainly w 1/2 of TX, possibly e as far as w margin of nc TX (Lane 1985). Jul–Oct. [*Xanthocephalum microcephalum* (DC.) Shinners] This species causes poisoning and abortion in sheep and cattle apparently due to the presence of saponins; this has resulted in significant economic losses in w TX

(Kingsbury 1964); symptoms include loss of appetite, dropping of the head, and hematuria (Burlage 1968); in w TX this species is an indicator of overgrazed range conditions (Powell 1988). ☞☞

**Gutierrezia sarothrae** (Pursh) Britton & Rusby, (thought by Pursh to resemble *Hypericum savothra* Michx.), BROOM SNAKEWEED, PERENNIAL BROOMWEED, MATCHWEED, MATCHBRUSH, KINDLING-WEED, YERBA DE VÍBORA, TURPENTINE-WEED, ESCOBA DE LA VÍBORA. Woody-based subshrub 0.2-1 m tall; leaves linear, entire; involucre 1-3 mm broad; ray flowers with pappus of linear, obtuse scales; disk flowers with pappus of acute scales about twice the length of the ray pappus scales. Open or disturbed sites, often calcareous soils; Brown, Callahan, Erath, Montague, and Young cos.; w part of nc TX s and w to w TX, also se TX. Jul-Nov. [*Xanthocephalum sarothrae* (Pursh) Shinnery] This species is an indicator of overgrazing; a number of common names refer to the highly flammable nature of the dried stems which were used historically in starting fires (Ajilvsgi 1984). This species causes toxicity to livestock, as in *G. microcephala*, due to saponins or unknown toxins (Kingsbury 1964; James & Welsh 1992). It is reported to contain a protein with antitumor activity (Mabberley 1997). ☞☞

**Gutierrezia sphaerocephala** A. Gray, (spherical-headed), ROUND-HEAD BROOMWEED, ROUNDLEAF. Stems to 0.6 m tall, much branched above; leaves linear, 2-3 mm wide; involucre about 3-5 mm long; achenes densely white pubescent on ribs; pappus of disk flowers of several scales; pappus of ray flowers similar but shorter. Disturbed habitats; included by Mahler (1988) for nc TX; we can find no specimens or other citations for nc TX and according to Lane (1985) this species occurs only far to the w of nc TX; w 1/2 of TX. Jul-Nov. [*Xanthocephalum sphaerocephalum* (A. Gray) Shinnery]

**Gutierrezia texana** (DC.) Torr. & A. Gray, (of Texas), TEXAS BROOMWEED, KINDLING-WEED. Stems 0.1-0.8 m high; much branched above; leaves linear, 0.6-2(-5) mm wide; involucre ca. 2.5-4 mm long; ray flowers 10-15; pappus of disk flowers of acute scales. Disturbed habitats; se and e TX w to Rolling Plains and Edwards Plateau. Jul-Nov. [*Xanthocephalum texanum* (DC.) Shinnery]

## HEDYPSNOIS

☞ A genus of 2 species native from Macaronesia to Iran. (Greek name used by Pliny for a kind of wild endive) (tribe Lathuceae)

REFERENCE: Sell 1976.

**Hedypnois cretica** (L.) Dum.Cours., (of Crete). Taprooted annual, ± hairy; stems spreading and ascending, 10-30 cm long, sparingly branched; leaves alternate; basal leaves pinnately lobed, usually with winged petioles; stem leaves few, reduced, sessile; heads solitary at the branch tips; involucre ca. 10 mm high; inner phyllaries scabrous-hispid, after flowering becoming conspicuously curved and boat-shaped (with a very rounded keel); outer phyllaries < 1/2 as long as inner; inner phyllaries strongly incurved in fruit; flowers perfect, mostly fertile; corollas all ligulate, yellow, with 5 purple teeth; achenes ca. 5-7.5 mm long, ± cylindrical, beakless, the outer achenes incurved; pappus of outer achenes a crown ca. 1 mm long, that of inner achenes of several bristle-like scales ca. 5 mm long. Sandy or rocky soils, roadsides; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990), probably only to the se of nc TX. Mar-Apr. Native of Mediterranean region, Canary Islands. (Cichorieae) ☞☞

## HELENIUM SNEEZEWEED, BITTERWEED

Annual or perennial herbs, glabrous or pubescent; leaves alternate, entire to deeply and finely lobed, resin-dotted; heads terminal, solitary or corymbose; phyllaries few, herbaceous, loosely spreading or reflexed; heads usually radiate; ray flowers with ligules widened and 3-toothed

apically, yellow to brown-red, often reflexed; disks ovoid or globose; disk corollas yellow to brown-red; pappus of 5-7 scales elongated into an awn-like tip.

☛ An American genus of 40 species including some cultivated ornamentals. ☛ Most species are poisonous and unpalatable to grazing animals (Barkley 1986); some contain sesquiterpene lactones (e.g., helenalin) or a glycoside (Blackwell 1990; Hardin & Brownie 1993). (Greek: *helenion*, the name of another plant said by Linnaeus to be named after Helen of Troy, wife of King Menelaus of Sparta) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCES: Rock 1957; Bierner 1972, 1989; Stanford & Turner 1988.

1. Leaves linear to lanceolate, elliptic, or oblong, usually > 2 mm wide, decurrent (= leaf tissue extending down the stem), the stems thus winged.
  2. Perennials with fibrous roots from subrhizomatous base; disk corollas completely yellow; ray flowers with ligules completely yellow \_\_\_\_\_ **H. autumnale**
  2. Annuals with taproot; disk corollas with lobes reddish brown or yellowish brown; ray flowers with ligules completely yellow or yellow with reddish brown basal blotch.
    3. Ray flowers with ligules 3-11.5 mm long, yellow, often with reddish brown basal blotch; upper stem leaves linear, reduced, entire; heads peduncled, well above the foliage \_\_\_\_\_ **H. elegans**
    3. Ray flowers with ligules 2-3(-5) mm long, completely yellow; upper stem leaves ovate to oblong, little reduced, often with at least some teeth; heads short-peduncled, barely above the foliage \_\_\_\_\_ **H. microcephalum**
1. Leaves or leaf segments linear to thread-like, usually < 2 mm wide, not decurrent, the stems thus unwinged \_\_\_\_\_ **H. amarum**

**Helium amarum** (Raf.) H. Rock, (bitter). Annual; plant 10-85 cm tall; leaves all linear or filiform except for lowest which are sometimes pinnatifid (these sometimes withered before flowering time); ray flowers ca. 10, with ligules yellow, 5-10 mm long. Open woods, fields, pastures, and disturbed areas. The following two varieties have often been recognized as species; Stanford and Turner (1988) discussed their relationship.

1. Disk corollas yellow with lobes yellow to yellow-brown; lower and basal leaves typically withered at flowering time; basal leaves entire to toothed to occasionally pinnatifid \_\_\_\_\_ var. **amarum**
1. Disk corollas yellow with lobes reddish brown or purple; lower and basal leaves sometimes withered at flowering time or often present; basal leaves pinnatifid \_\_\_\_\_ var. **badium**

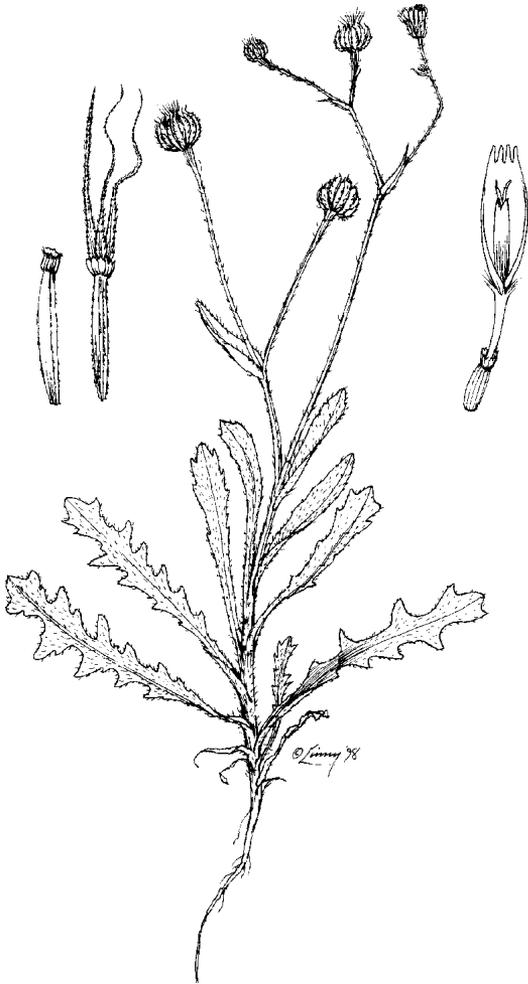
var. **amarum**, BITTERWEED. Se and e TX w to Rolling Plains and Edwards Plateau, mostly e of 100th meridian. May-Nov. The foliage is extremely bitter, largely avoided by livestock, and thus greatly increasing under conditions of overgrazing; conspicuously dominant on abused pastures. May-Nov. [*H. tenuifolium* Nutt.] All parts of the plant contain the glycoside dugaldin and cause toxic symptoms in animals; cows that have eaten even small amounts of the plant produce extremely bitter, distasteful milk; honey made from the flowers is also reportedly bitter (Correll & Johnston 1970; Stephens 1980; Ajilvsgi 1984). ☛

var. **badium** (A. Gray ex S. Watson) Waterfall, (reddish brown), BASIN SNEEZEWEED. Similar to variety *amarum* except for the characters in the key. Dallas and Grayson cos. w and sw to w TX. Apr-Jul, sporadically to Oct. [*H. badium* (A. Gray) Greene]

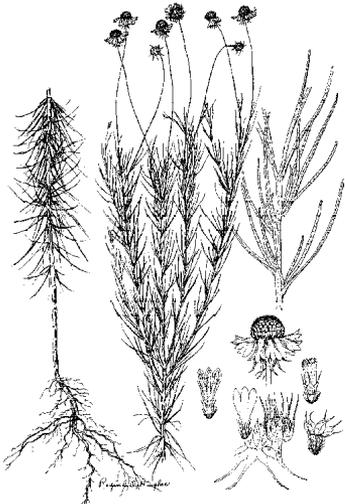
**Helium autumnale** L., (of autumn), COMMON SNEEZEWEED, TALL SNEEZEWEED, STAGGERWORT, SWAMP-SUNFLOWER. Stems to 1(-2) m tall; leaves linear-elliptic; ray flowers ca. 20, with corollas to 15 mm long. Low, moist, calcareous soils; Tarrant County; also e TX, Rolling Plains, and Edwards Plateau. Aug-Oct. Poisonous to cattle and sheep; it is reported to cause "spewing sickness" with symptoms including weakness, depression, vomiting, excessive salivation, frothing, irregular pulse, and kidney and liver damage (Burlage 1968). ☛



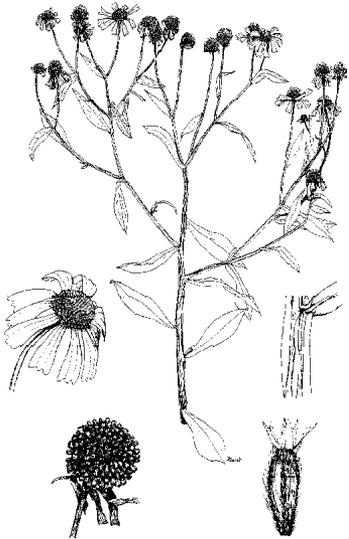
*Gutierrezia texana* [SID]



*Hedynois cretica* [HEA]



*Helenium amarum* var. *amarum* [REE]



*Helenium autumnale* [GWO]



*Helenium elegans* [BT3]



*Helenium microcephalum* [HEA]

**Helienium elegans** DC., (elegant). Plant 20–120 cm tall; leaves narrowly elliptic to lanceolate or linear. Gravelly stream bottoms or seepy slopes on limestone; Dallas and Grayson cos. s and sw to Edwards Plateau. May–Jul.

**Helienium microcephalum** DC., (small-headed), SMALL-HEAD SNEEZEWEED, SMALL SNEEZEWEED, SNEEZEWEED. Plant 10–120 cm tall; leaves narrowly elliptic to narrowly oblong-elliptic. Sandy or silty ground, dried-up ponds, and fields; West Cross Timbers and Lampasas Cut Plain s and w to w TX. Jun–Jul.

## HELIANTHUS SUNFLOWER

Annuals or perennials, herbaceous; leaves sessile or petioled, alternate, opposite, or opposite below and alternate above; heads sessile or peduncled; phyllaries in several series; ray flowers pistillate, infertile (not producing mature achenes), the corollas yellow; disk flowers perfect, fertile, the corollas reddish purple or yellow, producing mature achenes that are compressed laterally but not thin-edged; pappus of 2 awns, readily falling.

☛ A North American genus of 50 species including the widely cultivated SUNFLOWER, *H. annuus*. Species of this genus are often confused with those of *Silphium*; however, in *Silphium* the ray flowers produce mature achenes (disk flowers do not), while in *Helianthus* the disk flowers produce mature achenes (ray flowers do not). (Greek: *helios*, the sun, and *anthos*, flower, presumably in reference to the turning of the inflorescences towards the sun) (tribe Heliantheae) REFERENCES: Heiser 1951, 1954; Jackson 1963; Heiser et al. 1969; Rogers et al. 1982; Sims & Price 1985; Chandler et al. 1986; Rieseberg et al. 1991.

1. Foliage blue-green glaucous; leaf margins and phyllaries ciliate; perennial with long, slender rhizomes; leaves almost all opposite; plants usually 0.7 m or less tall \_\_\_\_\_ **H. ciliaris**
1. Foliage not blue-green glaucous; plants without the above combination.
  2. Leaf blades narrowed to a distinct petiole (sometimes as short as 5 mm, often much longer), entire to conspicuously toothed.
  3. Annuals with taproot.
    4. Larger leaves 10–30 cm wide; plants often 1.5–4 m tall; phyllaries conspicuously long ciliate marginally, 4–7(–10) mm wide, ± abruptly contracted near apex; peduncles with wide-spreading hairs \_\_\_\_\_ **H. annuus**
    4. Larger leaves 2–10 cm wide; plants 0.4–2 m tall; phyllaries scabrous, not marginally ciliate, 4 mm or less wide, ± gradually tapered to apex; peduncles with appressed or ascending hairs.
    5. Leaf blades usually entire, sometimes serrate, cuneate to truncate at base; pales (= bracts on receptacle) in center of head with tips densely white-bearded; w Blackland Prairie \_\_\_\_\_ **H. petiolaris**
    5. Leaf blades usually serrate, rarely entire, cuneate to truncate or often cordate at base; pales in center of head with tips hispid or slightly villous; extreme e margin of nc TX \_\_\_\_\_ **H. debilis**
  3. Perennials with erect crowns and/or tough creeping rootstocks or rhizomes.
    6. Stems glabrous, glaucous; leaf blades not or only slightly scabrous above \_\_\_\_\_ **H. grosseserratus**
    6. Stems pubescent; leaf blades usually conspicuously scabrous above.
      7. Phyllaries with tips ± tightly appressed and clearly imbricate in several series of very different lengths; disk corollas with reddish brown or reddish purple lobes \_\_\_\_\_ **H. pauciflorus**
      7. Phyllaries with the tips loose-spreading and all about the same length; disk corollas totally yellow.
      8. Upper leaves alternate; petioles winged, 4–9 cm long; leaf blades 60–150 mm wide \_\_\_\_\_ **H. tuberosus**

8. Leaves mostly opposite; petioles unwinged, 0.5–2 cm long; leaf blades 7–70 mm wide \_\_\_\_\_ **H. hirsutus**
2. Leaf blades sessile, without a distinct petiole, entire or with small inconspicuous teeth.
9. Leaf blades very narrow, linear to linear-lanceolate, 2–10(–12) mm wide; disk corollas with reddish brown or reddish purple lobes \_\_\_\_\_ **H. salicifolius**
9. Leaf blades usually much broader, 20–60(–90) mm wide; disk corollas with yellow OR reddish brown or reddish purple lobes.
10. Phyllaries with tips ± tightly appressed and clearly imbricate in several series of very different lengths; disk corollas with reddish brown or reddish purple lobes; leaves mostly opposite, not clasping \_\_\_\_\_ **H. pauciflorus**
10. Phyllaries with the tips loose-spreading and all about the same length; disk corollas totally yellow; leaves either alternate or if opposite then cordate clasping.
11. Leaves alternate, not clasping, the blades narrowly elliptic, some or all folded lengthwise; flowering mostly Sep–Oct \_\_\_\_\_ **H. maximiliani**
11. Leaves mostly opposite, mostly cordate-clasping, the blades ovate to ovate-lanceolate, all flat; flowering Jun–Sep \_\_\_\_\_ **H. mollis**

**Helianthus annuus** L., (annual), COMMON SUNFLOWER, MIRASOL. Extremely variable in size, flowering when as little as 10 cm tall or as much as 4 m; leaf blades triangular-ovate to ovate-lanceolate, mostly alternate but lowermost opposite, truncate to cordate at base; ray corollas deep yellow; disk corollas brown-red (rarely dark yellow); achenes glabrous or pubescent. Stream bottoms, roadsides, disturbed areas; throughout TX. May–Oct. [*H. annuus* subsp. *lenticularis* (Douglas ex Lindl.) Cockerell, *H. annuus* subsp. *texanus* Heiser] The cultivated SUNFLOWER, widely grown for the seeds, for oil, and as an ornamental, is derived from *H. annuus*; it is one of the world's most important oil crops (Mabberley 1987; Rieseberg & Seiler 1990). Achenes of *H. annuus* were gathered as food by Native Americans of the w U.S. (Heiser 1951) and the species was being cultivated in parts of North America when Europeans arrived (Heiser 1993); it is one of the few agricultural plants to originate in North America north of Mexico (Nabhan 1979). ☒/91

**Helianthus ciliaris** DC., (ciliate, fringed with hairs), BLUE-WEED SUNFLOWER, BLUEWEED, TEXAS BLUEWEED. Perennial from slender rhizomes; foliage blue-green glaucous; stems 0.3–0.7 m tall, glabrous or nearly so; leaves mostly opposite, sessile or short petiolate; leaf blades narrowly to broadly lanceolate, usually 0.5–2(+) cm wide; ray flowers 10–18, the ligules ca. 10 mm long or sometimes absent; disk flowers reddish or with reddish lobes; achenes ca. 3 mm long. Sandy or sandy clay soils; Denton, Tarrant, and Young cos., also Brown Co. (HPC); w 2/3 of TX, mainly w of nc TX. Jun–Sep.

**Helianthus debilis** Nutt. subsp. **cucumerifolius** (Torr. & A. Gray) Heiser, (sp.: weak, frail; subsp.: with leaves like *Cucumis*—cucumber), CUCUMBER-LEAF SUNFLOWER. Stems usually 0.55–0.65 m tall; leaves ± all alternate; leaf blades deltoid-ovate to deltoid-lanceolate, cuneate to truncate or often cordate at base, 3–8 cm wide, usually regularly serrate, rarely entire; petioles ca. as long as blades; ray flowers with ligules ca. 20 mm long; disk corollas with deep red-purple lobes. Sandy soils; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se TX, but at least as far n as Travis Co. (Correll & Johnston 1970) just s of nc TX. Late summer–fall. [*H. cucumerifolius* Torr. & A. Gray]

**Helianthus grosseserratus** M. Martens, (large-toothed), SAW-TOOTH SUNFLOWER. Stems 1–3(–5) m tall, glabrous, glaucous; leaves mostly alternate; leaf blades narrowly ovate, prominently serrate; petioles about 8 cm long mid-stem; ray flowers with ligules ca. 25–40 mm long, yellow; disk corollas yellow; achenes glabrous, about 5 mm long. Wooded stream bottoms; Cooke, Dallas, Fannin, and Lamar cos., also Collin Co. (R. O'Kennon, pers. obs.); in TX mainly nc part of state, also rare in Edwards Plateau (Gillespie Co.) and sc TX (Gonzales Co.). Oct.

**Helianthus hirsutus** Raf., (hairy), HAIRY SUNFLOWER, STIFF-HAIR SUNFLOWER. Stems 0.5–1.7 m tall; leaves opposite; leaf blades lanceolate to narrowly ovate or ovate, serrate to rarely entire; petioles 5–20 mm long; ray and disk corollas completely yellow; ray flowers with ligules ca. 15–25 mm long; achenes glabrous. Sandy open woods, forest margins; se and e TX w to West Cross Timbers and Edwards Plateau. Jun–Aug.

**Helianthus maximiliani** Schrad., (for its discoverer, Prince Maximilian von Wied-Neuwied, 1782–1867, German botanist and traveler in Brazil and North America), MAXIMILIAN SUNFLOWER, MICHAELMAS DAISY. Perennial, sometimes forming extensive colonies; stems 0.3–3 m tall; leaves alternate, often conspicuously folded and sickle-shaped; heads few to numerous in a spike-like or raceme-like arrangement; ray flowers with ligules ca. (15–)25–35(–40) mm long, yellow; disk corollas yellow; achenes 3–4 mm long. Low moist areas, roadsides, prairies; one of the most abundant sunflowers in nc TX; widespread in TX. Mostly Sep–Oct. ☒/91

**Helianthus mollis** Lam., (soft hairy), ASHY SUNFLOWER, HAIRY SUNFLOWER, DOWNY SUNFLOWER. Perennial; stems 0.5–1 m tall, hirsute to villous; leaves mostly opposite, ovate-lanceolate to broadly ovate, sessile, usually cordate-clasping, grayish green in appearance; heads solitary or in spike-like racemes; ray and disk corollas completely yellow; ray flowers with ligules to ca. 30 mm long; achenes ca. 4 mm long. Sandy, wooded or open areas; Cooke, Grayson, and Tarrant cos; se and e TX w to nc TX. Jun–Sep.

**Helianthus pauciflorus** Nutt., (few-flowered), STIFF SUNFLOWER. Perennial; stems 0.8–2 m tall; leaves nearly all opposite; leaf blades oblong-lanceolate to lance-ovate, acuminate, subsessile or with winged petiolar base; ray flowers with ligules yellow, sometimes with reddish tinge on back near apex, ca. 20–35 mm long. Prairies or open woods, often on sand; mainly se and e TX disjunct w to Cooke, Montague, and Wise cos., also a report from Hunt Co. (Clymer Meadow–J. Eidson, pers. comm.). Aug–Oct. [*H. laetiflorus* Pers. var. *rigidus* (Cass.) Fernald; *H. rigidus* (Cass.) Desf.]

**Helianthus petiolaris** Nutt., (with a petiole or leaf stalk), PLAINS SUNFLOWER, PRAIRIE SUNFLOWER. Stems 0.5–2 m tall; leaves alternate; leaf blades triangular-ovate to narrowly ovate; petioles 1–15 cm long, nearly as long as the blades; heads paniculate, pedunculate; ray flowers with ligules ca. 20 mm long; disk corollas usually with red-purple lobes; achenes 3.5–4.5 mm long, villous. Sandy or rocky prairies; Dallas and McLennan cos. s and w to w TX. May–Oct. Known to hybridize with *H. annuus*.

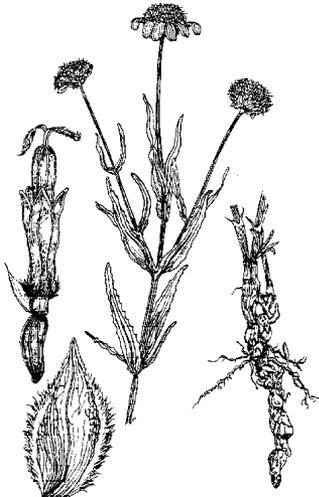
**Helianthus salicifolius** A. Dietr., (with leaves like *Salix*—willow), WILLOW-LEAF SUNFLOWER. Perennial; stems 0.4–2 m tall, glabrous; leaves alternate, crowded, usually conspicuously linear to linear-lanceolate; disk corollas with red-purple or reddish brown lobes; ray flowers with ligules ca. 10–20(–30) mm long; achenes 4–6 mm long, glabrous. Calcareous soils, prairies; Cooke, Dallas, Grayson, Hill, and Montague cos.; nc TX w to e Rolling Plains and s to Edwards Plateau. Jun–Oct.

**Helianthus tuberosus** L., (tuberous), JERUSALEM-ARTICHOKE, GIRASOLE. Rhizomes slender with tuberous thickenings at ends; stems 1–3 m tall; leaves opposite below, alternate above; leaf blades ovate, 10–25 cm long; petioles winged, 4–9 cm long; ray and disk corollas yellow; ray flowers with ligules ca. 25–40 mm long; achenes 5–7 mm long, glabrous. Wooded areas; Dallas and Grayson cos.; in TX only in the nc part of the state. Aug–Oct. Cultivated for the edible tubers which are sweet (partly due to the presence of fructose and thus reported to be a useful carbohydrate source for diabetics since fructose is sweeter on a molar basis than glucose); used as a food by Native Americans (Mabberley 1997).

*Helianthus simulans* E. Watson, (resembling), a rhizomatous perennial with rhizomes 5–10 cm long, to 1 cm thick, alternate (± opposite in small individuals), ± sessile, non-folded leaves, and yellow or purple-tipped disk corollas, has been cited by Hatch et al. (1990) for vegetational area



*Helianthus annuus* [B73]



*Helianthus ciliaris* [CO1]



*Helianthus debilis* subsp. *cucumerifolius* [M18]



*Helianthus grosseserratus* [GLE, MTB]



*Helianthus hirsutus* [BB2]



*Helianthus maximiliani* [STE]

4 (Fig. 2) but apparently occurs only to the s and e of nc TX (Heiser et al. 1969). It is possibly of hybrid origin (Heiser et al. 1969).

### HETEROTHECA GOLDEN-ASTER, GOLD-ASTER, CAMPHORWEED

Pubescent or pilose annual or perennial herbs, often aromatic; leaves alternate; heads solitary or corymbose; phyllaries in several rows of unequal lengths, slender; ray flowers with ligules yellow, curling under at night or in age; disk corollas yellow; pappus of long, scabrous hairs, and an outer row of inconspicuous, short, narrow scales, or pappus absent from ray flowers.

☛ A s North American genus of 25 species. *Chrysopsis* sometimes lumped into *Heterotheca* (Mahler 1988). (Greek: *heteros*, different, and *theca*, case, alluding to the dissimilar ray and disk achenes) (tribe Astereae)

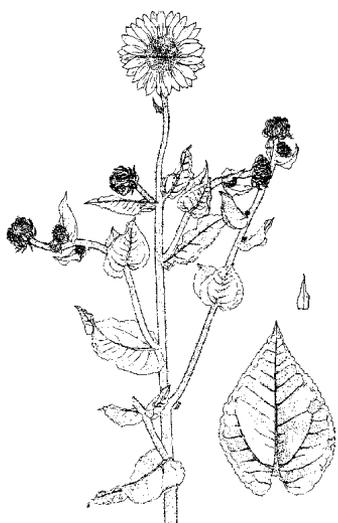
REFERENCES: Shinnars 1951b; Wagenknecht 1960; Harms 1965, 1968; Vernon 1965; Semple 1977, 1996; Semple et al. 1980; Nesom 1991b.

1. Blades of upper and middle stem leaves little or not narrowed at base, sessile and slightly to strongly clasping, ovate; plants annual or biennial from taproot; commonly with a single stem from base; pappus of ray flowers absent \_\_\_\_\_ **H. subaxillaris**
1. Blades of upper and middle stem leaves tapered to slender, petiole-like bases, not clasping, linear to oblanceolate; plants perennial from tough woody base, often rhizomatous; stems usually clustered; pappus of ray flowers present.
  2. Leaf blades conspicuously gray in appearance, softly and densely pubescent, the hairs usually without swollen bases; leaf blades of flowering branches oblanceolate, 3–5 times as long as wide; foliage lacking resin glands or nearly so; widespread in w 1/2 of nc TX \_\_\_\_\_ **H. canescens**
  2. Leaf blades distinctly green, bristly pubescent, the hairs usually with swollen bases (use lens); leaf blades of flowering branches usually ± linear, sometimes to linear-oblanceolate, mostly 8–15 times as long as wide; foliage with abundant resin glands (use lens); on extreme w margin of nc TX \_\_\_\_\_ **H. stenophylla**

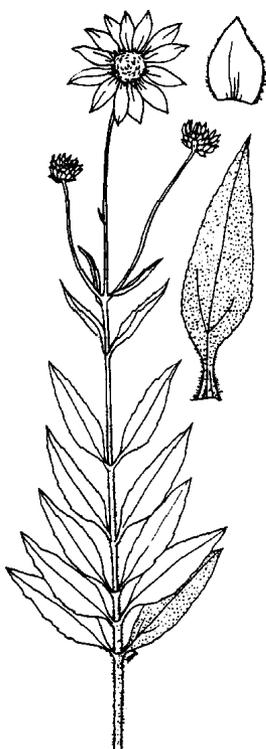
**Heterotheca canescens** (DC.) Shinnars, (grayish white), GRAY GOLD-ASTER. Perennial 15–60 cm tall, older plants many-stemmed; leaves rather numerous and crowded, entire; ray flowers with ligules 6–8 mm long. Sandy or gravelly prairies, rock outcrops; Panhandle to Trans-Pecos, e to West Cross Timbers and Lampasas Cut Plain; also Tarrant Co. (Semple 1996) and collected at Dallas by Reverchon. Jun–Oct. [*Chrysopsis canescens* (DC.) Torr. & A. Gray]

**Heterotheca stenophylla** (A. Gray) Shinnars, (narrow-leaved), NARROW-LEAF GOLD-ASTER. Perennial 10–40 cm tall; ray flowers with ligules ca. 10 mm long. Sandy soils; Archer and Clay cos., also Burnet, Eastland (Semple 1996) and Erath (Harms 1968) cos.; w TX e to w boundary of nc TX. Jun–Oct. [*Chrysopsis villosa* (Pursh) Nutt. ex DC. var. *stenophylla* (A. Gray) A. Gray]

**Heterotheca subaxillaris** (Lam.) Britton & Rusby, (subaxillary), CAMPHORWEED, GOLDEN-ASTER, CAMPHOR DAISY. Pilose and glandular-pubescent aromatic annual or biennial; stems 20–200 cm tall. Spring form: dwarf, with long-petioled basal leaves, the blades coarsely toothed; stem leaves short-petioled or sessile, the blades lanceolate, toothed, or entire. Summer form: taller, to 2 m by fall; lower leaves petioled, the petioles with enlarged, winged, clasping base; upper leaves similar or varying to sessile, the blades auricled-clasping, oblong or ovate, slightly or coarsely toothed; heads rather numerous; ray flowers with ligules ca. 5 mm long. Sandy or rocky ground, open woods, fields, roadsides; throughout TX. Apr–Oct. [*H. latifolia* Buckley, *H. subaxillaris* var. *latifolia* (Buckley) Gandhi & R.D. Thomas] The foliage has a strong camphor-like odor and the plants are avoided by livestock (Ajilvsgi 1984).



*Helianthus mollis* [MFB]



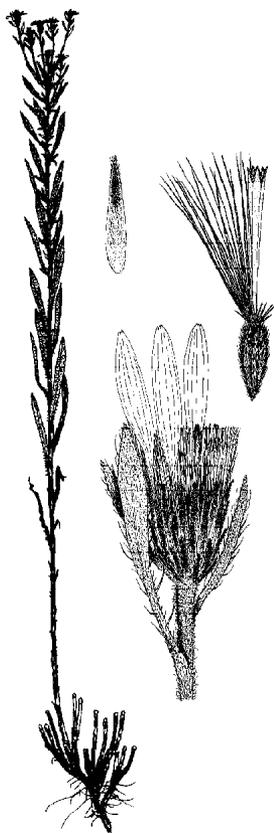
*Helianthus pauciflorus* [MFB]



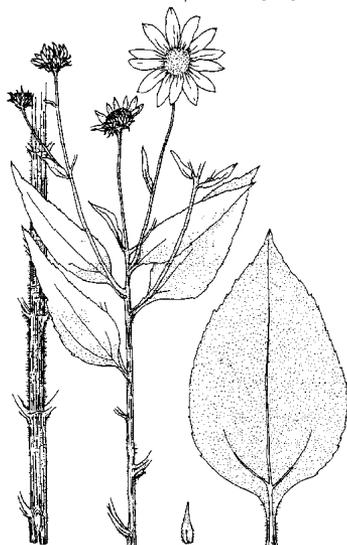
*Helianthus petiolaris* [MFB]



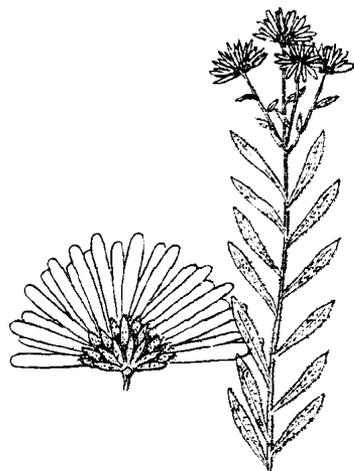
*Helianthus salicifolius* [MFB]



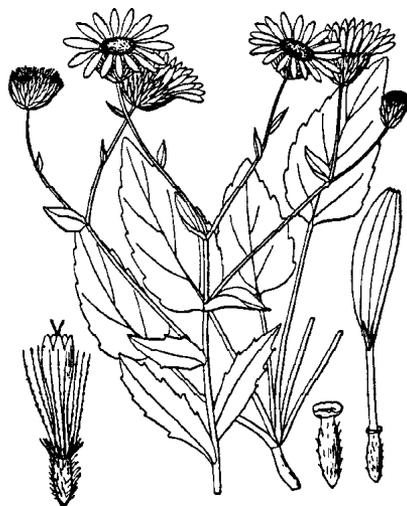
*Heterotheca stenophylla* [UWA]



*Helianthus tuberosus* [MFB]



*Heterotheca canescens* [STE]



*Heterotheca subaxillaris* [BB2]

**HIERACIUM** HAWKWEED

☛ A taxonomically complicated temperate and tropical montane genus of ca. 90 species (ca. 1,000 apomictic microspecies); the genus is related to *Crepis*. (Greek: *herax*, a hawk; the ancients, as recorded by Pliny and others, supposing that hawks ate these or similar plants to improve their eyesight) (tribe Lactuceae)

REFERENCE: Vuilleumier 1973.

**Hieracium gronovii** L., (for Jan Friedrich Gronovius 1690–1762, Dutch botanist at Leiden), GRONOVIIUS' HAWKWEED. Perennial herb; sap milky; stems 0.4–1.5 m tall, naked for a considerable distance below the heads; leaves mostly in lower part of stem; leaf blades oblanceolate or broadly elliptic, pilose with long brownish hairs (strikingly pilose in the field); inflorescences leafless, corymbose or narrowly paniculate, ± glandular-pubescent; heads small, 7–10 mm long; flowers all ligulate; corollas yellow; achenes 2–4 mm long; pappus of bristles. Sandy woods; Denton, Grayson, and Lamar cos.; se and e TX w to East Cross Timbers. May–Jun(–fall).

**HYMENOPAPPUS** WOOLLY-WHITE

Ours biennial herbs; leaves basal (rosette) and cauline, alternate, the blades usually pinnatifid, glandular-punctate, often conspicuously white hairy on lower surface; heads in corymb-like arrangement, discoid; phyllaries in 2 or 3 series, petaloid apically, herbaceous basally; receptacles naked; ray flowers (in our species) absent; disk flowers perfect, fertile; corollas white or with reddish tinge (yellow in a species to the w of nc TX), the lobes becoming reflexed; anther column long-exserted; achenes obconic, 4-angled, pubescent; pappus of 14–18 ovate to oblong hyaline scales to 1.5(–2) mm long.

☛ A s North American genus of 14 species; some were used medicinally by Native Americans. (Greek: *hymen*, membrane, and *pappus*, down, fuzz, pappus) (tribe Helenieae, sometimes lumped into Heliantheae; *Hymenopappus* can also be keyed using the Anthemidae key)

REFERENCES: Turner 1956; Rieseberg 1991.

1. Basal leaves with ultimate segments to 1.5 mm wide, elongate linear to filiform; corollas 2–3 mm long (to tips of corolla lobes), the corolla tubes 1.5–2(–2.2) mm long \_\_\_\_\_ **H. tenuifolius**
1. Basal leaves with ultimate segments 2–20(–30) mm wide, variously shaped but wider than linear to filiform; corollas 3–5 mm long (to tips of corolla lobes), the corolla tubes 2–3 mm long.
  2. Flowers white or creamy white; basal leaves finely once-pinnately to bipinnately parted, the ultimate segments linear, 2–8 mm wide; usually on clay or limestone soils \_\_\_\_\_ **H. scabiosaeus**
  2. Flowers reddish-tinged (rarely completely white); basal leaves simple to coarsely once-pinnately parted (rarely bipinnately parted), the ultimate segments broad, 6–30 mm wide; usually on sandy soils \_\_\_\_\_ **H. artemisiifolius**

**Hymenopappus artemisiifolius** DC., (with leaves like *Artemisia*—sagebrush or wormwood), RAGWEED WOOLLY-WHITE, WOOLLY-WHITE, WILD CAULIFLOWER. Plant 0.4–1.3 m tall; corollas reddish-tinged (rarely completely white), 3.5–5 mm long; phyllaries 6–12 mm long, 3–7 mm wide, white or tinged with red. Open woods, fields, disturbed areas; Denton, Henderson, Hill, Milam, Tarrant, and Wise cos.; scattered in nc TX; mainly on sandy soils of se and e TX. Apr–Jun. [*H. scabiosaeus* L'Her. var. *artemisiifolius* (DC.) Gandhi & R.D. Thomas]

**Hymenopappus scabiosaeus** L'Her. var. **corymbosus** (Torr. & A. Gray) B.L. Turner, (sp.: from Latin: *scabies*, itch; var.: with flowers in corymbs), OLD-PLAINSMAN. Plant 0.4–1 m tall; phyllaries 5–9 mm long, 2–4 mm wide, with white or yellowish white tips 2–4 mm long; corollas white or creamy white, 3–4 mm long. Prairies, open woods, roadsides; widespread in TX except for e TX and Panhandle. Apr–May.

**Hymenopappus tenuifolius** Pursh, (slender-leaved), CHALKHILL WOOLLY-WHITE, WOOLLY-WHITE, OLD-PLAINS MAN. Plant 0.4–1.5 m tall; phyllaries 5–8 mm long, 2–4 mm wide, yellowish for 1–2 mm from tip; corollas white. Gravelly prairies, limestone outcrops or sandy soils; Bell and Dallas cos. w to Panhandle and s to sc TX. May–Jul.

*Hymenopappus flavescens* A. Gray, (yellowish), with bright yellow corollas, occurs from w TX e as far as Taylor Co., just w of nc TX.

### **HYMENOXYIS BITTERWEED**

☞ A genus of 17–28 species depending on circumscription; they are native from s North America to Argentina; sometimes treated broadly to include *Tetranneuris*. A molecular study by Bierner and Jansen (1998) supported the recognition of *Tetranneuris* as a separate genus. ☞ Some contain sesquiterpene lactones toxic to sheep and goats; other species were formerly used as chewing gum by Native Americans. (Greek: *hymeno*, membrane, and *oxys*, sharp, alluding to the pointed pappus scales) (tribe Helenieae, sometimes lumped into Heliantheae)  
REFERENCES: Strother 1966; Bierner & Jansen 1998.

**Hymenoxys odorata** DC., (odorous), POISON BITTERWEED, WESTERN BITTERWEED, BITTERWEED, BITTER RUBBERWEED. Inconspicuously pubescent, taprooted annual, 7–60 cm tall, becoming bushy-branched when not crowded, forming rounded mounds; foliage aromatic when crushed; leaves alternate, pinnately divided into 3–15 linear-filiform segments, minutely resin-dotted; heads terminal, solitary or corymbose; ray flowers 6–13, the ligules deep yellow, widened and toothed apically, ca. 5–11 mm long; disk corollas orange; pappus of 5(–6) acuminate or awn-tipped scales 1–2.3 mm long. Disturbed sites, becoming abundant in overgrazed areas; Archer Co., also Brown Co. (Stanford 1971); w margin of nc TX s and w to w TX. Apr–Jun. Poisonous to livestock, especially to sheep under starvation conditions; the sesquiterpenes cause gastrointestinal irritation and result in a wasting condition even after short periods of grazing; POISON BITTERWEED causes considerable loss of livestock on ranges in the sw U.S. including the Edwards Plateau and has been one of the main causes of the decline of sheep ranching in the sw U.S. (Kingsbury 1964; James & Welsh 1992). ☞

### **HYPOCHAERIS CAT'S-EAR**

Annual or perennial herbs with leaves basal or flowering stems with a few more or less well-developed leaves, at least toward the base; leaf blades oblanceolate, toothed or pinnatifid; flowers all ligulate; corollas yellow or in one species white; pappus, at least in part, of plumose bristles; achenes all alike and beaked or of two kinds, the outermost beakless and the inner beaked.

☞ A genus of ca. 60 species native to Europe, Asia, n Africa, and especially South America; including some weeds and cultivated ornamentals. The generic name has sometimes been spelled *Hypochoeris* (e.g., Shinnars 1966b; Tomb 1974; DeFilippis 1976), probably based on the spelling by Linnaeus (1754) in *Genera Plantarum*. However, the accepted spelling is *Hypochaeris* (Greuter et al. 1993), based on Linnaeus' (1753) original spelling in *Species Plantarum*. While not presently known from nc TX, 3 other species naturalized in the e and se parts of TX are included below. They have been treated to alert collectors, and because of the possibility that they will become part of the nc TX flora; their scientific names are in italics rather than bold to indicate they are not currently known from nc TX. The following key is modified from Shinnars (1966b) and Cronquist (1980). (According to Vuilleumier (1973), Greek: *hypochoiris*, used by Dioscorides for some plant, and also mentioned by Pliny as *hypochoeris*, perhaps derived from *hypo*, for [or beneath], and *choiros*, pig, the animals being fond of its roots) (tribe Lactuceae)

REFERENCES: Shinnars 1966b; Vuilleumier 1973; Tomb 1974; Cronquist 1980; Diggs et al. 1997.

1. Pappus bristles of 2 types: an outer series of short, merely barbellate bristles and an inner series of much longer, plumose bristles; flowering stems leafless or nearly so (at most with reduced leafy bracts abruptly much smaller than the numerous basal rosette leaves).
  2. Plants mostly annual, essentially glabrous; heads not very showy, the ligules about equaling the involucre and only about twice as long as broad; outermost achenes usually beakless \_\_\_\_\_ **H. glabra**
  2. Plants perennial, with evidently hispid leaves; heads showy, the ligules evidently surpassing the involucre and about 4 times as long as wide; outermost achenes usually with well-developed beak (like the inner achenes) \_\_\_\_\_ *H. radicata*
1. Pappus bristles all alike, of long plumose bristles; flowering stems with a few more or less well-developed leaves, at least toward the base.
  3. Flowers yellow; middle and outer involucral bracts hispid; heads relatively broad, the involucre campanulate, nearly as wide as high or wider, mostly 5–8 mm wide at the middle at flowering time \_\_\_\_\_ *H. brasiliensis*
  3. Flowers white; involucral bracts glabrous or inconspicuously tomentose-puberulent; heads narrow, the involucre cylindrical, ca. half as wide as high or less, mostly 2–4 mm wide at the middle at flowering time \_\_\_\_\_ *H. microcephala*

**Hypochaeris glabra** L., (smooth, hair-less). Annual or winter annual, ± glabrous; stems 10–40 cm tall, leafless or minutely bracteate; leaves basal; leaf blades oblanceolate, toothed or pinnatifid; heads 1–several; involucre ca. 8–10 mm high at flowering, to 17 mm in fruit; flowers all ligulate; corollas yellow; the ligules ± equal to involucre in length; body of achenes 4–5 mm long, the inner ones with well-developed beaks, the outer beakless; pappus bristles of 2 types, the inner plumose, the outermost shorter and merely barbellate. Frequently mowed hay field; Williamson Co. (TJ. Watson 162Q 1993, BRIT, LL/TEX) is the only collection seen from Texas (Diggs et al. 1997). Feb–? Native of Europe. 🌿

*Hypochaeris brasiliensis* (Less.) Griseb. var. *tweedyi* (Hook. & Arn.) Baker, (sp. of Brazil; var. for John Tweedie, 1775–1862, Scottish gardener at the Royal Botanic Garden, Edinburgh and collector in South America), a yellow-flowered South American species related to *H. microcephala* was first reported for TX by Tomb (1974). It is known from vegetational area 1 (Hatch et al. 1990). [*H. tweedyi* Hook. & Arn.] 🌿

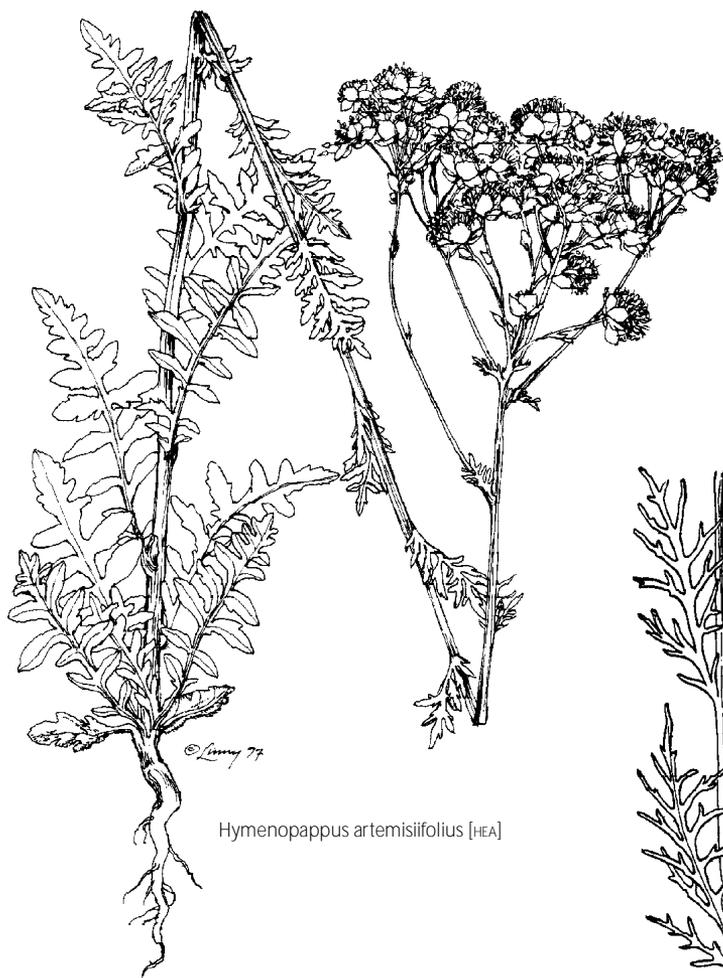
*Hypochaeris microcephala* (Sch.Bip.) Cabrera var. *albiflora* (Kuntze) Cabrera, (small-headed; var.: white-flowered), a white-flowered South American taxon first reported for North America (southeastern TX) by Shinnars (1966b) is known from both e and se TX (Hatch et al. 1990). At present this weedy species is rapidly spreading in se TX (G. Nesom, pers. comm., 1998) and is likely to soon become a member of the nc TX flora. 🌿

*Hypochaeris radicata* L., (having conspicuous roots), a yellow-flowered perennial species similar to *H. glabra*, is also known from e TX. This European species was apparently first collected in the state in 1970 (Tomb 1974). 🌿

### IVA SUMPWEED, MARSH-ELDER

Ours annual herbs; leaves opposite or sometimes alternate above, entire to toothed, resinous-glandular, petiolate; inflorescences spike-like or raceme-like in paniculate arrangements; heads small, inconspicuous (plants wind pollinated), sessile or subsessile in the axils of bracts, the peripheral flowers pistillate, the central flowers staminate; phyllaries distinct or united; staminate corollas funnellform; pistillate corollas tubular; pappus none.

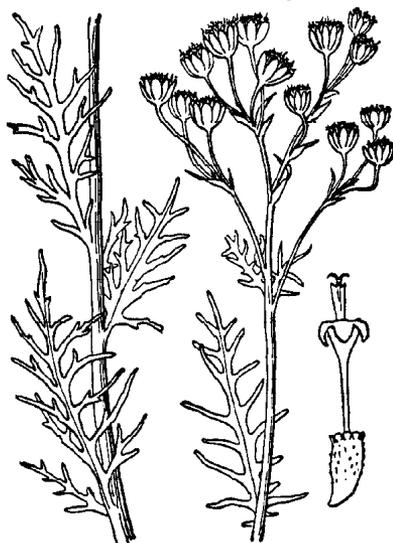
☛ A genus of 15 species native from North America to the West Indies; pollen from some spe-



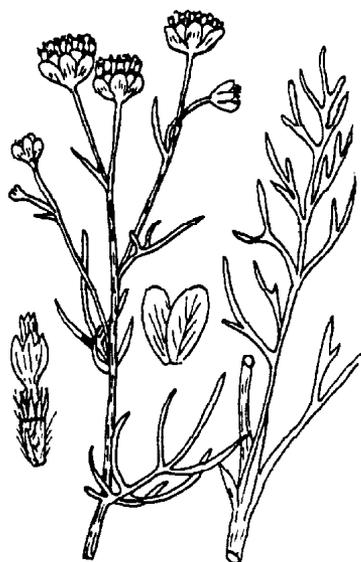
Hymenopappus artemisiifolius [HEA]



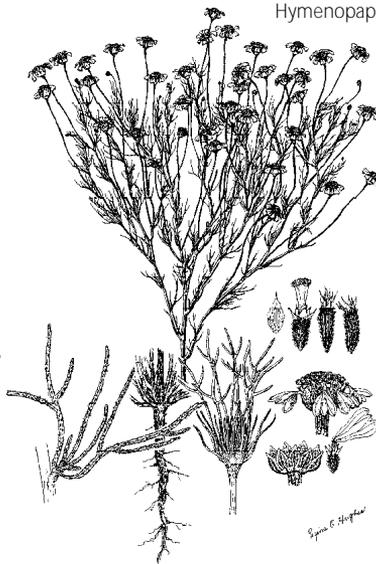
Hieracium gronovii [BB2]



Hymenopappus scabiosaeus var. corymbosus [BB2]



Hymenopappus tenuifolius [RVB]



Hymenoxys odorata [REE]



Hypochaeris glabra [BEN]

cies causes hay fever. (Latin name from the mint *Ajuga iva* Schreb., with similar odor) (tribe Heliantheae)

REFERENCES: Rydberg 1922; Jackson 1960; Bolick 1985.

1. Phyllaries united into a cup-like involucre with toothed margin; leaves linear to lanceolate, 2–5 cm long, 2–12 mm wide \_\_\_\_\_ **I. angustifolia**
1. Phyllaries 3 or 4, distinct; leaves ovate to lanceolate, 3–15 cm long, ca. 20–70 mm wide \_\_\_\_\_ **I. annua**

**Iva angustifolia** Nutt. ex DC., (narrow-leaved), NARROW-LEAF SUMPWEED, MARSH-ELDER. Stems 0.5–1.4 m tall; leaf blades entire to serrate, the larger ones conspicuously 3-nerved; heads sessile in axils of usually linear or filiform bracts; involucre 2–3 mm broad; corollas 1.5–2 mm long; mature achenes black, 2–2.8 mm long. Low moist areas, prairies, and post oak woodlands; widespread in TX. Sep–Nov.

**Iva annua** L., (annual), MARSH-ELDER, SEA-COAST SUMPWEED, SHARP-BRACT SUMPWEED, PELOCOTE. Stems 0.4–2 m tall; leaf blades serrate, 3-nerved, reduced upward to bracts, aromatic; heads sessile in axils of linear to ovate bracts; involucre 4–5 mm broad; corollas 1.5–2.5 mm long; mature achenes brown, 2–4.5 mm long. Low moist areas, calcareous or sandy soils, sometimes forming extensive stands; widespread, but mainly e 1/2 of TX. Sep–Nov. The wind-borne pollen is a cause of hay fever (Jackson 1960); the achenes were formerly eaten by Native Americans who domesticated this species (Heiser 1990b; Mabberley 1997).

### KRIGIA DWARF-DANDELION

Small, ± glabrous annual or perennial herbs; sap milky; leaves basal or alternate; leaf blades oblanceolate or oblong-lanceolate to linear, entire or unevenly toothed or lobed; heads generally small, usually solitary and terminal or few together; phyllaries nearly equal; flowers all ligulate; corollas yellow or yellow-orange, open during morning in sunny weather; pappus none or single or double, of scales or an inner ring of bristles and an outer ring of scales.

☛ A North American genus of 7 species. The 5 nc TX species all differ in chromosome number (Kim & Turner 1992). (Named for David Krig or Krieg, died 1713, a German or Hungarian physician, who was among the first to collect plants in Maryland) (tribe Lactuceae)

REFERENCES: Shinnars 1947b; Vuilleumier 1973; Kim & Mabry 1991; Kim & Turner 1992; Kim et al. 1992a, 1992b.

1. Phyllaries 4–8 times as long as wide, linear-lanceolate to oblong-lanceolate, numerous (8–16), becoming shrivelled or reflexed in age, never keeled; inner pappus of bristles 4–8 mm long, outer of as many or fewer short scales less than 1/4 as long; stems leafless.
2. Plants perennials with a small tuber a few cm below ground, developing slender, whitish rhizomes; involucre 10–15 mm high; corollas 12–17 mm long; pappus with numerous bristles and numerous short scales \_\_\_\_\_ **K. dandelion**
2. Plants annuals with fibrous roots; involucre 4–6.5 mm high (to 9 mm in age); corollas 4–7 mm long; pappus with 5 bristles and 5 scales \_\_\_\_\_ **K. virginica**
1. Phyllaries 1.5–3 times as long as wide, lanceolate to ovate, few (4–10), remaining erect and expanded in age, with midvein which in age becomes a prominent keel; pappus absent OR of short scales or bristles up to 2 mm long; stems leafless or leafy.
3. Stems leafless, unbranched (but stems buried by over-washed soil or robust plants may develop short, basal internodes); pappus of 5 well-developed short scales or both 5 well-developed short scales and short bristles \_\_\_\_\_ **K. occidentalis**
3. Stems leafy, branched (but beginning to flower with leaves crowded at base and branches scarcely developed); pappus absent OR of much reduced scales and bristles.
4. Pappus of much reduced scales and bristles (use hand lens or scope) \_\_\_\_\_ **K. wrightii**
4. Pappus absent \_\_\_\_\_ **K. cespitosa**



*Iva angustifolia* [BT3, UKS]



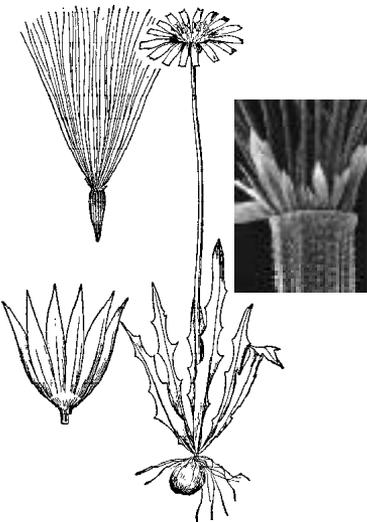
*Krigia cespitosa* forma *cespitosa* [BB2, BT1]



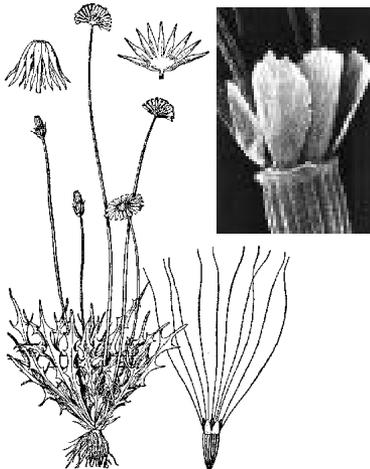
*Iva annua* [AM]



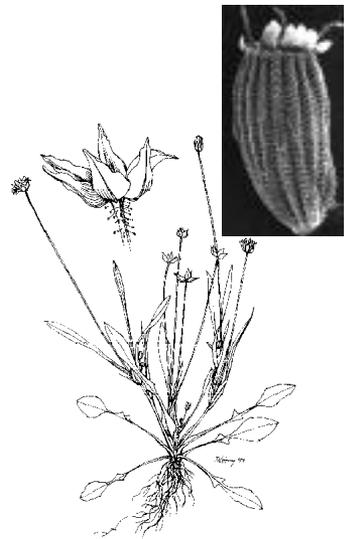
*Krigia occidentalis* [BT1, IPL]



*Krigia dandelion* [BT1, GLE]



*Krigia virginica* [BT1, GLE]



*Krigia wrightii* [BT1, HEA]



**Krigia cespitosa** (Raf.) K.L. Chambers, (growing in tufts). Variable annual; stems leafy, branched. Shinners (1947b) treated the following 2 forms as species. Kim and Mabry (1991), Kim and Turner (1992), and Kim et al. (1992b) have observed intermediate populations, have concluded that the characters Shinners used to separate them are often correlated with environmental differences, and that molecular data could not separate the 2 taxa;  $n = 4$ .

1. Corollas 2–4 mm long; involucre 3–4.3 mm high in flower, 3–5.3 mm high in age; heads 3–6 mm in diam. \_\_\_\_\_ forma **cespitosa**

1. Corollas 5–10 mm long; involucre 5.3–8.3 mm high in flower, to 8.5 mm high in age; heads 6–9 mm in diam. \_\_\_\_\_ forma **gracilis**

forma **cespitosa**, WEEDY DWARF-DANDELION. Plant 35–40 cm tall; phyllaries 5–8. Stream banks, damp woods, roadsides, and disturbed areas, especially on sandy soils; se and e TX w to East Cross Timbers and Edwards Plateau. Mar–May. [*K. oppositifolia* Raf., *Serenia cespitosa* (Raf.) Kuntze]

forma **gracilis** (DC.) K.J. Kim, (graceful). Plant 8–40 cm tall; phyllaries 8–10. Low spots in prairies, or borders of woods, disturbed areas, chiefly calcareous clay, less often sandy soils; Post Oak Savannah and se TX w to West Cross Timbers and Edwards Plateau. Apr–May. [*K. gracilis* (DC.) Shinners]

**Krigia dandelion** (L.) Nutt., (from its resemblance to *Taraxacum* –dandelion), TUBER DWARF-DANDELION, POTATO-DANDELION. Scapose tuberous perennial 10–45 cm tall; heads large and showy; phyllaries ca. 15; pappus of numerous bristles 5–8 mm long and 5 small scales;  $n = 30$ . Sandy open woods, roadsides, and lawns; Grayson, Henderson, Hopkins, and Hunt cos.; also Lamar and Parker cos. (Shinners 1947b); se and e TX w to nc TX. Apr–May.

**Krigia occidentalis** Nutt., (western), WESTERN DWARF-DANDELION. Scapose annual 4–16 cm tall; phyllaries 4–7; corollas 3.5–3.8 mm long; pappus usually of 5 bristles 0.8–2 mm long and 5 small scales;  $n = 6$ . Sandy open woods, fields, and roadsides; Falls, Hopkins, Hunt, Kaufman, Milam, and Navarro cos.; also Bell, Eastland, and Tarrant cos. (Shinners 1947b); se and e TX w to West Cross Timbers and Edwards Plateau. Mar–May.

**Krigia virginica** (L.) Willd., (of Virginia), CAROLINA DWARF-DANDELION. Scapose annual 4–35 cm tall; phyllaries ca. 10; pappus of 5 bristles 4–7 mm long and 5 small scales;  $n = 5$  or 10. Sandy open woods, fields, and roadsides; Burnet, Denton, Henderson, and Tarrant cos., also Comanche Co.; se and e TX w to Grand Prairie and Edwards Plateau. Mar–Apr, rarely repeating as late as Oct.

**Krigia wrightii** (A. Gray) K.L. Chambers ex K.J. Kim, (for Charles Wright, 1811–1885, TX collector). Annual extremely similar to the dwarf form of *K. cespitosa* and the taller individuals of *K. occidentalis*; the chromosome number of  $n = 9$  is unique in the genus (Kim & Turner 1992); chromosomal and molecular data (Kim & Turner 1992) indicated the species is more distinctive than morphology would suggest. Roadsides, weedy areas, low spots, often in sandy soils; Burnet, Dallas, Denton, Falls, Hunt, Kaufman, Navarro, and Tarrant cos.; according to Kim and Turner (1992), *K. wrightii* occurs throughout most of nc TX; se and e TX w to nc TX and e Edwards Plateau. [*Apogonwrightii* A. Gray]

## LACTUCA LETTUCE

Coarse annual or biennial herbs; sap milky or brownish; leaves alternate; leaf blades oblong-lanceolate, coarsely toothed or deeply lobed; heads small, in terminal panicle-like inflorescences (these at first dense and spike-like); involucre narrow; phyllaries in several rows, unequal; flowers all ligulate; corollas yellow in most species to blue or white in a summer- and fall-blooming species, open during the morning, withering greenish or bluish; pappus of numerous hair-like bristles.

☛ A genus of ca. 75 species; cosmopolitan but especially n temperate. *Lactuca sativa* L., the cul-

tivated LETTUCE or GARDEN LETTUCE, lacks the bitter sesquiterpene lactones present in wild species. (The ancient name of the lettuce, *L. sativa*, from Latin: *lac*, milk, in allusion to the white sap) (tribe Lactuceae)

REFERENCES: Stebbins 1937; Vuilleumier 1973.

1. Corollas blue or white; body of achenes 4–5 mm long; beak of achenes stout, 0.5–1(–2) mm long or absent \_\_\_\_\_ **L. floridana**
1. Corollas usually yellow; body of achenes of various lengths; beak of achenes thread-like, 2–10 mm long.
  2. Plants annuals with taproot; achenes ca. 1 mm wide, 5- to 7-nerved on each face; beak equal to or conspicuously longer than body; latex white; midrib prickly on lower surface of leaf \_\_\_\_\_ **L. serriola**
  2. Plants biennials with thick crown; achenes at least 2 mm wide, 1- to 3-nerved on each face; beak equal to or shorter than body; latex brownish; midrib on lower surface of leaf prickly or not so.
  3. Body of achenes 4.5–5 mm long, the achenes including beak 7–10 mm long; pappus bristles 7–10 mm long; involucre 13–22 mm long in fruit; upper leaf blades pinnately lobed, the margins conspicuously prickly toothed \_\_\_\_\_ **L. ludoviciana**
  3. Body of achenes 3.5–4.5 mm long, the achenes including beak 4.5–6.5 mm long; pappus bristles 5–7 mm long; involucre 10–15 mm long in fruit; upper leaf blades usually not lobed, the margins entire to toothed but usually not prickly-toothed \_\_\_\_\_ **L. canadensis**

**Lactuca canadensis** L., (of Canada), WILD LETTUCE. Biennial; stems 0.5–2.5(–3) m tall; leaf blades pinnatifid (the upper nearly lobeless), oblanceolate, narrowed to nonclasping base; achenes flat and somewhat winged, the beak filiform. Typically in sandy soils; Denton, Fannin, Grayson, and Tarrant cos.; se and e TX w to nc TX and Edwards Plateau. May–Aug. In some cases *L. canadensis* and *L. ludoviciana* are difficult to distinguish; according to Correll and Johnston (1970), in TX the two intergrade and introgressive hybridization has possibly occurred.

**Lactuca floridana** (L.) Gaertn., (of Florida), WOODLAND LETTUCE, FLORIDA LETTUCE. Annual 0.5–2.5(–3) m tall; leaf blades deeply runcinate-pinnatifid, the terminal portion large, triangular, the lateral lobes large, 1 or 2 per side; involucre 9–10 mm high; achenes flattened, unwinged, mottled black and gray, the beak tapered, 0.5–1(–2) mm long or absent. Disturbed areas; se and e TX w to West Cross Timbers and Edwards Plateau. Aug–Nov.

**Lactuca ludoviciana** (Nutt.) Riddell, (of Louisiana), WESTERN WILD LETTUCE. Biennial 1–2 m tall; leaves pinnately lobed becoming deltoid and clasping in upper part, the midrib beneath sometimes prickly; corollas yellow or according to Barkley (1986), possibly blue (this color not observed in nc TX); achenes flattened, somewhat winged, the beak filiform. Usually in calcareous soils; widespread in TX. May–Jul.

**Lactuca serriola** L., (possibly from Latin: *serrula*, a small saw, referring to the toothed leaves, or a corruption of *scariola*, an old name for wild lettuce), PRICKLY LETTUCE. Annual 0.5–2 m tall; latex white; leaf blades pinnatifid, the uppermost unlobed, clasping, the margins prickly-toothed, the midrib prickly beneath, sometimes conspicuously so; corollas yellow, drying bluish; achenes 2.5–3 mm long, half way flattened (lenticular), unwinged, the beak filiform, 3–4 mm long. Disturbed sites; mainly nc TX and Edwards Plateau s and w to w TX. Apr–Aug. Native of the Old World; name often but not originally written *scariola*. The widely cultivated GARDEN LETTUCE, *L. sativa*, is thought to be derived from *L. serriola* (Moore et al. 1976). Cattle have been poisoned by eating large quantities of the young growth (Kingsbury 1964). ☒ ☞

**Lactuca saligna** L., (resembling *Salix*—Willow), WILLOW-LEAF LETTUCE. Just before this book went to press, a large individual (ca. 2 m tall) of this species was discovered in a recently planted landscape in Tarrant Co. (*O'Kennon 14252*, Fort Worth, 21 Aug 1998). While known

from OK (Taylor & Taylor 1994), this European native has not previously been reported from TX (O'Kennon et al. 1998). It is not clear whether it will become an established member of the nc TX flora. It is a glabrous winter annual with milky latex. While the Tarrant Co. individual has pinnatifid leaves, leaves in this species can vary from pinnatifid to entire. The corollas are yellow with bluish or purplish on the abaxial side. In the above key it would come out with *L. serriola* except that the midrib is usually not prickly on the lower surface of the leaf. Also, the achenes lack bristles at the base of the beak (in contrast to *L. serriola*, whose achenes have conspicuous bristles at the base of the beak), the leaves are linear to linear-lanceolate, 0.3–5 cm wide, with narrow lobes and entire or few-toothed margins (in contrast to *L. serriola*, whose leaves are lanceolate to ovate, oblong-elliptic, or obovate, 1–10(–15+) cm wide, with broad lobes and prickly-toothed margins), and there are usually 8–15 flowers per head (versus 14–25 in *L. serriola*).

### LEUCANTHEMUM

☛ A genus of 33 species of Europe and n Asia including a number of cultivated ornamentals; previously treated in *Chrysanthemum*. The widely cultivated CHRYSANTHEMUMS or MUMS are now treated in the segregate genus *Dendranthema*. Another segregate of *Chrysanthemum*, *Tanacetum*, includes the European *T. cinerariifolium* (Trevir.) Sch.Bip. [*Pyrethrum cinerariifolium* Trevir.] (PYRETHRUM, DALMATIAN INSECT-FLOWER), the flower heads of which yield the monoterpene, pyrethrum, used since ancient times as an insecticide and now widely used by organic gardeners (Fuller & McClintock 1986). ☛ The leaves and flowers of some species can cause contact dermatitis in sensitive individuals (Spoerke & Smolinske 1990). (Greek: *leucos*, white, and *antheon*, flower) (tribe Anthemideae)

REFERENCE: Arriagada & Miller 1997.

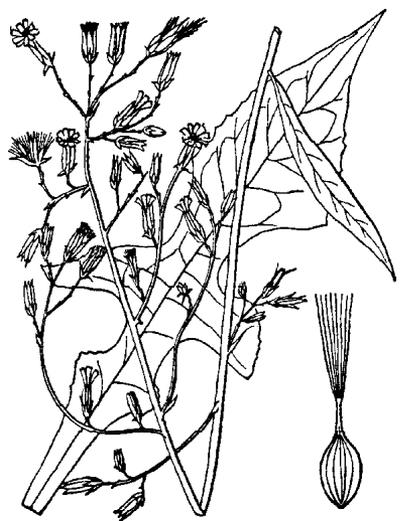
**Leucanthemum vulgare** Lam., (common), OX-EYE DAISY, WHITE DAISY, WHITEWEED, MOON DAISY, DOG DAISY, MARGUERITE. Perennial; stems glabrous, 0.3–1 m tall; leaves mostly basal, the blades spatulate-obovate, on long slender petioles; stem leaves alternate, the blades serrate to pectinate to pinnately lobed, attenuate basally; heads solitary on long peduncles; ray flowers pistillate, the ligules 3-toothed at apex, white, 10–nearly 30 mm long, 2–10 mm wide; disk flowers perfect, the corollas yellow; receptacles naked; achenes 1.5–2 mm long; pappus a very short crown. Open grassy areas, spreading in native prairie from “wildflower” planting; Grayson and Tarrant cos.; otherwise not reported from TX; escaping more commonly in the e U.S. May-Jul(–fall). Native of Europe and Asia. While formerly included in *Chrysanthemum* and still treated there by some authors (e.g., Jones et al. 1997; Taylor 1997), we are following Bremer (1994), Kartesz (1994), and Arriagada and Miller (1997) in recognizing it in *Leucanthemum*. [*Chrysanthemum leucanthemum* L., *C. leucanthemum* var. *pinnatifidum* Lecoq & Lemotte, *Leucanthemum leucanthemum* Rydb.]

### LIATRIS BLAZINGSTAR, GAYFEATHER, BUTTON-SNAKEROOT

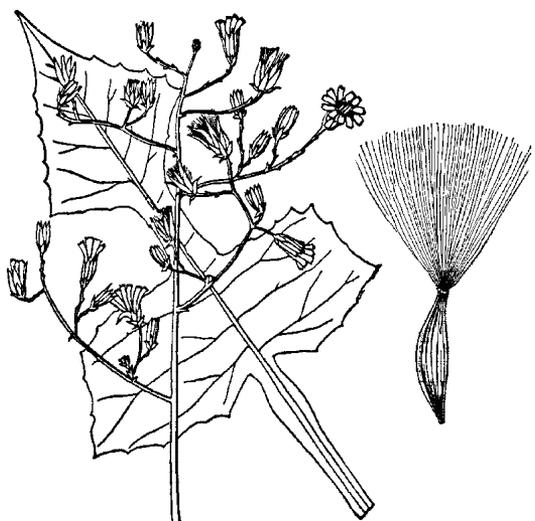
Herbaceous perennials from swollen, underground, corm-like structures; stem leaves alternate, simple, ± sessile, the blades entire, essentially linear, usually punctate with resinous dots; inflorescences spike-like or raceme-like, showy; phyllaries sometimes resinous-dotted, greenish to purplish, pink, or white; ray flowers absent; disk flowers fertile; corollas purplish or rarely white; pappus of bristles, these barbellate or plumose; achenes ± cylindrical, usually ca. 10-ribbed.

☛ An e North American (including ne Mexico) genus of 43 species including some cultivated as ornamentals. The common name BUTTON-SNAKEROOT is derived from the use of the corm-like structures in treating snake bites (Ajilvsgi 1984). (Derivation of generic name unknown) (tribe Eupatorieae)

REFERENCE: Gaiser 1946.



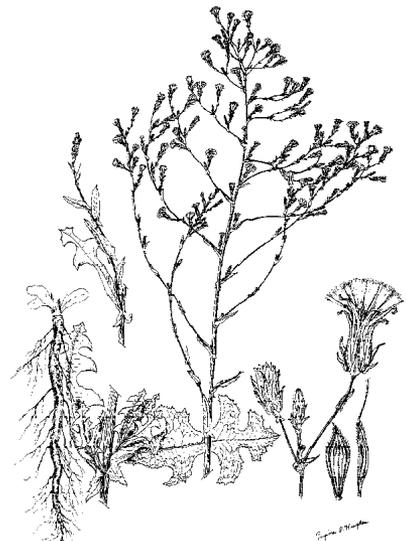
*Lactuca canadensis* [BB2]



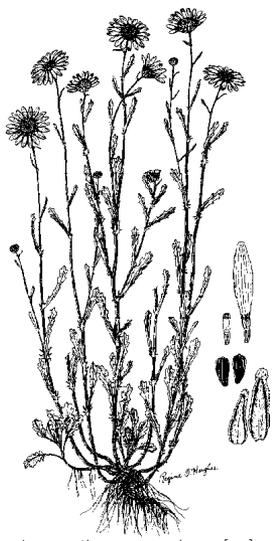
*Lactuca floridana* [BB2, GLE]



*Lactuca ludoviciana* [BB2, GLE]



*Lactuca serriola* [REE]



*Leucanthemum vulgare* [REE]



*Liatris aspera* [GLE]



*Liatris elegans* [BB2]

1. Phyllary tips usually  $\pm$  rounded; phyllaries glabrous; heads globose \_\_\_\_\_ **L. aspera**
1. Phyllary tips usually acute to acuminate; phyllaries glabrous or pubescent; heads longer than broad.
  2. Inner phyllaries with prolonged petal-like tips conspicuously longer than the corollas or pappus, the tips white or pink in color; corollas not pilose within the tube \_\_\_\_\_ **L. elegans**
  2. Inner phyllaries without prolonged petal-like tips, the phyllaries green or purplish and not exceeding the corollas or pappus; corollas pilose within the tube (except in *L. pycnostachya*).
  3. Heads densely crowded in the racemes, the inflorescence axis thus not easily visible; bracts subtending the individual heads usually not or only slightly longer than the heads; heads with 3–12 flowers each, cylindrical, 8–15 mm long to end of pappus; inner phyllaries usually < 12 mm long (often much less).
  4. Pappus bristles merely barbellate (the length of the side hairs on the bristles only 3–6 times the thickness of the central bristle axis), the side hairs inconspicuous even with a lens; heads with 5–12 flowers; plants 0.6–1.5 m tall; n part of nc TX \_\_\_\_\_ **L. pycnostachya**
  4. Pappus bristles feathery (the length of the side hairs on the bristles 15 times or more the thickness of the central bristle axis), the side hairs conspicuous with a lens and often even with the naked eye; heads with 3–6 flowers; plants 0.8 m or less tall; widespread in Blackland and Grand prairies \_\_\_\_\_ **L. mucronata**
3. Heads not densely crowded in the racemes, the inflorescence axis thus easily visible; bracts subtending the individual heads often conspicuously longer than the heads; heads with 20–40 or more flowers each, broadly cylindrical, the well-developed ones (13–)15–20+ mm long to end of pappus; inner phyllaries usually 10–20 mm long \_\_\_\_\_ **L. squarrosa**

**Liatris aspera** Michx., (rough), TALL GAYFEATHER, ROUGH GAYFEATHER. Stems 0.4–1.1(–1.5) m tall; inflorescences with heads not crowded, the central axis usually easily visible; heads 15–25 mm broad, with 25–40 flowers; phyllaries  $\pm$  puckered; corollas purple; pappus bristles merely barbellate, 7–8 mm long. Sandy soils; Fannin, Grayson, Hunt, and Lamar cos., also Denton Co. (J. Quayle, pers. comm.); se and e TX w to n part of nc TX. Jul–Oct. ☞/95

**Liatris elegans** (Walter) Michx., (elegant), PINK-SCALE GAYFEATHER, HANDSOME BLAZINGSTAR. Stems 0.3–1 m tall; inflorescences spike-like, with heads  $\pm$  crowded; heads usually 5-flowered; prolonged inner phyllary tips serrulate; corollas white or light purple; pappus plumose, 9–11 mm long. Sandy soils, often in open woods; Cooke, Dallas, Denton, Grayson, Henderson, Lamar, Limestone, and Milam cos; se and e TX w to East Cross Timbers. Aug–Oct.

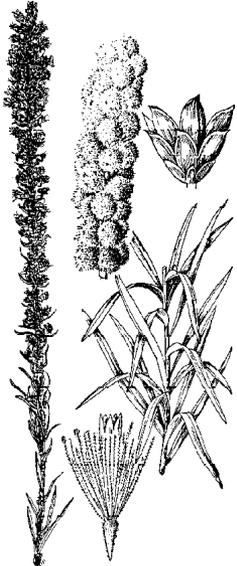
**Liatris mucronata** DC., (mucronate, pointed), NARROW-LEAF GAYFEATHER. Stems 0.3–0.8 m tall; inflorescences 8–60 cm long, spike-like, the heads densely crowded; corollas purple, 9–10 mm long; pappus 6–7 mm long. Calcareous upland soils; Blackland and Grand prairies in nc TX; se and e TX w to Edwards Plateau and Rolling Plains. (Jun–)Aug–Nov.

**Liatris pycnostachya** Michx., (thick-spiked), KANSAS GAYFEATHER, HAIRY BUTTON-SNAKEROOT. Stems 0.6–1.5 m tall; inflorescences 15–30 cm long, spike-like, the heads densely crowded; phyllary tips reflexed or spreading; corollas purple (rarely white); pappus 6–7 mm long. Sandy open areas, prairies, in or around boggy places; Denton (wet area near Lake Ray Roberts) and Lamar (Tridens Prairie) cos., also a plant growing on a roadside in Cooke Co. was observed in 1997 (S. Lusk and J. Quayle, pers. comm.); mainly se and e TX. Jun–Oct. At one time, a poultice of the roots was used in treating snakebite, leading to the common name (Tveten & Tveten 1993).

**Liatris squarrosa** (L.) Michx., (with parts spreading or recurved at the ends). Stems 0.3–0.6 m tall; inflorescences raceme-like or paniculate, the heads not crowded; heads sessile or on short peduncles, the terminal head often larger; corollas purple; pappus plumose. Sandy soils.



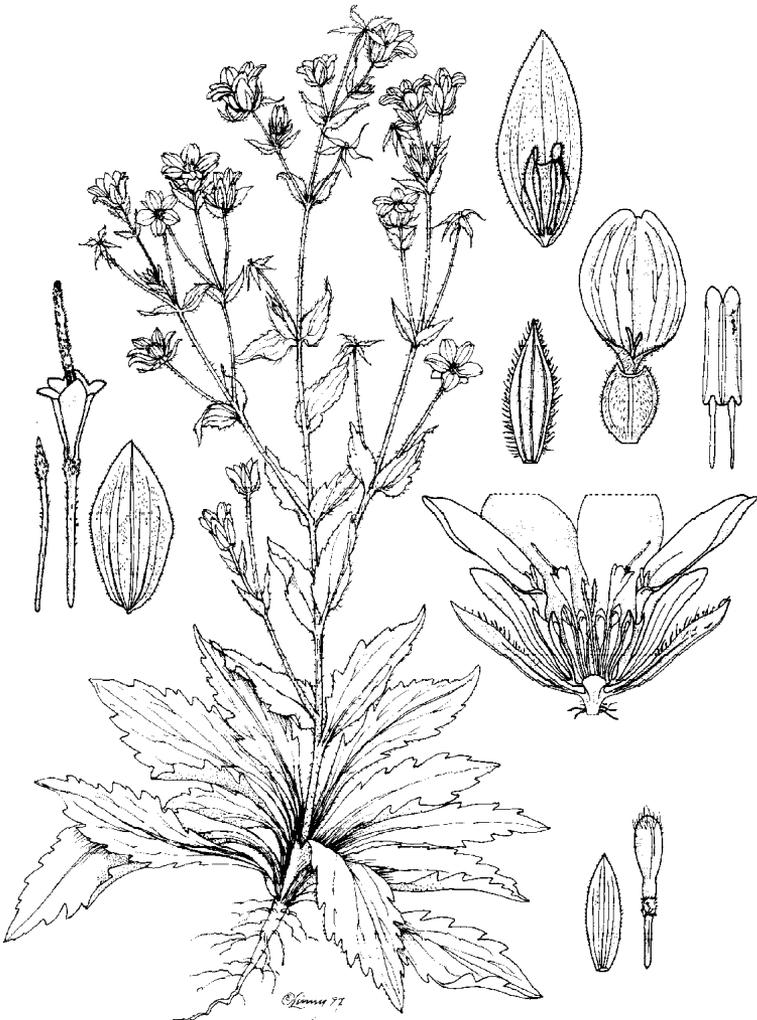
*Liatris mucronata* [ROE]



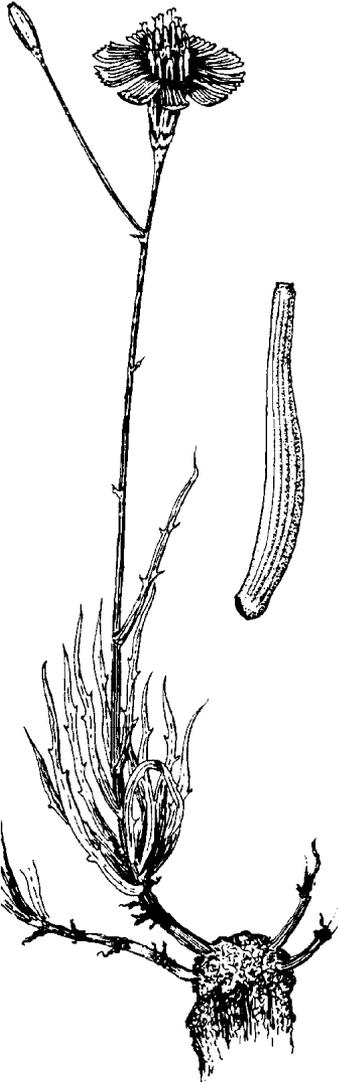
*Liatris pycnostachya* [CO1, GLE]



*Liatris squarrosa* var. *glabrata* [RW]



*Lindheimeria texana* [HEA, KEM]



*Lygodesmia texana* [SBM]

1. Stems, leaves, and often outer phyllaries glabrous OR pubescent; pappus 10 mm long; outer phyllaries 5–8 mm long, usually ciliate-margined; se and e TX w to e margin of nc TX. \_\_\_\_\_ var. **alabamensis**
1. Plants entirely glabrous; pappus 7–8 mm long; outer phyllaries 7–10 mm long, not ciliate-margined; widespread, East and West cross timbers and along Red River \_\_\_\_\_ var. **glabrata**

var. **alabamensis** (Alexander) Gaiser, (of Alabama), Heads 10–15 mm wide; corollas 10–12 mm long. Limestone Co. near e margin of nc TX; mainly se and e TX. Aug–Nov. [*L. glabrata* Rydb. var. *alabamensis* (Alexander) Shinnery]

var. **glabrata** (Rydb.) Gaiser, (somewhat glabrous, becoming glabrous), SMOOTH GAYFEATHER. Heads averaging 10 mm wide; corollas ca. 10 mm long. Cooke, Denton, Grayson, Lamar, and Tarrant cos.; East and West cross timbers, and along Red River; also e TX. Jul–Oct. [*Liatris glabrata* Rydb.] ☒/95

*Liatris acidota* (Engelm. & A. Gray) Kuntze, (possibly from Latin: *acidus*, sour, sharp), which would key to *L. pycnostachya* or *L. mucronata* in the key, is cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2). This species can be distinguished by the merely barbellate pappus bristles, flowers 3–5 per head, and the phyllary tips appressed (not reflexed or spreading). It apparently occurs only to the se of nc TX.

### LINDHEIMERA TEXAS-STAR, STAR DAISY

☛ A monotypic genus native to the sw United States and n Mexico. (Named for Ferdinand Jacob Lindheimer, 1801–1879, German-born collector of Texas plants and correspondent of Asa Gray and George Engelmann, resided in New Braunfels—Geiser 1948) (tribe Heliantheae)  
REFERENCES: Turner & Johnston 1956; Turner & Woodruff 1993.

**Lindheimera texana** Engelm. & A. Gray, (of Texas), TEXAS-STAR, YELLOW TEXAS-STAR, LINDHEIMER'S DAISY. Hispid-pubescent taprooted annual 10–30(–65) cm tall; leaves alternate and subopposite or the uppermost opposite; leaf blades oblanceolate to rhombic- or ovate-lanceolate, entire or coarsely toothed, sessile or short-petioled; heads usually solitary or few and corymbose, on peduncles 1–4 cm long; involucre 10–15 mm tall, the phyllaries in 2 series, the outer series narrower, longer, and more acute than the conspicuous inner; ray flowers usually 5, pistillate and fertile, the ligules ca. 1 cm long, yellow or orange-yellow, 2-toothed at apex; disk flowers few, infertile; achenes flattened, large, nearly as large as the inner phyllaries; pappus of 2 awns. Clayey or occasionally sandy prairies, roadsides; Post Oak Savannah and se TX w to Edwards Plateau and Rolling Plains. Mar–May.

### LYGODESMIA

SKELETON-WEED, SKELETON-PLANT, RUSH-PINK, ROSE-RUSH, RUSHWEED

☛ A genus of 7 species of the Americas, especially w North America. (Greek: *lygos* a plant twig, and *desme*, a bundle, from clustered stick-like or twiggy stems) (tribe Lactuceae)  
REFERENCES: Vuilleumier 1973; Tomb 1980.

**Lygodesmia texana** (Torr. & A. Gray) Greene, (of Texas), TEXAS SKELETON-PLANT, PURPLE-DANDELION, FLOWERING-STRAW, MILK-PINK. Glabrous and glaucous, low perennial with deep, thick, woody root producing in age numerous vertical to oblique rhizomes, terminating in above-ground stems, forming clumps; sap milky; stems 20–65 cm tall, with few reduced leaves or bracts, openly and stiffly branched toward summit; leaf blades mostly basal, linear to lanceolate, entire or usually deeply pinnately lobed; heads large; involucre subcylindrical, 10–25 mm high; flowers all ligulate, with heavy sweet scent; corollas purple to pale lavender (rarely white), open during morning; achenes 13–17 mm long; pappus of hair-like bristles, 10–15 mm long. Lime-

stone outcrops and rocky calcareous soils; in nc TX mainly Grand Prairie and w, also Dallas Co. to the e (Tomb 1980); widespread in TX except the extreme ne part of the state. May-Sep. ☒/97

## MACHAERANTHERA

☛ A w North American genus of 36 species including some used as indicators of selenium and uranium. The genus is sometimes included in *Haplopappus* some taxa previously treated in *Machaeranthera* are now recognized in the recently named genus *Rayjacksonia* (Lane & Hartman 1996). (Greek: *macha*, sword, and *anthera*, anther) (tribe Astereae)

REFERENCES: Hall 1928; Cronquist & Keck 1957; Turner & Hartman 1976; Hartman 1990; Morgan & Simpson 1992; Morgan 1997 [1998].

***Machaeranthera pinnatifida*** (Hook.) Shinners, (pinnately cut), SPINY IRONPLANT, CUT-LEAF IRONPLANT. Herbaceous perennial from a woody, branching, underground structure, nearly glabrous to variously pubescent, often minutely glandular-pubescent; stems 0.2–0.8 m tall, branched only in uppermost part; leaves alternate, ± sessile, often not much reduced upwards; leaf blades 1–3 cm long, usually pinnately (rarely bipinnately) lobed, the sinuses usually extending 1/2 way to the midrib or more; heads solitary at the ends of the branches; involucre 5–8 mm high; phyllaries in several series, often acute and minutely bristle-tipped, eglandular or with scattered glands, straw-colored but the upper part with a dark often green area; ray and disk flowers yellow; ray flowers pistillate, fertile; ligules 8–10 mm long; disk flowers perfect, fertile; pappus of ray and disk flowers similar, of hair-like bristles; achenes ca. 2–2.5 mm long, pubescent. Grasslands; Clay, Jack, Montague, and Young cos.; mainly w 1/2 of TX rare e to w part of nc TX. Late May–Sep. [*Haplopappus pinulosus* (Pursh) DC.]

## MARSHALLIA BARBARA'S-BUTTONS

☛ A genus of 7 species native to the United States. Watson and Estes (1990) indicated that morphological variation is continuous among the species and that there are few abrupt boundaries. (Named at the request of Muhlenberg for Dr. Moses Marshall, 1785–1813, nephew of the more distinguished Humphrey Marshall) (tribe Heliantheae)

REFERENCES: Channell 1957; Watson & Estes 1990.

***Marshallia caespitosa*** Nutt. ex DC., (growing in tufts). Small perennial; stems glabrous or minutely pubescent above; leaves sessile or basal ones petioled; leaf blades oblanceolate to linear, 5–15 cm long, to 1(–1.5) cm wide, entire; heads terminal, solitary or few, 2.5–3.5 cm across, long-peduncled; phyllaries grading into bracts of disk, narrow, green, herbaceous; ray flowers absent; disk flowers sweet-scented; corollas white or occasionally pink-tinged; pappus of 5 scales 2–3 (–4) mm long, ca. as long as the achene.

1. Leaves crowded near base of plant, with no or few leaves up the stems; heads usually solitary per stem \_\_\_\_\_ var. **caespitosa**
1. Leaves gradually reduced upwards, the stems leafy except for peduncles, the leafy part of the stems usually as long or longer than the peduncles; heads solitary–several per stem \_\_\_\_\_ var. **signata**

var. **caespitosa**, SEEP MARSHALLIA, BARBARA'S-BUTTONS. Clayey prairies and limestone outcrops; Cooke, Dallas, and Denton cos.; se and e TX w to nc TX and Edwards Plateau. Apr–May.

var. **signata** Beadle & FE. Boynton, (marked, designated), BARBARA'S BRUTTONS. Limestone outcrops; nc TX s to s TX and w to e Rolling Plains; more common in nc TX than var. *caespitosa* Apr–May. ☒/98

## MELAMPODIUM BLACKFOOT

☛ A genus of 37 species native to tropical and warm areas of the Americas, especially Mexico.

(Greek: *melas*, black, and *podos* foot, alluding to the fact that each ray flower is subtended by a small, foot-shaped bract that turns black upon maturity) (tribe Heliantheae)

REFERENCES: Turner & King 1962; Stuessy 1971, 1972, 1979; Stuessy & Crisci 1984.

**Melampodium leucanthum** Torr. & A. Gray, (white-flowered), ROCK DAISY, PLAINS BLACKFOOT, BLACK-FOOT DAISY. Herbaceous or weakly subshrubby perennial; stems 15–50 cm tall; leaves opposite; leaf blades linear to narrowly oblong, 2–4.5 cm long, to 1 cm wide, entire to pinnately lobed, sessile; heads solitary, on peduncles 3–7 cm long; outer phyllaries united more than half way; inner phyllaries each surrounding the achene of a ray flower, expanded hood-like above the achene; ray flowers 8–13, pistillate, fertile; ligules 7–13 mm long, white; disk flowers staminate with abortive ovaries, the corollas yellow; achenes 1.5–2.5 mm long; pappus none. Calcareous soils; Bell, Eastland, Erath, Hamilton, Lampasas, and Mills cos.; Lampasas Cut Plain and East Cross Timbers s and w to w TX. Mar–Nov.

### MIKANIA HEMPWEED, CLIMBING HEMPWEED

☛ A mainly tropical genus of ca. 430 species of climbers; the single nc TX representative of this genus is the only Asteraceae in the nc TX flora that is a twining vine. (Named for Joseph Gottfried Mikán, 1743–1814, professor in the University of Prague) (tribe Eupatorieae)

REFERENCES: Holmes 1981, 1990.

**Mikania scandens** (L.) Willd., (scandent, climbing), CLIMBING HEMPWEED, HEMPVINE, CLIMBING-BONESET. Perennial twining vine; leaves opposite, petioled, the blades ovate to deltoid, subentire or undulate, generally acuminate; heads corymbose; phyllaries 4, equal, 4–5 mm long, acuminate; ray flowers absent; disk flowers 4 per head; corollas whitish, sometimes pink-tinged; achenes 5-ribbed; pappus persistent, of numerous bristles. Woodlands, low areas; Bell, Dallas, Grayson, Hopkins, and Rockwall cos.; se and e TX w to East Cross Timbers and Edwards Plateau. Aug–Nov.

### ONOPORDUM COTTON-THISTLE, SCOTCH-THISTLE

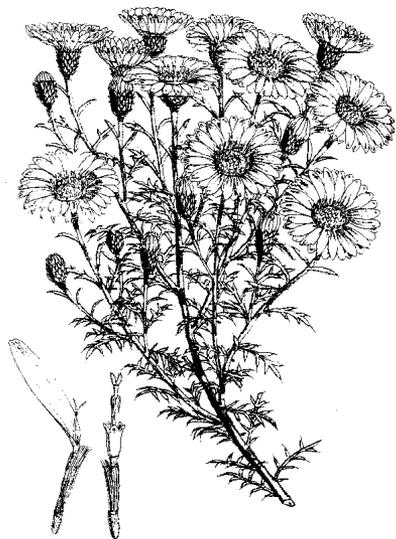
☛ A genus of ca. 60 species of prickly herbs native to Europe, the Mediterranean region, and w Asia. (Ancient Greek name of the plant, from *onos* donkey, and *porde*, flatulence, Pliny stating that it produced flatulence in donkeys) (tribe Cardueae)

**Onopordum acanthium** L., (prickly), SCOTCH-THISTLE. Coarse biennial 0.5–3 m tall, often gray from sparse to dense cottony pubescence; stems with wings 5–15(–20) mm wide, these with spine-tipped lobes; leaves alternate, lobed or toothed, conspicuously spiny-margined, sessile, decurrent; heads terminal, solitary or 2–5 in ± loose clusters, large (2.5–5 cm in diam.); phyllaries linear-subulate, ascending-spreading, tapering from base to spine-tip; ray flowers absent; disk corollas purplish or pinkish white, slender, 20–25 mm long; pappus of numerous barbellate bristles 7–9 mm long. Roadsides and disturbed areas; first seen in TX at the Fort Worth stockyards (Tarrant Co.) in 1938, also Erath, Johnson, and Parker cos.; otherwise known in TX only from 2 counties in the Edwards Plateau (Gillespie and Kerr), but given its local spread, this species is potentially a problematic weed for the state. May–Jul. Native of Eurasia. 🇪🇺

### PACKERA RAGWORT, GROUNDSEL, BUTTERWEED

Ours annual or perennial herbs, glabrous to woolly pubescent; leaves alternate, toothed to pinnately compound; inflorescences terminal, the heads cymosely arranged; principal phyllaries in a single series, linear, with hyaline margins, subtended by an outer series of short, bract-like phyllaries; ray flowers in ours ca. 8 or 13, pistillate, fertile, with yellow ligules; disk flowers perfect, fertile, the corollas yellow; pappus of numerous, white, capillary hairs; achenes cylindrical.

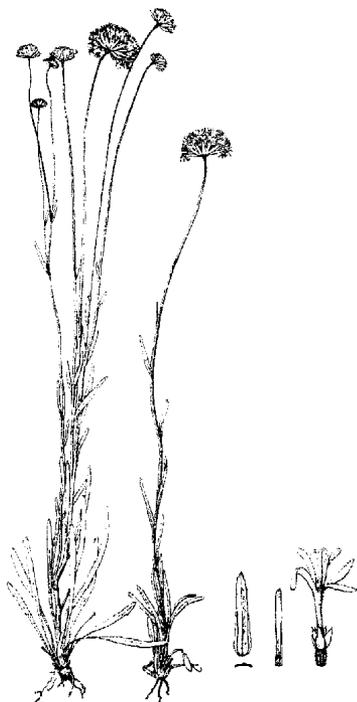
☛ A genus of ca. 60–65 species centered in temperate North America but with 16 species in



Machaeranthera pinnatifida [CUR]



Marshallia caespitosa var. caespitosa [BR3]



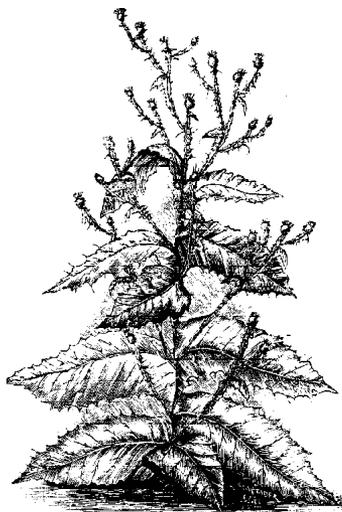
Marshallia caespitosa var. signata [BBS]



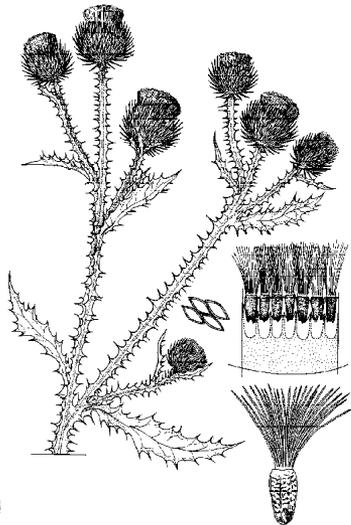
Melampodium leucanthum [BB2]



Mikania scandens [BR3]



Onopordum acanthium [GAR, M&F]



Mexico and some in Siberia; it is well known for imprecise and intergrading species (Barkley et al. 1996). While sometimes still treated in the genus *Senecio* in the broad sense (Kartesz 1994; Jones et al. 1997), we are following Freeman and Barkley (1995), Barkley et al. (1996), and T. Barkley (pers. comm.) in treating the aureoid group of Senecios as *Packera*. In addition to morphological differences, the genera differ in chromosome number; in *Packera*  $n = 23$  (more rarely 22) or a derivative, while in *Senecio*  $n = 20$  (more rarely 10) or a derivative. ☞ As with *Senecio*, some contain pyrrolizidine alkaloids (e.g., senecionine) which can cause severe liver damage and even death in livestock (Morton 1982); because similar effects are to be expected in people, the plants should not be used as herbal teas or ingested in other ways. (Named for John G. Packer, botanist and friend of Á. and D. Löve, who named the genus) (tribe Senecioneae)

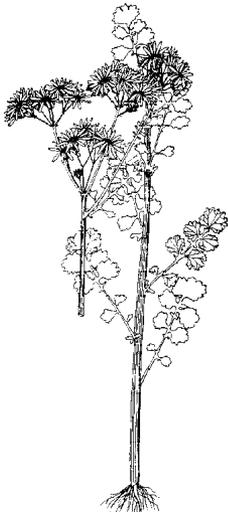
REFERENCES: Greenman 1915–1918; Barkley 1962, 1978, 1981, 1985a, 1985b, 1986, 1988; Vuilleumier 1969a; Löve & Löve 1975 [1976]; Freeman & Barkley 1995; Barkley et al. 1996.

1. Basal leaves pinnately compound or very deeply lobed; basal leaves and stem leaves usually similar; leaves ± well-distributed along the stem, only gradually reduced upwards; annuals with delicate taproot or fibrous roots, without rhizomes or stolons.
2. Plants usually with a delicate, distinct, main taproot; lateral lobes of lower and middle stem leaves often contracted to very narrow linear basal portions that attaches to the midrib (this character, while frequently used to separate these 2 species, does not appear to always be dependable in nc TX); widespread weed in open disturbed sites in nc TX \_\_\_\_\_ **P. tampicana**
2. Plants with a cluster of fibrous roots, a taproot lacking; lateral lobes of lower and middle stem leaves tapering to base, but usually with a broad attachment to the midrib; disturbed damp sites, often in partial shade; rare in nc TX, mainly se and e TX \_\_\_\_\_ **P. glabella**
1. Basal leaves shallowly toothed or deeply lobed; basal leaves and stem leaves quite different in appearance; largest leaves crowded near base of plant, progressively reduced up the stem; perennials from an abruptly foreshortened rhizome or an elongated rhizome, sometimes with stolons.
3. Plants glabrous except in leaf axils; inflorescences without woolly pubescence; blades of the basal leaves ovate to orbicular, < 1.5 times as long as wide; in wooded bottomlands \_\_\_\_\_ **P. obovata**
3. Plants unevenly woolly-pubescent when young, becoming partly glabrous but with at least some woolly pubescence at the nodes of the inflorescences; blades of the basal leaves oblong-elliptic or lanceolate, > 1.5 times as long as wide; in prairies and upland woods \_\_\_\_\_ **P. plattensis**

**Packera glabella** (Poir.) C. Jeffrey, (somewhat smooth, hairless), BUTTERWEED, YELLOWTOP. Annual 10–80(–100) cm tall with a tuft of fibrous roots and no persistent taproot; terminal leaf segments variously sub-orbicular to ovate or obovate, usually undulate; phyllaries ca. 5 mm long; ligules ca. 4.5 mm long; achenes with some fine hairs (rarely glabrous), ca. 1.7 mm long. Moist, disturbed, often sandy soils, usually with at least partial shade; se and e TX w to n Red River Co. just e of nc TX, also reported for Fort Hood (Bell or Coryell cos.—Sanchez 1997). This species is superficially similar to *P. tampicana*. Mar–May. [*Senecio glabellus* Poir.] Liver damage and death have been reported in livestock; symptoms may not appear for 1 or 2 months after grazing (Morton 1982). ☞

**Packera obovata** (Muhl. ex Willd.) W.A. Weber & Á. Löve, (obovate), GOLDEN GROUNDSEL, ROUND-LEAF GROUNDSEL, OVATE-LEAF RAGWORT. Perennial 20–50(–70) cm tall, fibrous-rooted and rhizomatous, usually stoloniferous; basal leaves often purplish beneath; phyllaries 3–7 mm long; ligules 5–10 mm long; achenes usually glabrous, ca. 2.3 mm long; pappus bristles to ca. 6 mm long. Stream bottom woods; e TX w to nc TX and Edwards Plateau; also Trans-Pecos. Feb–Apr. [*Senecio obovatus* Muhl. ex Willd.] This is one of the earliest flowering native wildflowers in nc TX.

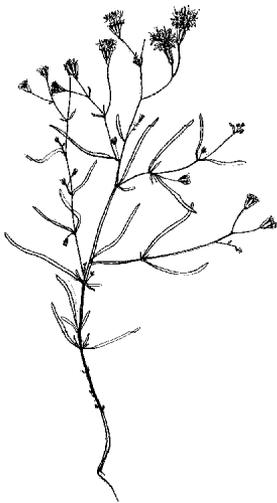
**Packera plattensis** (Nutt.) Á. Löve & D. Löve, (of the Platte River region), PRAIRIE GROUNDSEL,



*Packera glabella* [STF]



*Packera obovata* [BB2]



*Palafoxia callosa* [BT3]



*Packera plattensis* [BB2, BT3]



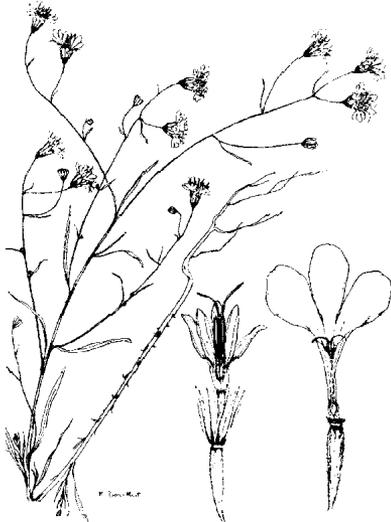
*Packera tampicana* [HEA]



*Palafoxia hookeriana* var. *hookeriana* [MC]



*Packera plattensis* [BB2, BT3]



*Palafoxia reverchonii* [RHO]

PRAIRIE RAGWORT. Biennial or perennial, fibrous-rooted, short rhizomatous, sometimes stoloniferous; stems 10–50(–70) cm tall; leaves sometimes purplish-tinged; phyllaries 5–6(–7) mm long; ligules 4–6 mm long; achenes with fine hairs, ca. 2.5 mm long. Prairies and open woods, calcareous soils; nc TX w to Rolling Plains and s to Edwards Plateau; rare in e TX. Mar–May. [*Senecio plattensis* Nutt.] Reported to be poisonous (Kingsbury 1964). ☠

**Packera tampicana** (DC.) C. Jeffrey, (of Tampico, Mexico), YELLOWTOP. Glabrous, low annual 10–40(–80) cm tall; similar to *P. glabella*; taprooted, but taproot sometimes poorly developed and masked by lateral roots; lower herbage often variously anthocyanic; terminal leaf segments often subreniform and dentate; phyllaries 3–7 mm long. Weedy in low prairies, disturbed areas, roadsides, typically in open places; populations in some areas (e.g., Hagerman N.W.R. in Grayson Co.) can number in the tens of thousands; widespread in TX, more abundant in e 1/2. Apr–May. [*Senecio imparipinnatus* Klatt., *S. greggii* Rydb., *S. tampicanus* DC.]

## PALAFOXIA

Ours annual herbs, often glandular; leaves alternate or first ones opposite; leaf blades linear to narrowly elliptical, lanceolate, or narrowly ovate; heads peduncled, irregularly corymbose; phyllaries in 2 series, narrowly obovate, scarious-margined or -tipped; receptacles naked; ray flowers absent or present, if present fertile, with pink to violet ligules; disk flowers radially symmetrical or irregularly lobed, perfect, fertile; corollas pink to purplish, the limb divided nearly to base, the lobes linear to narrowly oblong, the tube slender; achenes narrowly obconic, 4-angled, pubescent; pappus of 7–10 scales, minute to long acuminate.

☛ A genus of 12 species native to the s U.S. and Mexico; some are cultivated as ornamentals. (Named either for José de Palafox y Melzi, 1780–1847, a Spanish general, or for Juan de Palafox y Mendoza, 1600–1659, a prelate—Wagner et al. 1990) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCES: Ammerman (or as Baltzer) 1944; Cory 1946; Shinnors 1952; Turner & Morris 1976.

1. Heads with disk flowers only; all achenes with similar pappus.
  2. Phyllaries 0.6–1.2 mm wide, narrowly linear, usually 3–5 mm long; pappus scales 0.5–2 mm long; mainly on limestone derived soils; widespread in nc TX \_\_\_\_\_ **P. callosa**
  2. Phyllaries 1.2–2.5 mm wide, linear to obovate, 5–10 mm long; pappus scales 1–8 mm long; mainly on sandy soils; rare in nc TX \_\_\_\_\_ **P. rosea**
1. Heads with conspicuous ray flowers; ray and disk achenes with pappus greatly different in size.
  3. Leaf blades linear to linear-lanceolate, 2–4(–6) mm wide; stems (except for inflorescence) not glandular; phyllaries 6–8 mm long; achenes 5–6 mm long \_\_\_\_\_ **P. reverchonii**
  3. Leaf blades narrowly to broadly lanceolate, 3–25 mm wide; stems usually glandular for some distance below the inflorescence; phyllaries 7–20(–25) mm long; achenes 6–9 mm long.
    4. Phyllaries 2–2.5(–3) mm wide; ligules of ray flowers mostly 10 mm long or less; stems usually branched at or below middle; extreme n part of nc TX \_\_\_\_\_ **P. sphacelata**
    4. Phyllaries 2–5 mm wide; ligules of ray flowers mostly 10–12 mm long; stems usually branched at or above middle; extreme se part of nc TX \_\_\_\_\_ **P. hookeriana**

**Palafoxia callosa** (Nutt.) Torr. & A. Gray, (thick-skinned), SMALL PALAFOXIA. Plant scabrous, glandular; stems 20–60 cm tall; leaf blades linear, 1–4 mm wide, with glandular-based hairs; peduncles densely stipitate-glandular; anthers brownish to reddish purple; achenes 3–5 mm long. Calcareous soils, disturbed habitats; e TX w to Rolling Plains and Edwards Plateau. Aug–Nov.

**Palafoxia hookeriana** Torr. & A. Gray var. **hookeriana**, (for William Jackson Hooker, 1785–1865, director of Kew Gardens), SHOWY PALAFOXIA. Stems 25–180 cm tall, densely viscid-glandular throughout; leaf blades narrowly to broadly lanceolate, 5–10 cm long, 4–25 mm wide; phyllar-

ies (7-)10-15 mm long, with glandular and eglandular hairs; ray flowers with ligules pink, showy, 3-lobed; disk corollas deep pink, 10-12 mm long; achenes 6-9 mm long; pappus of ray flowers < 1 mm long; pappus of disk flowers 5-8 mm long;  $n = 12$ . Sandy soils, usually in forested areas; Milam Co. (Shinners 1952) on e margin of nc TX; mainly se to sc TX; endemic to TX. Sep-Oct. 📍

var. *minor* Shinners, (smaller), with the lower half of the stem without glandular hairs, is found just to the e of nc TX in e Milam and Freestone cos.; endemic to TX (Turner & Morris 1976). 📍

**Palafoxia reverchonii** (Bush) Cory, (for Julien Reverchon, 1837-1905, a French-American immigrant to Dallas and important botanical collector of early TX), REVERCHON'S PALAFOXIA. Stems 10-90 cm tall; ray flowers with ligules pale to dark violet, with 3 lobes, the lobes 4-5 mm long; disk corollas violet; pappus of ray flowers ca. 0.5 mm long; pappus of disk flowers 3-6 mm long. Sandy soils, wooded areas; Limestone Co. at extreme e margin of nc TX, also Henderson Co. (Turner & Morris 1976); mainly e TX; endemic to TX. Sep-Oct. Closely related to *P. hookeriana* (Turner & Morris 1976). 📍

**Palafoxia rosea** (Bush) Cory, (rose-colored), ROSE PALAFOXIA. Plants scabrous, glandular; stems 10-50 cm tall; leaf blades with glandular-based hairs; peduncles stipitate-glandular; inflorescences corymbose, with ca. 3-10 heads; heads with 10-30 flowers; corollas pale violet, 7-10 mm long; anthers brownish to reddish purple. Disturbed habitats. Jun-Nov.

1. Pappus scales 3-8 mm long, acute to long acuminate; phyllaries 7-10 mm long \_\_\_\_\_ var. **macrolepis**

1. Pappus scales 1-3 mm long, obtuse to acute; phyllaries 5-7 mm long \_\_\_\_\_ var. **rosea**

var. **macrolepis** (Rydb.) B.L. Turner & M.I. Morris, (large-scaled). Sandy soils, open areas; Eastland Co. (Turner & Morris 1976) on w edge of nc TX; sc TX nw to Panhandle.

var. **rosea**. ROSE PALAFOXIA. Forested areas; Dallas Co. (Buzzards Spring, *Reverchon*, 1902); mainly se and e TX, rarely further w; endemic to TX and OK (Turner & Morris 1976).

**Palafoxia sphacelata** (Nutt. ex Torr.) Cory, (dead, withered), RAYED PALAFOXIA. Similar to *P. hookeriana*; stems 10-90 cm tall, densely viscid-glandular; leaf blades narrowly to broadly lanceolate, 3-9 cm long, 3-20 mm wide; ray flowers with ligules pale to dark violet, with 3 narrow lobes, the lobes 4-8 mm long; disk corollas pale violet, 10-14 mm long; achenes 6-9 mm long; pappus of ray flowers < 1 mm long; pappus of disk flowers of ca. 8 scales 7-9 mm long;  $n = 12$ . Sandy soils, grasslands; disjunct e to Grayson Co. in Red River drainage (Turner & Morris 1976); mainly Trans-Pecos and Panhandle e to Rolling Plains. May-Nov.

## PARTHENIUM

☛ A genus of 16 species native to North America and the West Indies. The genus also contains the GUAYULE RUBBER PLANT (*P. argentatum* A. Gray), a source of natural rubber (Rollins 1950), native to w TX and Mexico; during World War II, because of rubber shortages, a program to grow the GUAYULE RUBBER PLANT was carried out by the U.S. Forest Service (McGinnies in Foster et al. 1983). (An ancient name of some plant from the Greek: *parthenos*, virgin; with only the pistillate ray flowers fertile, i.e., producing achenes) (tribe Heliantheae)

REFERENCES: Rollins 1950; Mears 1975.

**Parthenium hysterophorus** L., (old generic name), FALSE RAGWEED, RAGWEED PARTHENIUM, SANTA-MARIA, FEVERFEW, CICUTILLA. Pubescent, somewhat glandular annual, 0.3-1 m tall; leaf blades, except uppermost, deeply once or twice pinnatifid; heads small (3-4 mm across), numerous, in an open inflorescence; ray flowers pistillate, fertile, with ligules minute (< 1 mm long), white; disk flowers seemingly perfect but functionally staminate, not maturing achenes, the corollas white; achenes black, 2-2.5(-3.5) mm long; pappus of 2 petaloid scales. In and near

towns and farms, disturbed areas; Dallas, Grayson, and Tarrant cos.; widespread in TX. Summer–fall. Hairs and sessile capitate glands on the leaf surfaces contain sesquiterpene lactones (parthenin and ambrosin) which can cause serious dermatitis in some individuals; this New World native was introduced in India (first noted in 1956) presumably as a contaminant with cereal grains; there it has become a problematic alien invader, crowding out the native flora and causing dermatitis in agricultural workers (Lampe 1986; Mabberley 1987). ☘

## PECTIS

☞ A genus of ca. 100 species of tropical and warm areas of the New World and the Galápagos Islands. Like many members of the genus, *Pectis papposa* A. Gray, of the sw U.S. and Mexico, is strong-scented; it was used by Native Americans for flavoring foods and as a perfume (Bradley & Haagen-Smit 1949). (Greek: *pectis*, to comb, when the marginal leaf glands become broken, the leaf has a somewhat serrated effect marginally—Bradley & Haagen-Smit 1949) (tribe Heliantheae) REFERENCES: Fernald 1897; Bradley & Haagen-Smit 1949; Keil 1977.

***Pectis angustifolia*** Torr. var. ***fastigiata*** (A. Gray) D.J. Keil, (sp.: narrow-leaved; var.: having branches close together and erect). Strong-scented, fibrous-rooted, much-branched perennial or some individuals annual; stems 5–15 cm long, sometimes woody at base; leaves linear, 10–40 mm long, 1–2 mm wide, glabrous, ciliate basally with bristles 1–2 mm long, often revolute, marginally glandular-punctate; heads congested at ends of branches; peduncles 3–30 mm long; phyllaries in one row, subequal, 2.5–4.5 mm long, keeled, broadest near apex, with a conspicuous subterminal oil gland 0.5–1 mm long and 1 or 2 pairs of smaller submarginal glands; ray flowers 8, pistillate, fertile; ray corollas 4–6 mm long, yellow; disk flowers 8–21, perfect, fertile; disk corollas 2.7–4 mm long, yellow; achenes 2.5–3.5 mm long; pappus 0.5–1(–2) mm long, of 0–4 short scales forming a low crown. Usually on limestone, dry uplands; Bell and Bosque cos., also Coryell Co. (Fort Hoot—Sanchez 1997); also Travis Co. just s of nc TX; Lampasas Cut Plain and Edwards Plateau; endemic to TX. Sep–Nov. Two other varieties of this species occur in s and w TX and Mexico. [*P. fastigiata* A. Gray, *P. texana* Cory] ☞

## PERITYLE ROCK DAISY

☞ A genus of ca. 63 species native to sw North America with 1 in Chile and Peru. (Greek: *peri*, around, and *tyle*, knot, knob, or callus, from the thickened margin around the fruit) (tribe Helenieae)

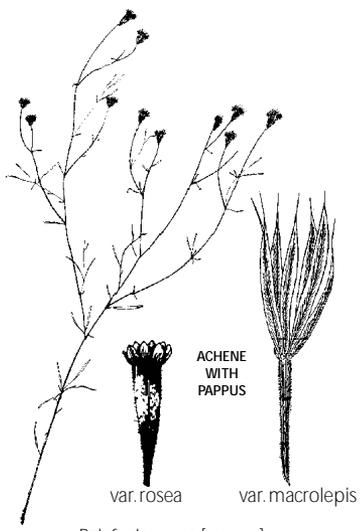
REFERENCE: Powell 1973.

***Perityle lindheimeri*** (A. Gray) Shinnery, (for Ferdinand Jacob Lindheimer, 1801–1879, German-born TX collector), LINDHEIMER'S ROCK DAISY. Perennial from a woody base; plants (10–)18–45(–60) cm tall; leaves opposite below, alternate above; leaf blades broadly ovate to ovate-lanceolate, 2–5 cm long, minutely punctate, essentially glabrous, with large serrations/small lobes; petioles 4–10 mm long; inflorescences cymose; involucre ca. 4–5 mm high; ray flowers 3–5, pistillate and fertile, the ligules 2.5–3 mm long, 1.5–2 mm wide, yellow; disk corollas 3–3.5 mm long, yellow; achenes 2–2.8 mm long, linear to narrowly obconical; pappus usually of a single bristle 0.5–1.8 mm long and vestigial squamellae. Crevices in limestone bluffs; Burnet Co. (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.); s margin of nc TX and Edwards Plateau; endemic to TX and NM. Spring–fall.

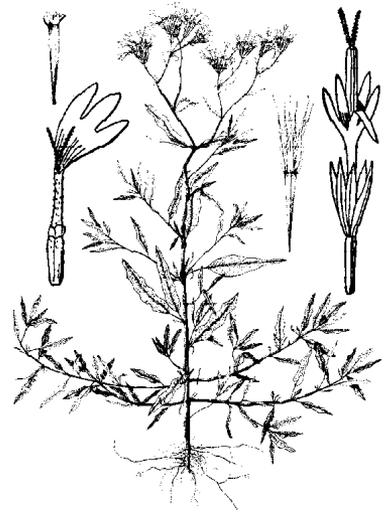
## PINAROPAPPUS PINK-DANDELION, ROCK-LETTUCE

☞ A genus of 6 species native to s North America. (Greek: *pinaw*, dirty, and *pappus*, down, fuzz, pappus) (tribe Lactuceae)

***Pinaropappus roseus*** (Less.) Less., (rose-colored), SMALL ROCK-LETTUCE. Glabrous, small (10–30



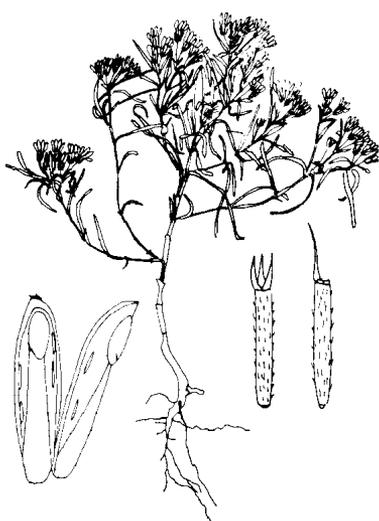
*Palafoxia rosea* [BT3, RHO]



*Palafoxia sphacelata* [BB2, RHO]



*Parthenium hysterophorus* [BB2]



*Pectis angustifolia* [RHO]



*Perityle lindheimeri* [GR2]



*Pinaropappus roseus* [BT3]

cm tall) perennial with slender to thick, woody, branching root; leaves mostly basal; leaf blades oblong-lanceolate to linear, entire or coarsely toothed or lobed; heads large (15–25 mm high including corollas), terminal, solitary; phyllaries semi-scarious, in several overlapping rows, usually with prominent dark tips; flowers all ligulate; corollas pink to deep rose-lavender beneath, paler to white above, the innermost ones yellowish; pappus of numerous hair-like bristles. Limestone outcrops; Bell, Brown, Burnet, Callahan, Coleman, Shackelford, and Throckmorton cos; w part of nc TX s and w to Trans-Pecos. Apr–May.

### PITYOPSIS GRASS-LEAF GOLDEN-ASTER

☛ A genus of 8 species of the e U.S. and Central America. Previously often included in *Chrysopsis* or *Heterotheca*. (Greek: *pitys*, pine, fir, and *opsis*, appearance or resembling; possibly for pine-like appearance resulting from the narrow leaves) (tribe Astereae)

REFERENCES: Shinners 1951b; Semple 1977; Semple et al. 1980; Semple & Bowers 1985.

**Pityopsis graminifolia** (Michx.) Nutt. var. **latifolia** (Fernald) J.C. Semple & F.D. Bowers, (sp: grass-leaved; var.: broad-leaved), SILK-GRASS. Rhizomatous perennial; stems erect, 20–80 cm tall, usually 1–5(–more) per plant, with long, appressed, silvery white, silky pubescence; leaves linear to narrowly lanceolate, ± grass-like in appearance, 8–25(–40) cm long, 2–20 mm wide, with pubescence like the stems; basal leaves usually much longer than stem leaves; upper leaves reduced; inflorescences cymose-paniculate, with several to many pedunculate heads; peduncles 1–10 cm long; involucre at anthesis 8–12 mm high; phyllaries imbricate in 4–6 series; ray flowers 9–13, with ligules 4–14 mm long, yellow; disk flowers 30–50, the corollas yellow; achenes fusiform, 2.5–4.5 mm long, ribbed, strigose; pappus double, the outer whorl of setiform squamellae 0.4–0.9 mm long, the inner whorl of capillary bristles 5–9 mm long. Wooded areas, roadsides, waste areas, often in sandy soils; Tarrant Co. (Semple & Bowers 1985 cited *Ruth s.n.* at TEX); mainly se and e TX. Aug–Nov. [*Chrysopsis graminifolia* var. *latifolia* Fernald] Jones et al. (1997) did not cite this variety for TX.

### PLUCHEA MARSH-FLEABANE, STINKWEED, FLEABANE

Annual or perennial aromatic herbs; stems erect, 0.5–2 m tall, glabrate below, pubescent above; leaves alternate; leaf blades simple, ovate to elliptic, glabrous to puberulent or tomentose, sometimes with resin-globules, usually serrate to serrate-dentate or crenate; heads numerous; phyllaries imbricated, sometimes pink or purplish; ray flowers absent; disk flowers of two types: a few central flowers perfect, infertile, the corollas 5-lobed; numerous outer flowers pistillate and fertile, the corollas 3-lobed; corollas rose, rose-purple, or creamy white or yellowish; achenes cylindrical, < 1 mm long; pappus of fine barbellate bristles in a single series.

☛ A genus of ca. 40 species of warm areas of the world. The key is adapted from Godfrey (1952). The foliage is very aromatic with a strong camphor-like smell. (Named for Noel Ant. Pluche, 1688–1761, French naturalist) (tribe Inuleae)

REFERENCES: Godfrey 1952; Robinson & Cuatrecasas 1973; Gillis 1977; Nesom 1989b; Keeley & Jansen 1991.

1. Middle and upper leaves sessile, not narrowed at base, usually ± auriculate-clasping; corollas cream-white or yellowish; near extreme e edge of nc TX \_\_\_\_\_ **P. foetida**
1. Middle and upper leaves sessile or petiolate, tapering to a narrow base, not auriculate-clasping; corollas rose to rose-purple; widespread in nc TX.
  2. Phyllaries granular from minute, sessile, golden resin-globules; only the outermost phyllaries sparsely puberulent and ciliate, the median and inner phyllaries ± glabrous except for resin-globules; inflorescence characteristically an elongate panicle, the branches numerous and



*Pityopsis graminifolia* var. *latifolia* [uwa]



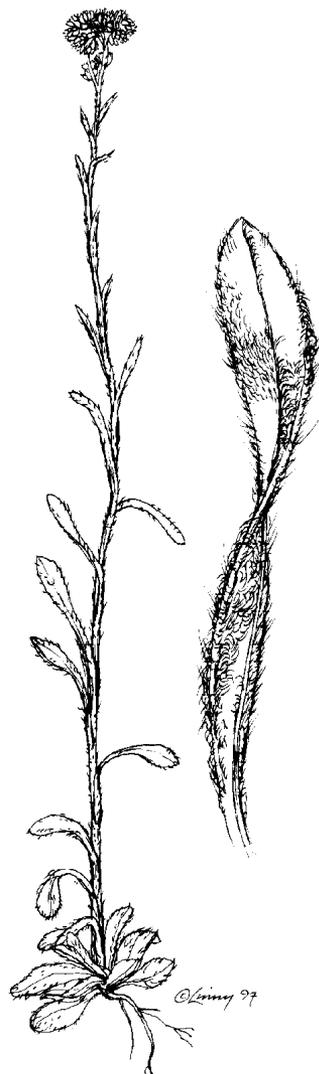
*Pluchea camphorata* [GLE]



*Pluchea foetida* [roe]



*Pseudognaphalium obtusifolium* [DAR]



*Pseudognaphalium stramineum* [HEA]



*Pluchea odorata* [COI]

terminating in convex, paniced cymes, the central uppermost axis maturing first, but the lateral ones never equaling or exceeding it; leaves petioled \_\_\_\_\_ **P. camphorata**

2. Phyllaries with resin globules or not; outermost and median phyllaries copiously puberulent and ciliate, the inner sparsely puberulent on their summits; inflorescence characteristically more truly cymose, the younger lateral branches elongating and exceeding the more central ones, thus producing a flat-topped or layered inflorescence; leaves sessile or petioled \_\_\_\_\_ **P. odorata**

**Pluchea camphorata** (L.) DC., (camphor), CAMPHORWEED, CAMPHOR PLUCHEA. Aromatic annual or perennial to 2 m tall; leaf blades elliptic to oblong-elliptic, entire to serrate, the lower surface puberulent, both surfaces sparsely dotted with resin-globules. Low drainage areas; Collin, Dallas, Grayson, and Lamar cos.; se and e TX w to n part of nc TX, also Edwards Plateau. Summer-fall.

**Pluchea foetida** (L.) DC., (fetid, bad-smelling), STINKING PLUCHEA, STINKING-FLEABANE. Aromatic perennial 0.4-1 m tall; leaves usually auriculate-clasping but sometimes with cuneate bases; inflorescences often flat-topped. Wet areas; Henderson Co. near extreme e margin of nc TX; mainly se and e TX. Summer-fall.

**Pluchea odorata** (L.) Cass., (fragrant), CANELA, PURPLE PLUCHEA. Aromatic annual to 1.5 m tall; leaf blades mostly ovate to lanceolate or elliptic, entire to serrate, essentially glabrous to tomentose, resin-globules often present. Low drainage areas; Brown, Comanche, Cooke, Coryell, Dallas, and Denton cos.; nearly throughout TX. Summer-fall. [*Conyza odorata* L., *P. purpurascens* (Sw.) DC.] Jones et al. (1997) used the name *P. purpurascens* for this taxon.

## PSEUDOGNAPHALIUM CUDWEED, EVERLASTING

Annual or biennial herbs, whitish to grayish with felty or woolly pubescence at least when young; stems erect or ascending; leaves alternate, sessile; inflorescences usually with numerous disciform heads densely clustered, somewhat flat-topped; involucre woolly near base; phyllaries scarious; receptacles naked; ray flowers absent; disk flowers all fertile; achenes glabrous; pappus of numerous bristles, these separating individually or in clusters, not deciduous as a ring.

☛ A genus of ca. 80 species in the New World, Africa, and Asia; often lumped into *Gnaphalium*. While often treated in *Gnaphalium* (e.g., Mahler 1988; Kartesz 1994), we are following Anderberg (1991), Jones et al. (1997), and J. Kartesz (pers. comm. 1997) in recognizing the following species in *Pseudognaphalium*. (Greek: *pseudo*, false, and the genus name *Gnaphalium*, from an ancient Greek name of some downy plant, derived from *gnaphalon*, lock of wool) (tribe Inuleae)

REFERENCES: Hillard & Burt 1981; Anderberg 1991.

1. Leaves at maturity usually bright green and somewhat glandular-pubescent on the upper surface, not decurrent; widespread in nc TX \_\_\_\_\_ **P. obtusifolium**

1. Leaves at maturity gray- or white-woolly on both surfaces, decurrent; rare in nc TX, known only from Brown Co. on extreme w margin of nc TX \_\_\_\_\_ **P. stramineum**

**Pseudognaphalium obtusifolium** (L.) Hilliard & Burt, (blunt-leaved), FRAGRANT CUDWEED, CAT'S-FOOT, FRAGRANT EVERLASTING. Aromatic annual; stems usually erect, 0.1-1 m tall, usually white-woolly to subglabrate; rosette leaves with blades oblanceolate to spatulate; stem leaves with blades linear to narrowly lanceolate or narrowly oblanceolate, 3-10 cm long, 2-10 mm wide, white woolly below, green, ± glabrous or sparsely woolly or glandular above; involucre 5-7 mm tall, whitish, developing a slight rusty tinge; achenes 0.8-1.2 mm long. Prairies, open woods, roadsides, often in sandy soils; se and e TX w to East Cross Timbers, also Edwards Plateau. (Jul-)Sep-Nov. [*Gnaphalium obtusifolium* L.]

**Pseudognaphalium stramineum** (Kunth) W.A. Weber, (straw-colored), COTTON-BATTING CUD-

WEED. Annual or biennial; stems and leaves gray- or white-woolly, not glandular; stems erect or ascending, 0.2–0.8 m tall; rosette leaves oblanceolate to spatulate; leaves mainly cauline, linear to narrowly lanceolate or narrowly oblanceolate, 2–6 cm long, 2–5 mm wide, adnate-auriculate; involucre 4–6 mm tall, shiny yellowish white; achenes 0.6–0.8 mm long. Rocky prairies and fields; Brown Co. (Stanford 1971) on extreme w margin of nc TX; Rolling Plains and Edwards Plateau w to Trans-Pecos. May–Oct. [*Gnaphalium chilense* Spreng.; *Gnaphalium stramineum* Kunth]

### PYRRHOPAPPUS FALSE DANDELION, NATIVE-DANDELION

Annuals or perennials; sap milky; leaves basal and alternate, reduced upwards; leaf blades oblanceolate or oblong- to elliptic-lanceolate, entire or usually toothed or lobed; heads solitary or few, large and showy; flowers all ligulate; corollas yellow, open during morning; achenes beaked; pappus of abundant hair-like bristles 7–12 mm long.

☛ A North American genus of 3 species; the roots of some were eaten by Native Americans. (Greek: *pyrrhos*, flame-colored or red, and *pappus*, down, fuzz, pappus) (tribe Lactuceae)

REFERENCES: Northington 1971, 1974; Vuilleumier 1973; Barber & Estes 1978; Petersen et al. 1990; Turner & Kim 1990.

1. Perennials with small tuberous thickening 5–20 mm thick located 2–15 cm below ground at end of roots; stems with 0–2 leaves or leafy bracts, usually pubescent or short-pilose; stems 10–30 (–40) cm tall \_\_\_\_\_ **P. grandiflorus**
1. Annuals with tapering taproot; stems with 1–9 leaves, pubescent or glabrous; stems 20–100 cm tall.
  2. Stems pubescent with curly hairs (rarely glabrous), mostly branched from the base; stem leaves 1–5, the uppermost with blades deeply several-lobed; outer phyllaries usually 1/3 as long as inner or less; plants (5–)20–50(–60) cm tall \_\_\_\_\_ **P. pauciflorus**
  2. Stems glabrous, mostly unbranched from the base; stem leaves 3–9, the uppermost with blades entire or merely toothed or with one pair of basal lobes; outer phyllaries mostly 1/3–2/3 as long as inner; plants (5–)30–100 cm tall \_\_\_\_\_ **P. carolinianus**

**Pyrrhopappus carolinianus** (Walter) DC., (of Carolina), CAROLINA FALSE DANDELION. Annual or biennial from a taproot; stems 30–100 cm tall; basal leaves in a rosette, often early deciduous; stem leaves reduced upwards; principal phyllaries 15–25 mm long; achenes 14–17 mm long (including beak). Sandy soils; woodlands and fields; in nc TX in East and West cross timbers, also along Red River; se and e TX w to West Cross Timbers. Apr–Jul, sporadically to Sep. [*P. carolinianus* var. *georgianus* (Shinners) Ahles, *P. georgianus* Shinners]

**Pyrrhopappus grandiflorus** (Nutt.) Nutt., (large-flowered), TUBER FALSE DANDELION. Perennial with a tuber giving rise to 1 or several, simple or branched, erect or suberect rhizomes, these developing near ground level; leaf rosettes and eventually flowering stems 10–30(–40) cm tall; stems usually rather densely; pubescent with curly hairs, rarely glabrous; principal phyllaries 15–20 mm long; achenes 10–13 mm long. Rocky, clayey, or sandy prairies; Grand Prairie s and w to w TX. Apr–May.

**Pyrrhopappus pauciflorus** (D. Don) DC., (few-flowered), MANY-STEM FALSE DANDELION, TEXAS DANDELION, PATA DE LEON. Annual 20–60 cm tall; basal leaves in a rosette; principal phyllaries 16–20 mm long; achenes 12–14 mm long. Clay soils, prairies, roadsides; Blackland Prairie and Grand Prairie; se and e TX w to nc TX and Edwards Plateau. Mar–Jun. Hybridizes with *P. carolinianus* along highways where sand and limestone gravel have been brought in for fill. Petersen et al. (1990) indicated that infraspecific taxa are not warranted. [*P. geiseri* Shinners, *P. multicaulis* DC., *P. multicaulis* var. *geiseri* (Shinners) North.]

**RATIBIDA MEXICAN-HAT**

☛ A North American genus of 7 species; some are cultivated as ornamentals. (According to Fernald (1950a), "... meaning, like most work of its author [Rafinesque], not clear") (tribe Heliantheae)

REFERENCES: Jackson 1963; Richards 1968; Cox & Urbatsch 1990; Urbatsch & Jansen 1995.

**Ratibida columnifera** (Nutt.) Wooton & Standl., (bearing columns), MEXICAN-HAT, THIMBLE-FLOWER, PRAIRIE CONEFLOWER, UPRIGHT PRAIRIE CONEFLOWER. Minutely scabrous-pubescent perennial, flowering the first year; stems 0.2–1.2 m tall; leaves alternate, compound or deeply lobed, the ultimate segments linear or lanceolate; heads long-peduncled; ray flowers 3–7, infertile, with ligules yellow or orange-yellow, usually but not always with dark reddish brown base, sometimes with only the tip yellow, 10–20(–35) mm long, spreading or often reflexed; disk flowers perfect, fertile, with corollas yellow-brown; receptacles columnar, conspicuously elongated, 1.5–4.5 cm long; scales gray-pubescent; pappus of a minute awn ca. 0.6 mm long and often also a second shorter awn. Sandy, silty, or rocky open ground; throughout most of TX. May–Oct. [*R. columnaris* (Sims) D. Don] ☒/104

**RAYJACKSONIA**

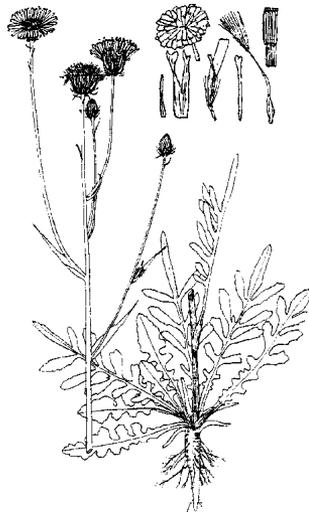
☛ A North American genus of 3 species only recently named (Lane & Hartman 1996); it was previously included in a broadly defined and polyphyletic *Haplopappus*; the taxa have been treated in a variety of genera including *Machaeranthera* (e.g., Kartesz 1994; Jones et al. 1997). We are following Lane and Hartman (1996) for nomenclature of the genus. Hartman (1990), referring to what is now *Rayjacksonia* as the "Phyllocephalus" group of *Haplopappus* indicated it is part of a  $x = 6$  chromosome line including such genera as *Grindelia* and *Xanthocephalum*. (Named for Dr. Raymond C. Jackson, student of *Haplopappus* sensu lato who first reported the correlation in the Astereae between a base chromosome number of  $x = 6$  and a particular disk floret corolla shape known as "goblet-shaped") (tribe Astereae)

REFERENCES: Hall 1928; Hartman 1990; Lane & Hartman 1996; Morgan 1997 [1998].

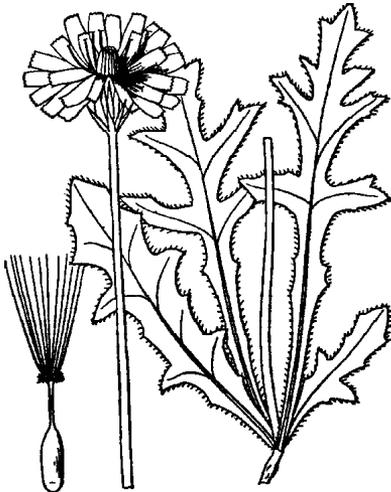
**Rayjacksonia annua** (Rydb.) R.L. Hartman & M.A. Lane, (annual). Annual or weakly biennial herb from a taproot, sparsely to densely glandular; stems erect, 0.3–0.7 m tall, branched above; leaves alternate, ± sessile, often much reduced upwards; leaf blades oblanceolate to narrowly obovate, 2–5+ cm long, 3–15 mm wide, with ca. 7–10 prominent marginal teeth on each side, these mucronate or with a short bristle; heads solitary at the ends of the branches or ± corymbosely arranged; involucre 6–8 mm high; phyllaries in several series, acute to acuminate or tapered to a minute bristle, densely glandular-pubescent (use lens), mostly straw-colored basally, with darker (usually green) tip; ray and disk flowers yellow; ray flowers pistillate, fertile; ligules 7–10 mm long; disk flowers perfect, fertile; pappus of ray and disk flowers similar, of hair-like bristles; achenes ca. 2 mm long, pubescent. Open areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); also s part of e TX, Plains Country, and Trans-Pecos. Aug–Oct. [*Haplopappus annuus* (Rydb.) Cory, *Haplopappus phyllocephalus* (DC.) Shinnery subsp. *annuus* (Rydb.) H.M. Hall, *Machaeranthera annua* (Rydb.) Shinnery, *Sideranthus annuus* Rydb.]

**RUDBECKIA CONEFLOWER, BROWN-EYED-SUSAN**

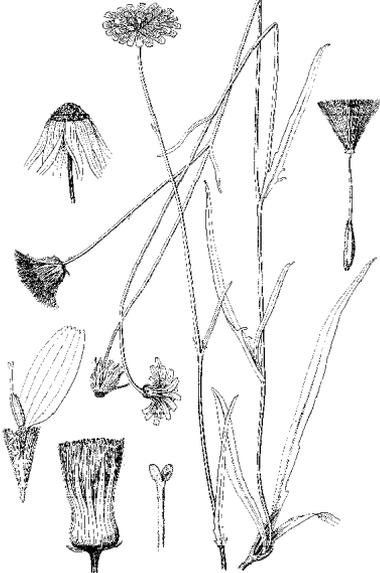
Annual or perennial herbs; leaves alternate, the blades usually unlobed or lobed to pinnatifid in 1 species; heads terminal, large, solitary or corymbose; phyllaries few, herbaceous, loose; ray flowers infertile, with ligules deep yellow or orangish, sometimes partly reddish brown; disk flowers conical or ovoid to subcylindrical, often elongating after flowering; disk flowers perfect, fertile, with corollas yellow-brown to blackish red-brown or dark purple.



*Pyrrhopappus carolinianus* [STE]



*Pyrrhopappus grandiflorus* [BB2]



*Pyrrhopappus pauciflorus* [USC]



*Ratibida columnifera* [BB2]



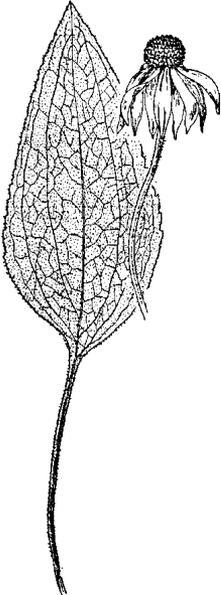
*Rayjacksonia annua* [BB2]



*Rudbeckia hirta* var. *pulcherrima* [BT3]



*Rudbeckia fulgida* var. *palustris* [STE]



*Rudbeckia grandiflora* var. *alismifolia* [GLE]

☛ A North American genus of 15 species; some are cultivated as ornamentals. (Named for Swedish professors Rudbeck: Olaf, 1630–1702, the father, and Olaf, 1660–1740, the son, predecessor of Linnaeus at Uppsala) (tribe Heliantheae)

REFERENCES: Perdue 1957; Cox & Urbatsch 1990, 1994; Urbatsch & Jansen 1995.

1. Some leaf blades usually tri-lobed or pinnatifid; pales (= bracts on receptacle) subtending disk flowers with glabrous, long smooth points; rare in nc TX \_\_\_\_\_ **R. triloba**
1. Leaf blades usually merely toothed or subentire; pales subtending disk flowers ciliate margined or pubescent- or bristle-tipped; includes species common in nc TX.
  2. Upper stem leaves auricled-clasping; leaf blades glabrous, glaucous; plants often very large, 1–3 m tall \_\_\_\_\_ **R. maxima**
  2. Upper stem leaves slightly or not clasping; leaf blades scabrous-pubescent or hispid-pilose; plants 0.3–1.3 m tall.
    3. Style branches of disk flowers short and blunt; pappus present (often minute); foliage pubescent but not coarsely hirsute; pales without a bristle at tip.
      4. Ligules 1–3 cm long; plants rhizomatous; pales glabrous except for ciliate margin; leaves without microscopic resin globules \_\_\_\_\_ **R. fulgida**
      4. Ligules 3–5(–7) cm long; plants with thick woody root or crown; pales canescent near tip with viscid hairs; leaves with microscopic resin globules (appear golden in light with lens) \_\_\_\_\_ **R. grandiflora**
    3. Style branches of disk flowers elongate, awl-like; pappus absent; foliage coarsely hirsute; pales with a bristle (or bristles) at tip \_\_\_\_\_ **R. hirta**

**Rudbeckia fulgida** Aiton var. **palustris** (Eggert ex C.L. Boynton & Beadle) Perdue, (sp.: fulgid, shining; var.: marsh-loving), MARSH CONEFLOWER. Nearly glabrous to strigose or hirsute perennial; basal leaf blades elliptic to orbicular; stem leaves gradually reduced upward, with blades ovate-lanceolate to lanceolate; ligules yellow to orangish. Disturbed areas; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); e and nc TX and Edwards Plateau. May–Jul. [*R. coryi* Shinnery]

**Rudbeckia grandiflora** (D. Don) J.F. Gmel. ex DC. var. **alismifolia** (Torr. & A. Gray) Cronquist, (sp.: large-flowered; var.: with leaves like *Alisma*—water-plantain), ROUGH CONEFLOWER. Perennial 0.5–1.0 m tall; stems glabrous to scabrous-pubescent below; basal leaves persistent, long-petioled, with broadly lanceolate or elliptic blades; ligules orange-yellow. Sandy open woods, chiefly low ground; Tarrant Co. (Mahler 1988); mainly se and e TX. Jun–Jul.

**Rudbeckia hirta** L. var. **pulcherrima** Farw., (sp.: hairy; var.: very handsome), BLACK-EYED-SUSAN. Coarsely pubescent annual or short-lived perennial; leaves narrowed basally, subpetiolate to sessile; heads peduncled; ligules yellow to orangish, sometimes reddish brown or purplish basally. Disturbed areas; se and e TX w to West Cross Timbers and Edwards Plateau. May–Jul, sporadically to Sep. *Rudbeckia hirta* is reported to cause poisoning in cattle, sheep, and hogs (Pammel 1911; Kingsbury 1964). ☛

**Rudbeckia maxima** Nutt., (largest), GIANT CONEFLOWER, GREAT CONEFLOWER, LARGEST BROWN-EYED-SUSAN. Glabrous, glaucous perennial, large and conspicuous; leaf blades ovate to oblong; upper leaves sessile, partly clasping; ligules 3–8 cm long, to 12 mm wide, yellow or orangish yellow; pales pubescent apically; disks conspicuously elongating in fruit, 4–8 cm long. Forming beds in low ground, sandy or silty soils; e TX w to East Cross Timbers, also Tarrant Co. (Fort Worth Nature Center). May–Jun.

**Rudbeckia triloba** L., (three-lobed), YELLOW DAISY, BROWN-EYED-SUSAN. Short-lived perennial, hispid to glabrous; leaves simple and cordate when young, often becoming 3-lobed to pinnately 5–7-parted; upper leaves ovate to narrowly ovate; ligules yellow or orange toward base. Creek

bottoms, roadsides; Lamar Co. in Red River drainage; otherwise apparently only known in TX from Nacogdoches Co. in e TX; first reported for TX by Taylor and Taylor (1981). May–Oct.

**SENECIO RAGWORT, SQUAW-WEED, GROUNDSEL**

Ours annual herbs, glabrate to usually pubescent; leaves alternate, the blades toothed to pinnately lobed; inflorescences terminal, the heads cymosely arranged; principal phyllaries in a single series, linear, with hyaline margins, subtended by an outer series of short, bract-like phyllaries; ray flowers usually pistillate, fertile, with yellow ligules, or ray flowers absent; disk flowers perfect, fertile, the corollas yellow; achenes cylindrical; pappus of numerous, capillary, white hairs.

☛ When broadly considered, *Senecio* is a huge, cosmopolitan genus of ca. 1,250–3,000 species depending on circumscription. Species vary in growth form from trees to shrubs, vines, herbs, or desert succulents, and include the GIANT GROUNDSELS on the mountains of e Africa. According to Barkley et al. (1996), new information and new concepts of taxa indicate that the genus should be divided into various segregates. We are following Freeman and Barkley 1995, Barkley et al. 1996, and T. Barkley (pers. comm.) in treating the aureoid group of *Senecios* as *Packera*. Even when this and numerous other segregates are removed, *Senecio* is still one of the largest genera of seed plants. ☛ A number are toxic and can be problematic if eaten by livestock, especially horses; acute illness and death can result from hepatotoxic pyrrolizidine alkaloids which cause liver damage. Milk from grazing animals and honey from *Senecio* nectar reportedly contain the alkaloids (Lewis & Elvin-Lewis 1977; Fuller & McClintock 1986; Blackwell 1990). Human deaths have been reported from ingestion of *Senecio* herbal teas as the result of liver damage—there is no known cure (Lampe & McCann 1985; Tveten & Tveten 1993). Some *Senecio* species were in the past used in poultices for wounds and abscesses; the common name GROUNDSEL apparently is derived through a series of changes from the Anglo-Saxon: *grundeswelge* pus-absorber (Tveten & Tveten 1993). (Latin name of a plant, from *senex*, an old man, alluding to the hoariness of many species, or to the white hairs of the pappus) (tribe Senecioneae).

REFERENCES: Greenman 1915–1918; Vuilleumier 1969a; Barkley 1978, 1985a, 1985b, 1986; Barkley et al. 1996.

- 1. Ray flowers yellow, prominent; main phyllaries and short, bract-like outer phyllaries below main phyllaries green-tipped; leaves shallowly toothed to subentire; native species \_\_\_\_\_ **S. ampullaceus**
- 1. Ray flowers usually absent, but if present the ligules greatly reduced and inconspicuous; main phyllaries and short, bract-like outer phyllaries prominently black-tipped; leaves usually shallowly pinnately lobed; introduced weedy species \_\_\_\_\_ **S. vulgaris**

**Senecio ampullaceus** Hook., (flask-shaped), TEXAS GROUNDSEL. Loosely woolly-pubescent to nearly glabrate annual 30–80 cm tall; lowermost leaves narrowed to a subpetiolar base, auriculate-clasping at very base; middle and upper leaves often truncate-clasping; involucre 7–11 mm high. Sandy open woods, fields, roadsides; Burnet, Callahan, Comanche, Dallas, and Denton cos.; se and e TX w to West Cross Timbers and Edwards Plateau; endemic to TX. Mar–May. ☛

**Senecio vulgaris** L., (common), COMMON GROUNDSEL. Annual 10–30(–60) cm tall, woolly-pubescent to glabrate; lower leaves petiolate; middle and upper leaves sessile, auriculate, ± clasping, undulate to pinnately lobed, 2–10 cm long, 0.5–2(–4.5) cm wide; involucre 6–10 mm high; achenes with fine hairs, 2.2–2.5 mm long; pappus 5–6 mm long. Disturbed areas; Dallas, Eastland, Grayson (first noted Mar 1998), and Tarrant (first noted Mar 1998) cos., also Brown Co. (first noted 1987; HPC); also Wichita Co. in Rolling Plains and Harris Co. in se TX; also Dimmit Co. (Cory 1948a); apparently first collected in TX in Dimmit Co. in 1944 (Cory 1947, 1948a). Mar–May. Native of

Europe. This species is among a number of Senecios that contain toxic pyrrolizidine alkaloids; animal deaths have been reported; the toxins are not lost upon drying and are still present in hay (Burlage 1968; Lampe & McCann 1985; Fuller & McClintock 1986). ☞ ☞

### SILPHIUM ROSINWEED

Herbaceous, coarse, sunflower-like perennials with woody crown or taproot; stems erect; leaves alternate to opposite, simple, the blades toothed or deeply lobed, entire, stiff, leathery, often conspicuously scabrous; heads large and showy, terminal, solitary, corymbose, or spicate-racemose; ray flowers pistillate, fertile, with ligules yellow or in one species white, producing mature achenes that are flattened, thin-edged, and winged; disk flat or nearly so; disk flowers functionally staminate, not maturing achenes; pappus absent or of 2 awns.

☞ An e North American genus of 23 species. The common name refers to the sticky secretions on the stems and leaves of some species (Ajilvsgi 1984). Species of this genus are often confused with those of *Helianthus*; however, in *Helianthus* the disk flowers produce mature achenes (ray flowers do not), while in *Silphium* the ray flowers produce mature achenes (disk flowers do not). (Greek: *silphion*, the ancient name of some resinous plant, transferred by Linnaeus to this genus) (tribe Heliantheae)

REFERENCES: Perry 1937; Settle & Fisher 1970.

1. Leaves deeply pinnatifid.

2. Ray flowers with ligules white, ca. 25 mm long; stems 1 m or less tall; achenes puberulent, with wings prolonged beyond the apex of the body of the achenes forming a V-shaped notch ca. 3–5 mm deep \_\_\_\_\_

**S. albiflorum**

2. Ray flowers with ligules yellow, 25–40 mm long; stems 1–3 m tall; achenes essentially glabrous, with wings prolonged beyond the body of the achenes forming a notch ca. 1–3 mm deep \_\_\_\_\_

**S. laciniatum**

1. Leaves entire to toothed.

3. Leaves alternate or opposite above, with some subtending heads (leaves only very gradually reduced up the stem so that well-developed leaves are usually very near the heads); peduncles usually short \_\_\_\_\_

**S. radula**

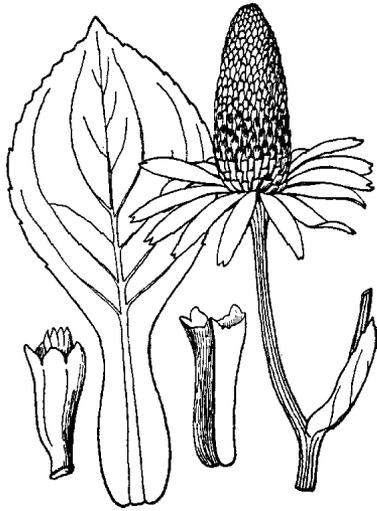
3. Leaves alternate above, reduced, not subtending heads (no well-developed leaf close to a head); peduncles typically long and ± naked \_\_\_\_\_

**S. gracile**

**Silphium albiflorum** A. Gray, (white-flowered), WHITE ROSINWEED, WHITE COMPASSPLANT. Stems (0.2–)0.4–1 m tall; leaves alternate, rigid, very scabrous, vertically oriented, ca. as broad as long; heads in a raceme-like arrangement; ray flowers with ligules white. Calcareous soils, open areas and prairies; Blackland Prairie and Grand Prairie; nc TX s to Edwards Plateau and w to Rolling Plains; endemic to TX. May–Jul. ☞ ☞/105

**Silphium gracile** A. Gray, (graceful), SIMPSON ROSINWEED, SLENDER ROSINWEED. Plant subscapose; stems (0.2–)0.3–0.6 m tall; leaves opposite below, alternate above and reduced in size and number; heads usually solitary on the peduncles; ray flowers with ligules yellow. Calcareous or sandy soils; Bell, Hunt, and Milam cos.; se and e TX w to e part of nc TX. Jun–Jul. [*S. reverchonii* Bush, *Silphium simpsonii* Greene var. *wrightii* L.M. Perry] The common name refers to the sticky resinous material secreted along the stems and leaves; it was used medicinally by Native Americans and also as a chewing gum (Ajilvsgi 1984).

**Silphium laciniatum** L., (lacinate, torn), COMPASSPLANT. Stems 1–3 m tall; leaves alternate, rigid, vertically oriented, usually longer than wide; heads in a raceme-like arrangement; ray flowers with ligules yellow. Calcareous or sandy soils, prairies; Cooke, Dallas, Denton, Grayson, Kaufman, Tarrant, and Wise cos.; also se and e TX. Jun–Aug. The common name refers to the vertical, supposedly north-south orientation of the leaves. ☞/105



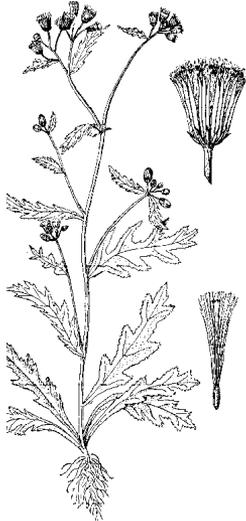
Rudbeckia maxima [BB2]



Rudbeckia triloba [BB2]



Senecio ampullaceus [cur]



Senecio vulgaris [CLE]



Silphium albiflorum [cur]



Silphium gracile [HEA]

**Silphium radula** Nutt., (rough), ROUGH-STEM ROSINWEED. Stems 0.3–1.2+ m tall; leaves alternate to opposite below and above (varying in same population); median and upper leaves sessile and entire or slightly toothed; heads solitary or a few in a corymbose arrangement; ray flowers with ligules yellow. Calcareous or sandy soils; se and e TX w to West Cross Timbers and e Edwards Plateau. Jun–Jul. [*Silphium asperrimum* Hook.] According to Correll and Johnston (1970), *S. radula* apparently intergrades with *S. gracile* (as *S. simpsonii* var. *wrightii*). *Silphium radula* seems very similar to *S. integrifolium* Michx., which occurs to the n and in TX only in the extreme e part of the state (vegetational area 1) (Settle & Fisher 1970; Hatch et al. 1990). According to Cronquist (1980), *S. radula* has longer, coarser stem pubescence with many or all of the hairs ca. 1 mm or more long and leaves often alternate. *Silphium integrifolium*, on the other hand, has most stem hairs ca. 0.5 mm or less long, varying to largely or wholly glabrous and leaves mostly opposite. Our plants seem to have mostly shorter hairs with individuals varying from having alternate to opposite leaves. While we are following Hatch et al. (1990) in treating the nc TX plants as *S. radula*, more work needs to be done to determine the actual patterns of variation of these very similar entities. ☒/105

### SILYBUM MILK-THISTLE

☛ A genus of 2 species native to the Mediterranean region. (Greek: *silybon*, name for similar thistle-like plants) (tribe Cardueae)

**Silybum marianum** (L.) Gaertn., (with white-mottled leaves, the spots were supposed to have resulted from drops of Mary's milk falling on the leaves), BLESSED MILK-THISTLE, OUR-LADY'S-THISTLE, HOLY-THISTLE. Coarse annual or biennial (rarely perennial?) 0.6–1.8+ m tall; stems loosely woolly-pubescent, becoming glabrous; leaves alternate, mottled green and white, the lower pinnately lobed, the middle and upper toothed; stem leaves auricled-clasping, all prickly or spiny-margined, not decurrent; heads large (2.5–6 cm in diam.), solitary, terminal; phyllaries to 5 cm long, with spinescent margins, constricted below middle, with broad bases and green, sub-leafy apical portions tapering to a spiny tip to 8 mm long; ray flowers absent; disk corollas rosy purple; pappus of numerous white, non-plumose bristles 15–20 mm long, deciduous as a ring. Pastures and roadsides; Dallas, Johnson, and Navarro cos., also Hamilton Co. (HPC); also Edwards Plateau; first collected in TX in Sutton Co. on the Edwards Plateau in 1938 (supposedly introduced through a shipment of hay from California) and in nc TX in Navarro Co. in 1949 (Cory 1940, 1950). May–Jun. Native of Mediterranean region. The fruit is used medicinally and considered since the time of Dioscorides to protect the liver; it contains flavonoids effective as an antidote for mushroom (*Amanita*) poisoning—the mode of action is to displace the toxin from cell membrane receptors (Mabberley 1987); its clinical use in Europe is widespread (Leung & Foster 1996). ☛☒

### SIMSIA

☛ A New World genus of 18 species extending from the sw U.S. to Argentina with 1 taxon endemic to Jamaica (Spooner 1987; Schilling & Spooner 1988). (Named for John Sims, 1749–1831, of Dorking, editor of *Curtis's Botanical Magazine*) (tribe Heliantheae)

REFERENCES: Spooner 1987; Schilling & Spooner 1988.

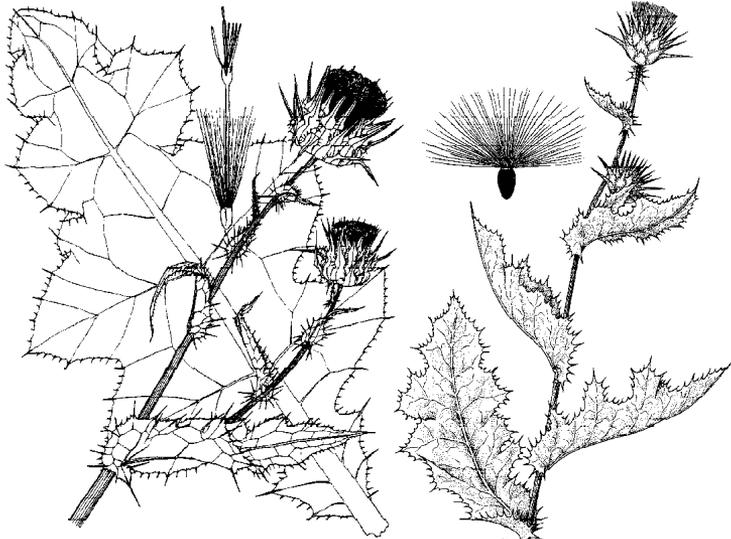
**Simsia calva** (Engelm. & A. Gray) A. Gray, (naked), AWNLESS BUSH-SUNFLOWER. Perennial, herbaceous from woody base, coarsely pubescent; roots fusiform or woody; herbage dark green; leaves opposite, petioled, the petioles sometimes auricled; leaf blades deltoid, often lobed, serrate; stipules toothed or serrate, often united; heads solitary at the end of long peduncles; phyllaries in several series; ray flowers 15–30, pistillate, infertile, the ligules yellow or orange-yellow, sometimes spotted or striped beneath with purple or red; pappus absent; disk flowers perfect, fertile; corollas yellow or orange-yellow, sometimes with purplish lines, gibbous basally; achenes flat-



*Silphium laciniatum* [GLE, STE]



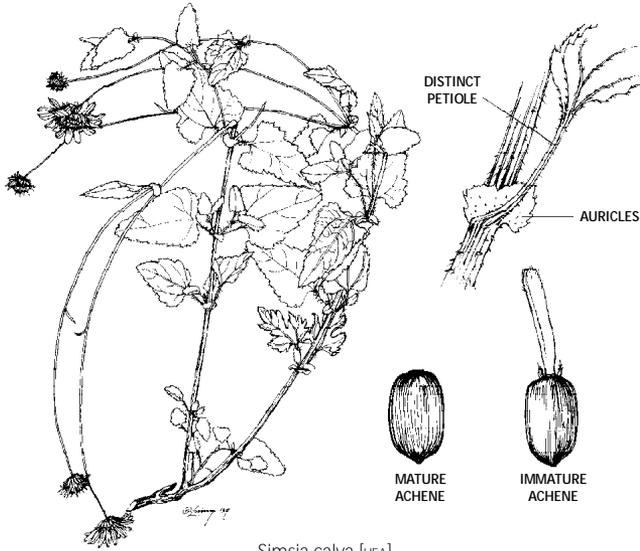
*Silphium radula* [STE]



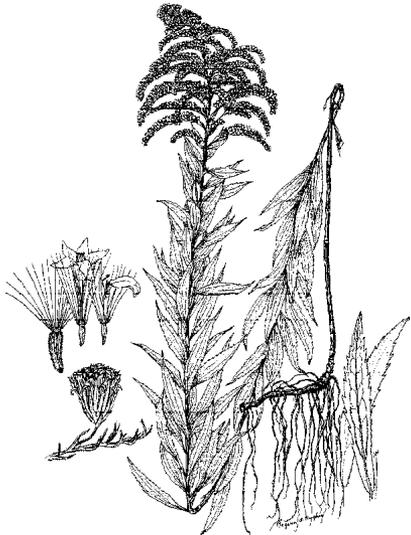
*Silybum marianum* [M&F, PNW]



*Smallanthus uvedalia* [GLE]



*Simsia calva* [HEA]



*Solidago canadensis* var. *scabra* [REE]

tened, emarginate, appearing winged; pappus of 2 short awns, usually absent on mature achenes. Calcareous soils; Coryell, Hamilton, Mills, and Shackelford cos., also Brown and Comanche cos. (Mahler 1988); w and sw parts of nc TX through Edwards Plateau to Trans-Pecos, also se and s TX. May–Nov.

### SMALLANTHUS LEAFCUP

☛ A genus of ca. 19 species of tropical and warm areas of the Americas; previously recognized in the genus *Polymnia*. (Named for John Kunkel Small, 1869–1938, American botanist and author of numerous works including *Manual of the Southeastern Flora*) (tribe Heliantheae)

REFERENCES: Wells 1965; Robinson 1978; Turner 1988b.

**Smallanthus uvedalia** (L.) Mack. ex Small, (derivation unknown, not indicated by Linnaeus), BEAR'S-FOOT, HAIRY LEAFCUP. Herbaceous perennial 1–3 m tall; stems erect, purple-spotted; leaves at least lower, opposite, often huge, to ca. 70 cm long and 40 cm wide, ovate to deltoid, palmately 3- to 5-lobed and veined, sessile or with broad conspicuous wings to base of petiole; heads clustered in loose leafy cymes; phyllaries 4–6, 10–20 mm long, to ca. 10–12 mm wide, ovate or ovate lanceolate; ray flowers 7–13, pistillate, fertile, the ligules yellow, 10–20(–30) mm long; disk flowers numerous, infertile, staminate, yellow; achenes ca. 6 mm long and 4 mm wide; pappus absent. Wooded bottomlands; Bell, Dallas, Fannin, Grayson (Hagerman N.W.R.), and Tarrant cos.; mainly se and e TX, w to nc TX and e edge of Edwards Plateau. Jul–Sep. [*Polymnia uvedalia* (L.) L., *Polymnia uvedalia* (L.) L. var. *densipilis* S.F. Blake]

### SOLIDAGO GOLDENROD

Herbaceous perennials; leaves alternate, sessile or short-petioled; inflorescence terminal, branched, of numerous, relatively small, often secund heads; phyllaries imbricated, in several series, inconspicuously green-tipped; ray flowers pistillate, fertile, few, usually 14(–20) or less, the ligules linear, yellow in ours; disc flowers perfect, fertile, the corollas cylindrical to funnel-form, yellow in ours; achenes cylindrical, ribbed; pappus of numerous, white, hair-like bristles.

☛ A mainly North American genus of ca. 80 species with a few taxa in South America, Macaronesia, and Eurasia. Because of marked phenotypic plasticity, polyploidy, and hybridization, *Solidago* is a taxonomically difficult genus. Complete specimens including mature inflorescences and lower leaves are often needed for definitive identification. Despite their bad reputation, GOLDENRODS are insect-pollinated and thus do not produce significant windblown pollen which could cause hay fever; most fall allergies are probably due to wind-pollinated species of *Ambrosia* (RAGWEED) that flower at the same time as GOLDENRODS. The related genus *Euthamia*, sometimes included in *Solidago*, is here treated separately. The key to *Solidago* species is adapted from Taylor and Taylor (1984). Nesom (1993) split the genus *Oligoneuron* from *Solidago*; it is a segregate of 6 species including 2 in nc TX, *S. nitida* and *S. rigida*. Until consensus is reached, we are following Taylor and Taylor (1984) and Semple (1992) in treating it traditionally and keeping all species in *Solidago*; appropriate synonymy is given below; nomenclature in general follows Taylor and Taylor (1984). (Latin, *solida*, to make whole or strengthen, alluding to medicinal properties) (tribe Astereae)

REFERENCES: Kapoor & Beaudry 1966; Croat 1972; Anderson & Creech 1975; Taylor & Taylor 1983, 1984; Heard & Semple 1988; Gandhi & Thomas 1989; Nesom 1990d, 1991c, 1993; Semple 1992.

1. Inflorescence flat-topped or nearly so (= corymbose) (segregate genus *Oligoneuron*).
2. Leaf blades usually densely pubescent, ovate, ca. 2–3.5 times as long as wide; ray flowers 7–14 per head; usually flowering Sep–Oct(–Nov) \_\_\_\_\_ **S. rigida**
2. Leaf blades glabrous, linear to narrowly lanceolate, ca. 5–10 times as long as wide; ray flowers 1–4 per head; usually flowering Jun–Sep \_\_\_\_\_ **S. nitida**

1. Inflorescence elongate, not flat-topped, either racemose, paniculate, cylindric, or pyramid-shaped and broadest near base or midsection (*Solidago* in a narrower sense).
3. Inflorescence racemose or very narrowly paniculate, less than 4 cm wide,  $\pm$  cylindric in shape.
  4. Primary stems glabrous; leaf blades either usually glabrous OR scabrous on upper surface; basal leaves elliptic to ovate or ovate; upper stem leaves small, appressed; atypical forms (these species usually have broadly paniculate inflorescences).
    5. Stems subcylindrical; leaf blades with upper surface usually glabrous \_\_\_\_\_ **S. ludoviciana**
    5. Stems, at least towards the base, bluntly 4-angled; leaf blades with upper surface strongly scabrous \_\_\_\_\_ **S. patula**
  4. Primary stems pubescent (pubescence often short); leaf blades usually pubescent on upper surface; basal leaves absent at flowering time; upper stem leaves spreading to widely spreading \_\_\_\_\_ **S. petiolaris**
3. Inflorescence paniculate, broadest at or near base, wider than 4 cm, not cylindric in shape.
  6. Primary stems essentially glabrous, rarely with sparse hairs; leaves glabrous.
    7. Inflorescence essentially glabrous.
      8. Leaf blades ovate, toothed along most of margin; in wooded habitats \_\_\_\_\_ **S. ulmifolia**
      8. Leaf blades oblanceolate, toothed only towards tip; in grasslands \_\_\_\_\_ **S. missouriensis**
    7. Inflorescence pubescent, usually densely so.
      9. Inflorescence usually narrowly paniculate, with ends of branches erect; heads not secund \_\_\_\_\_ **S. speciosa**
      9. Inflorescence broadly paniculate, triangular in outline, with ends of branches recurved; heads secund.
        10. Basal leaves absent; lower stem leaves absent at flowering time; stem leaves uniform in size.
          11. Leaf blades lanceolate, usually with 3 veins (central and 2 somewhat weaker laterals) more prominent than the others \_\_\_\_\_ **S. gigantea**
          11. Leaf blades ovate, usually with only 1 prominent vein (central) \_\_\_\_\_ **S. ulmifolia**
        10. Basal leaves present; lower stem leaves 10–30 cm long; leaves reduced upwards.
          12. Stems subcylindrical; leaf blades with upper surface usually glabrous \_\_\_\_\_ **S. ludoviciana**
          12. Stems, at least towards the base, bluntly 4-angled; leaf blades with upper surface strongly scabrous \_\_\_\_\_ **S. patula**
  6. Primary stems pubescent (pubescence often short but dense—use lens); leaves usually pubescent.
    13. Leaf blades linear, minutely gland-dotted (view with back lighting); on extreme margin of nc TX \_\_\_\_\_ **S. odora**
    13. Leaf blades lanceolate, ovate, or elliptic, not gland-dotted; widespread in nc TX.
      14. Inflorescence branches erect, not recurved apically; heads not secund or only slightly so; panicle narrow \_\_\_\_\_ **S. speciosa**
      14. Inflorescence branches recurved; heads secund (= on 1 side of branches); panicle triangular in outline.
        15. Leaf blades serrate.
          16. Leaf blades ovate (rarely lanceolate), the venation often prominently reticulate beneath, with 1 main vein (central), the smaller laterals all  $\pm$  equally prominent, with long hairs on the veins (hairs much longer than vein width) \_\_\_\_\_ **S. rugosa**
          16. Leaf blades lanceolate, the venation inconspicuously reticulate beneath, with 3 main veins (central and 2 laterals) more prominent than the others, with short hairs on the veins (ca. as long as vein width or slightly longer) \_\_\_\_\_ **S. canadensis**
  15. Leaf blades essentially entire except for apical teeth on larger leaves of some taxa.

17. Leaf blades usually more than 5 times as long as wide, lanceolate or linear to spatulate.
18. Leaf blades 1-nerved, spatulate, reduced up the stem; inflorescences mostly longer than broad \_\_\_\_\_ **S. nemoralis**
18. Leaf blades 3-nerved, lanceolate, ± uniform up the stem; inflorescences pyramidal, often nearly as broad as long \_\_\_\_\_ **S. canadensis**
17. Leaf blades 2–4 times as long as wide, lanceolate or broadly oblanceolate to elliptic or ovate \_\_\_\_\_ **S. radula**

**Solidago canadensis** L., (of Canada), COMMON GOLDENROD, CANADA GOLDENROD. Plant to 1.5(–2) m tall; stems pubescent; leaves chiefly cauline; leaf blades 3-nerved, lanceolate, pubescent on both surfaces; inflorescence triangular in outline; heads secund; involucre 2–5 mm high; achenes short-hairy. (Jun–)Aug–Nov. According to Taylor and Taylor (1984), the differences between the 2 varieties are not clear and many intermediates occur.

1. Plants usually < 0.7 m tall; leaf blades < 7 cm long, ± thick, gray-green, with pubescence nearly the same on both sides; prairies and floodplains \_\_\_\_\_ var. **gilvocanescens**
1. Plants usually > 0.8 m tall; leaf blades usually > 7 cm long, ± thin, green, with pubescence on upper surface shorter and less dense than below; open areas in woods \_\_\_\_\_ var. **scabra**

var. **gilvocanescens** Rydb., (yellowish gray). E TX w to West Cross Timbers and Edwards Plateau. [*S. gilvocanescens*(Rydb.) Smyth] This is the common variety on the prairies of nc TX.

var. **scabra** Torr. & A. Gray, (rough). Hopkins, Kaufman, Lamar, and Montague cos., also Dallas Co. (Taylor & Taylor 1984); se and e TX w to nc TX. [*S. altissima* L., *S. altissima* var. *pluricephala* M.C. Johnst.]

**Solidago gigantea** Aiton, (gigantic), GIANT GOLDENROD, LATE GOLDENROD. Plant large, to 1.5 m or more tall; stems glabrous, usually red; leaf blades lanceolate, toothed along most of the edge, glabrous; inflorescence broadly paniculate, triangular in outline; heads secund; involucre ca. 2.5–4 mm high; achenes short-hairy. Low wet areas, roadsides, margins of ponds and streams, generally mesic areas; widespread in TX. Mid-summer–late fall. [*S. gigantea* var. *serotina* (Kuntze) Cronquist]

**Solidago ludoviciana** (A. Gray) Small, (of Louisiana), WILLOW GOLDENROD. Leaves basal and cauline; basal leaves with blades elliptic to ovate, abruptly contracted into petioles; mid-stem leaves with blades narrowly elliptic to ovate, 10–35 mm wide, serrulate, glabrous or with sparse pubescence, short petiolate to sessile; inflorescences usually broadly paniculate; heads often secund; involucre ca. 4.5 mm high; achenes short-hairy. Disturbed areas, usually sandy soils; Taylor and Taylor (1984) lumped this species with *S. patula* var. *strictula* (as *S. salicina*) and mapped a number of nc TX counties (Dallas, Henderson, Hopkins, Johnson, and Navarro); they indicated that most TX plants are glabrous (and thus *S. ludoviciana*); Hatch et al. (1990) also cited vegetational area 4 (Fig. 2); se and e TX w to nc TX. Late summer–fall. [*S. boothii* Hook. var. *ludoviciana* A. Gray]

**Solidago missouriensis** Nutt. var. **fasciculata** Holz., (sp. of Missouri; var.: fascicled, clustered), MISSOURI BASIN GOLDENROD. Plant 0.4–0.9 + m tall; stems glabrous; leaves frequently fastigiate; leaf blades oblanceolate, toothed in upper half; inflorescence essentially glabrous, with sparse pubescence, paniculate, broadest basally; achenes glabrous or with sparse hairs. Upland prairies; Clay, Lamar, Montague, Tarrant, and Wise cos. in n part of nc TX; otherwise known in TX only from Bowie and Wichita cos. (Taylor & Taylor 1984). Jul–Oct. [*S. glaberrima* M. Martens]

**Solidago nemoralis** Aiton, (growing in shady places), OLD-FIELD GOLDENROD. Plant to 1(–1.3) m tall; stems pubescent, with basal rosette and persistent lower leaves; leaves reduced upward; leaf



*Solidago gigantea* [GLE]



*Solidago ludoviciana* [HEA]



*Solidago missouriensis* var. *fasciculata* [BB2]



*Solidago nemoralis* var. *longipetiolata* [PNW]



*Solidago nemoralis* var. *nemoralis* [BB2]

blades spatulate, 1-nerved (only the midvein apparent), mostly entire, pubescent; inflorescence paniculate, longer than broad; heads secund; achenes short-hairy. Dry upland sites. Aug–Nov.

1. Main stem leaves with blades linear-oblongate to linear, the upper sometimes much reduced in size, the lower ones 7–10 times as long as wide; involucre 4.5–6.5 mm high; widespread in nc TX \_\_\_\_\_ var. **longipetiolata**

1. Main stem leaves with blades oblanceolate to obovate, the upper gradually reduced in size, the lower ones 3–6 times as long as wide; involucre 3–4.5 mm high; mainly e TX \_\_\_\_\_ var. **nemoralis**

var. **longipetiolata** (Mack. & Bush) E.J. Palmer & Steyerl., (long-petioled). Bell and Grayson cos. w to e Rolling Plains and Edwards Plateau. [*S. decemflora* DC., *S. nemoralis* var. *decemflora* Fernald]

var. **nemoralis**. OLD-FIELD GOLDENROD. A BRIT sheet (Taylor 27009) from Lamar Co. is possibly var. *nemoralis*; mainly e TX.

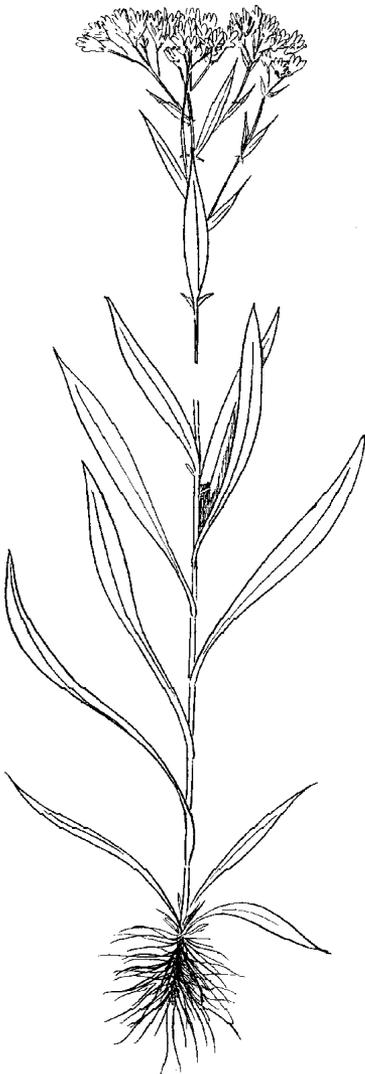
**Solidago nitida** Torr. & A. Gray, (shining), SHINY GOLDENROD, FLAT-TOPPED GOLDENROD. Plant 0.5–1.2 m tall; stems essentially glabrous; leaf blades linear, almost grass-like, glabrous; inflorescence corymbose, flat-topped; involucre ca. 5 mm high, the phyllaries multiveined; achenes glabrous. Prairies and disturbed areas; se and e TX w to West Cross Timbers. Jun–Sep, a primarily summer-blooming species. Sometimes placed in the segregate genus *Oligoneuron* [as *O. nitidum* (Torr. & A. Gray) Small].

**Solidago odora** Aiton, (odorous, fragrant), FRAGRANT GOLDENROD, SWEET GOLDENROD. Plant to 1.2 m tall; stems pubescent; leaf blades linear, essentially glabrous except for margin, minutely gland-dotted (when viewed with back lighting), often with an anise odor when crushed; involucre 4–5 mm high; achenes glabrate or short-hairy. Roadsides, woods; Henderson Co., also Lamar Co. (Taylor & Taylor 1984); mainly se and e TX. Sep–Nov.

**Solidago patula** Muhl. var. **strictula** Torr. & A. Gray, (sp.: spreading; var.: somewhat erect, upright), WILLOW GOLDENROD. Stems glabrous below the rough-puberulent inflorescence, bluntly 4-angled at least below; leaves basal and cauline; basal rosettes of large, long-petiole leaves, the blades broadly elliptic to obovate; mid-stem leaves sessile or short-petioled, the blades elliptic, strongly scabrous on upper surface; inflorescences usually broadly paniculate; heads often secund; involucre ca. 4.7 mm high; achenes glabrate. Disturbed areas; possibly rare in e part of nc TX; Taylor and Taylor (1984) lumped this taxon with *S. ludoviciana*, recognized it under the name *S. salicina*, and cited a number of nc TX counties; however, they indicated that most TX plants have glabrous leaves (and are thus *S. ludoviciana*); they stated of the two taxa that “Our own field and herbarium studies indicate they are the same entity. . .”; mainly e TX possibly w to nc TX. Late Aug–Oct. [*S. salicina* Elliott]

**Solidago petiolaris** Aiton, (with a petiole or leaf stalk). Plant to 1.5 m tall, growing in dense bunches with many stems; stems pubescent, the hairs short; leaf blades lanceolate to occasionally ovate, pubescent, at least on upper surface; inflorescence racemose to very narrowly paniculate; heads 6–11 mm high (including pappus)—among the largest heads of any nc TX GOLDENROD; involucre to 6.3 mm high; achenes glabrous. Prairies; Post Oak Savannah w to Panhandle and Edwards Plateau. Sep–Oct. [*S. petiolaris* var. *angustata* (Torr. & A. Gray) A. Gray]

var. *angustata* (Torr. & A. Gray) A. Gray, (narrow), was recognized by Taylor and Taylor (1984); they indicated it is more common in e TX but occasional further w; while we have seen no nc TX material of this variety, Hatch et al. (1990) cited vegetational areas 4 and 5 (Fig. 2) and Nesom (1990d) cited Cooke, Grayson, Palo Pinto, and Parker cos.; we are following Nesom (1990d), Kartesz (1994), and Jones et al. (1997) in lumping var. *angustata* with the more common var. *petiolaris*. Taylor and Taylor (1984) separated the 2 varieties as follows:



*Solidago nitida* [B73]



*Solidago odora* [GLF]



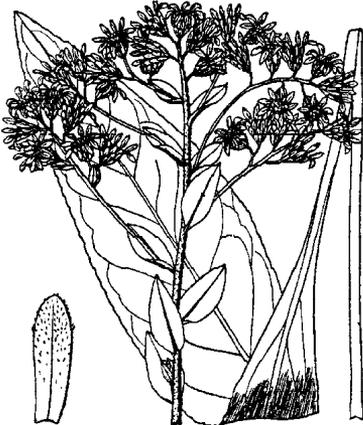
*Solidago patula* var. *strictula* [HEA]



*Solidago petiolaris* [BB2]



*Solidago radula* [BB2]



*Solidago rigida* [BB2]



*Solidago rugosa* var. *aspera* [BB2]



*Solidago rugosa* var. *rugosa* [BB2]

1. Leaf blades prominently sticky or resinous, lower surface glabrous; phyllaries glandular-dotted, essentially glabrous \_\_\_\_\_ var. *angustata*
1. Leaf blades scarcely or not at all sticky or resinous, lower surface and main veins ± hairy with spreading hairs; phyllaries minutely hairy with hairs often sticky, but sometimes glabrous \_\_\_\_\_ var. *petiolaris*

**Solidago radula** Nutt., (rough), ROUGH GOLDENROD. Plant 0.4–1.2 m tall; stems pubescent; inflorescence paniculate, dense to open, with long floriferous branches with small (< 1 cm long) elliptic leaves on their lower portions; heads not secund in the field, but often appearing so when pressed; involucre to 5.5 mm high; achenes short-hairy. Dry bluffs, upland xeric sites; e TX w to Rolling Plains and Edwards Plateau. Aug–Nov.

**Solidago rigida** L., (rigid, stiff), STIFF GOLDENROD, RIGID GOLDENROD. Plant variable, to 1.6 m tall; basal leaves with long conspicuous petioles; middle stem leaves sessile or nearly so; leaf blades narrowly ovate to ovate, usually densely pubescent; inflorescence flat-topped, dense; heads large, the involucre 5–9 mm high, the phyllaries multinerved; achenes glabrous or nearly so, ribbed. Prairies; se and e TX w to West Cross Timbers. Sep–Oct(–Nov). Sometimes put in the segregate genus *Oligoneuron* [as *O. rigidum* (L.) Small]. [*S. rigida* var. *laevicaulis* Shinnery, *S. rigida* var. *glabrata* E.L. Braun, *S. rigida* subsp. *glabrata* (E.L. Braun) S.B. Heard & J.C. Semple, *S. rigida* subsp. *humilis* (Porter) S.B. Heard & J.C. Semple] We are following Jones et al. (1997) in not recognizing infraspecific taxa in this species. Heard and Semple (1988) divided this species into three subspecies which, according to their range map, all occur in nc TX. Their key divided the subspecies as follows:

1. Outer series phyllaries glabrous; leaves and stems glabrous to somewhat hispid \_\_\_\_\_ subsp. *glabrata*
1. Outer series phyllaries pubescent; leaves and stems hispid to densely so.
  2. Inner series phyllaries conspicuously pubescent, often linear; plants usually short (0.3–0.7 m) but may be taller; capitulescence compact; pubescence of leaves and stems fine and very dense (> 50 hairs/mm<sup>2</sup>) \_\_\_\_\_ subsp. *humilis*
  2. Inner series phyllaries glabrate to very sparsely pubescent, oblong and bluntly rounded; plants more robust (0.6–1.4 m) with loose, open capitulescence; pubescence coarsely hispid (< 50 hairs/mm<sup>2</sup>) \_\_\_\_\_ subsp. *rigida*

**Solidago rugosa** Mill., (rugose, wrinkled), ROUGH-LEAF GOLDENROD, WRINKLED GOLDENROD. Plant usually < 1 m tall; stems pubescent; leaf blades serrate, the lower surface with long hairs; panicle triangular in outline, the branches recurved; heads secund; involucre ca. 4 mm high; achenes short-hairy. Roadside ditches, along streams, moist sites in oak-hickory forests. Sep–Nov. We are following Taylor and Taylor (1984), Gandhi and Thomas (1989), and Jones et al. (1997) in treating the following infraspecific taxa as varieties. Kartesz (1994) recognized them as subspecies.

1. Leaf blades broadly lanceolate to ovate, with pronounced rugose-venation on lower surface \_\_\_\_\_ var. **aspera**
1. Leaf blades lanceolate, without pronounced rugose-venation on lower surface \_\_\_\_\_ var. **rugosa**

var. **aspera** (Aiton) Fernald, (rough), CELTIS-LEAF GOLDENROD. Included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se and e TX. [*S. aspera* Aiton, *S. celtidifolia* Small, *S. rugosa* var. *celtidifolia* (Small) Fernald, *S. rugosa* subsp. *aspera* (Aiton) Cronquist]

var. **rugosa**. HARSH GOLDENROD, ROUGH-LEAF GOLDENROD. Fannin, Henderson, Hopkins, and Lamar cos. on e edge of nc TX; mainly se and e TX.

**Solidago speciosa** Nutt. var. **rigidiuscula** Torr. & A. Gray, (sp.: showy; var.: somewhat rigid), PRAIRIE GOLDENROD, NOBLE GOLDENROD. Stems usually pubescent at least above; leaf blades narrowly elliptic to elliptic, entire or nearly so, glabrate; inflorescence a narrow dense panicle; involucre ca. 6 mm high; achenes glabrous. Sandy prairies; Henderson, Kaufman, Jack, and

Montague, cos., also Navarro and Palo Pinto cos. (Mahler 1988); e TX w to West Cross Timbers. (Jun-) Sep-Oct. [*S. rigidiuscula* (Torr. & A. Gray) Porter]

***Solidago ulmifolia*** Muhl. ex Willd. var. ***microphylla*** A. Gray, (sp.: with leaves like *Ulmus*—elm; var.: small-leaved), ELM-LEAF GOLDENROD. Plant 0.4–1.5 m tall; stems glabrous; basal rosette absent; leaf blades ovate, toothed, essentially glabrous; lower inflorescence branches long, floriferous apically; heads secund; involucre 2.5–5 mm high; achenes short-hairy, ribbed. Sandy soils, roadsides, openings in woodlands, drier upland sites; Grayson and Lamar cos., also Dallas, Denton, Fannin, Hunt, Kaufman, Montague, Tarrant, and Wise cos. (Taylor & Taylor 1984); e TX w to West Cross Timbers and sc TX. (Jul-)Sep-Oct(-Nov), Taylor and Taylor (1984) indicated *S. ulmifolia* begins blooming in summer and is often finished flowering before some of the later flowering species begin. [*S. delicatula* Small, *S. microphylla* (A. Gray) Engelm. ex Small]

*Solidago altiplanities* C.E.S. Taylor & J. Taylor, (high plains), HIGH PLAINS GOLDENROD, occurs in OK just across the Red River from Clay Co.; it also occurs in the Plains Country of TX. It would key to *S. odora* in the above key but can be distinguished by its erect branches (vs. recurved apically), conical inflorescences (vs. pyramidal), and larger leaves to 9 cm long (vs. 5 cm or less) and not punctate.

*Solidago sempervirens* L., (evergreen), SEASIDE GOLDENROD. Two varieties, var. *mexicana* (L.) Fernald and var. *sempervirens*, are cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), but according to Taylor and Taylor (1984) occur only in se TX to the s of nc TX; C. Taylor (pers. comm.) indicated that they do not occur close to nc TX. The species can be distinguished by the primary stems and leaves usually glabrous; the inflorescence racemose or paniculate, pubescent; a rosette of linear-lanceolate leaves; and linear to narrowly lanceolate, entire stem leaves.

### SOLIVA BURWEED, PIQUANTE, STICKERWEED, STICKERS

Low growing annuals with short stems (to only ca. 15 cm tall) or nearly stemless; leaves alternate, often crowded; leaf blades 1–3-pinnatifid; heads sessile in clusters of leaves, ca. 3–8 mm wide, apparently only of disk flowers; outer flowers pistillate, without corollas; inner disk flowers functionally staminate with minute 4-toothed whitish or green-translucent corollas; achenes flattened, with wings or ± wing-like lateral appendages, tipped by the persistent spine-like style, conspicuously hairy to glabrous apically; pappus absent.

☛ A South American genus of 8 species. Easily recognized by the spine-like styles which make *Soliva* species painfully noxious weeds, similar in effect to *Cenchrus* (SANDBURS). The segregate genus *Gymnostyles* has been recognized by some (Tutin 1976; Kartesz 1994; Jones et al. 1997). However, the differences used to distinguish it from *Soliva* seem minute and we are following Cronquist (1980), Gandhi and Thomas (1989), Bremer (1994), and Arriagada and Miller (1997) in retaining all the species in *Soliva*. (Named for Dr. Salvador Soliva, 18th century physician to the Spanish court and botanist at the Royal Botanic Garden, Madrid, where he studied medicinally useful plants—Arriagada & Miller 1997) (tribe Anthemideae)

REFERENCES: Cabrera 1949; Tutin 1976; Cronquist 1980; Ray 1987; Gandhi & Thomas 1989; Arriagada & Miller 1997.

1. Achenes 2.5–4 mm wide, with only short hairs; wings (lateral appendages) of achenes broad, thin, smooth, without raised lines, conspicuously indented toward lower half forming 2 basal lobes; lateral pinnae of leaves palmately divided; heads scattered, not clustered at base of plant; plants caulescent \_\_\_\_\_ ***S. pterosperma***
1. Achenes 1–2 mm wide, conspicuously long-hairy at tip; wings (lateral appendages) of achenes thick, only slightly wing-like, with conspicuous raised lines running across the wings, not indented; lateral pinnae of leaves not palmately divided (either pinnately divided or not further divided); heads mostly clustered near base of plant; plants ± acaulescent.

2. Lateral pinnae of leaves usually not further divided; lateral projections of achenes with raised lines nearly to apex, with 2 divergent acute awns, projections, or shoulders at apex of achene, 1 on each side of the spine-like style \_\_\_\_\_ **S. stolonifera**
2. Lateral pinnae of leaves pinnately divided; lateral projections of achenes  $\pm$  smooth in distal 1/3, without any apical awns, projections, or shoulders near the spine-like style \_\_\_\_\_ **S. mutisii**

**Soliva mutisii** Kunth, (for Jose Celastino Bruno Mutis y Bosio, 1732–1808, Spanish physician and botanist of Madrid), BUTTON BURWEED, SMOOTH-STICKERS. Heads clustered in basal rosette. This species, not known from nc TX, is included in the key. It is widespread in se and e TX and is to be expected in nc TX. Mar–Apr. Native of South America. ☞

**Soliva pterosperma** (Juss.) Less., (winged seed), LAWN BURWEED, STICKERS, JO-JO WEED). Much branched, small, mat-forming or ascending annual herb to 15 cm tall; leaves small (1–3.5 cm long), usually tri-pinnatifid; heads scattered, not clustered at very base; corollas of central flowers ca. 1.6 mm long; achenes ca. 3.2 mm long, 2.5–4 mm wide, with broad lateral wings indented toward lower half forming basal lobes, glabrous apically, with a sharp, spinose, 1.5–2 mm long, persistent style and in addition a pair of spinulose projections ca. 1 mm long. Collected from soccer field near Arlington, Tarrant Co. (1995), possibly spread by athletic shoes; also a lawn weed in se and e TX. Apr–May. Native of South America. Ray (1987) and Kartesz (1994) treated *S. pterosperma* as a synonym of *S. sessilis* Ruiz & Pav. We are following Cronquist (1980), Gandhi and Thomas (1989), and Jones et al. (1997) in recognizing it as a separate species. ☞

**Soliva stolonifera** (Brot.) Loudon, (bearing stolons), TRAILING-STICKERS. Stoloniferous,  $\pm$  acaulescent; leaves to 3 cm long and 1 cm wide; heads solitary per node; corollas of central flowers 1.8 mm long; styles of pistillate flowers to ca. 2 mm long; achenes ca. 2 mm long and 1.7 mm wide. Lawn weed; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se and e TX. Mar–Apr. Native of South America. [*Gymnostylesstolonifera* (Brot.) Tutin] ☞

## SONCHUS SOW-THISTLE

Ours annuals with taproot, glabrous or with glandular-pubescent peduncles and upper stems; sap milky; stem leaves auricled-clasping, the blades obovate to oblong or ovate-lanceolate, coarsely or spiny-toothed or lobed; heads small, corymbose; phyllaries narrow, green, in several rows, the outer successively shorter; flowers all ligulate; corollas yellow; achenes flattened, 2–3 mm long; pappus of white, hair-like bristles 5–9 mm long.

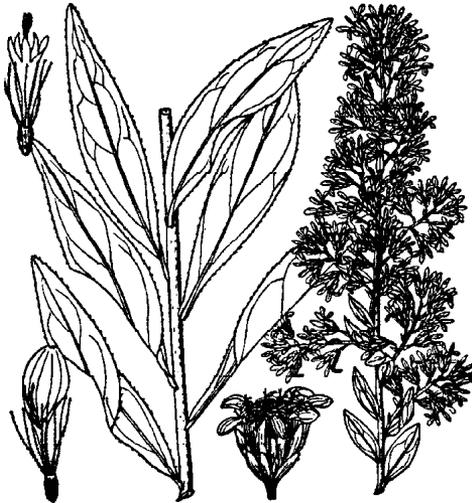
☞ A genus of 62 species native from Eurasia to Australasia and tropical Africa. (Greek: *sonchos* ancient name used for a prickly plant) (tribe Lactuceae)

REFERENCES: Boulos 1972–74, 1976; Vuilleumier 1973.

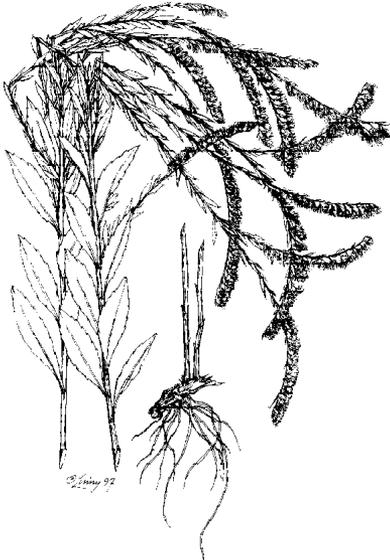
1. Leaves stiff and painfully prickly when grasped; leaf auricles (lobe-like extensions on both sides at base) rounded, sometimes made irregularly so by prominent, spiny teeth; mature achenes with several nerves but not wrinkled-roughened \_\_\_\_\_ **S. asper**
1. Leaves softer, not painfully prickly when grasped; leaf auricles triangular or triangular-lanceolate, pointed, as well as sharp-toothed; mature achenes with several nerves and cross wrinkled-roughened \_\_\_\_\_ **S. oleraceus**

**Sonchus asper** (L.) Hill, (rough), PRICKLY SOW-THISTLE, ACHICORIA DULCE. Stems 0.1–1(–1.5) m tall; corolla tubes longer than the ligules; nerves of achenes evident. Gardens, roadsides, disturbed areas; nearly throughout TX. Mar–Jun, sporadically all year. Native of Eurasia. ☞

**Sonchus oleraceus** L., (of the vegetable garden, a potherb used in cooking), COMMON SOW-THISTLE. Similar to *S. asper*, but less prickly and often more glaucous; corolla tubes ca. equaling the ligules; nerves of achenes evident to obscure. Same habitats and flowering period as *S. asper*; less common than *S. asper*, but widespread in TX. Native of Eurasia. ☞



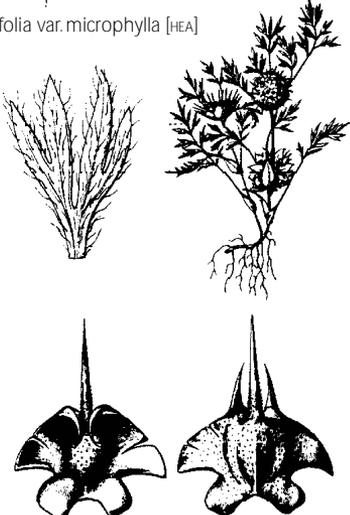
*Solidago speciosa* var. *rigidiuscula* [BB2]



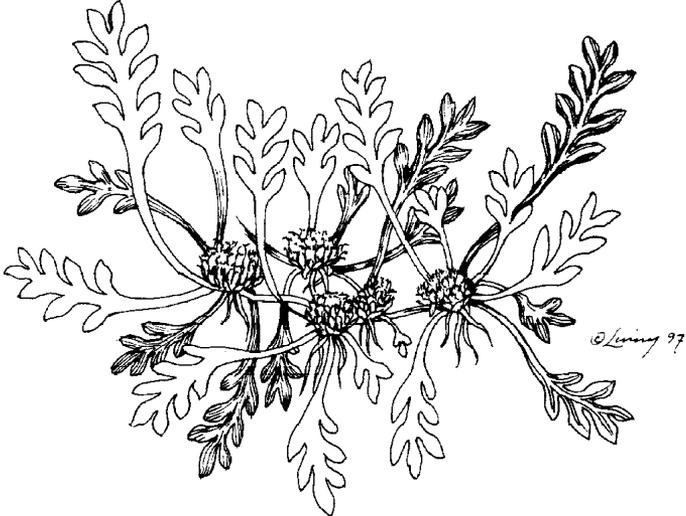
*Solidago ulmifolia* var. *microphylla* [HEA]



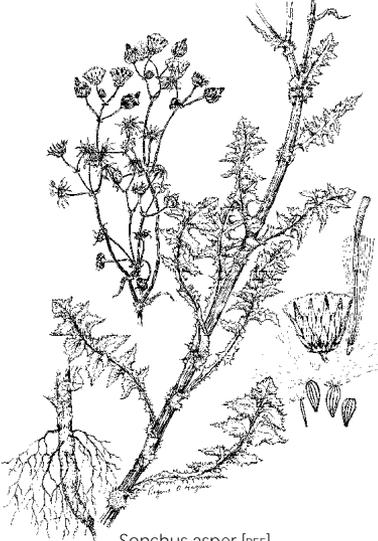
*Soliva mutisii* [HEA]



*Soliva pterosperma* [MAR]



*Soliva stolonifera* [HEA]



*Sonchus asper* [REE]

## TARAXACUM DANDELION

Small perennials, commonly behaving as winter annuals, with coarse taproot; sap milky; leaves all in a basal rosette, the blades oblong-lanceolate, coarsely toothed to deeply pinnately lobed; scapes hollow, ± pubescent, 4–30(–50) cm tall; heads solitary, terminal, large; phyllaries green, the outer short and ± curved-spreading or reflexed, the inner long, erect; flowers all ligulate; corollas yellow; achenes with beak 0.5–4 times as long as the body; beak tipped with parachute-like pappus of numerous capillary bristles; achenes with their pappuses in a conspicuous, easily disrupted, ball-like arrangement.

☛ A genus of 60 species of the n temperate zone and temperate South America including some cosmopolitan weeds. Apomixis and polyploidy have made the taxonomy of this group exceedingly complex. The name DANDELION comes from the French: *dent de lion*, tooth of the lion, apparently in reference to the leaf shape (Tveten & Tveten 1993). Some authors (e.g., Hatch et al. 1990) lump the following 2 very similar species. (Persian: *talkh chakok*, bitter herb, through medieval Latin *tarasacōn*) (tribe Lactuceae)

REFERENCES: Shinnars 1949a; Vuilleumier 1973.

1. Mature achenes red or purplish red or brownish red; tips of some of the inner phyllaries with a low knob or blunt ridge on back (visible only on living plants, sometimes quite obscure); leaf blades typically deeply lobed for their whole length, the terminal lobe usually not larger than the lateral lobes \_\_\_\_\_ **T. laevigatum**
1. Mature achenes greenish tan or brownish or straw-colored; tips of inner phyllaries all flat; leaf blades usually less deeply lobed, the terminal lobe usually larger than the lateral lobes \_\_\_\_\_ **T. officinale**

**Taraxacum laevigatum** (Willd.) DC., (smooth), RED-SEED DANDELION. Terminal lobe of leaf blades usually triangular with straight or concave, rarely convex, sides. In lawns, disturbed areas, and under trees in towns; Bell, Dallas, Denton, Hopkins, Kaufman, and McLennan cos., also Brown Co. (HPC); widespread in TX. Dec–Jun, sporadically to Nov, often drying up and disappearing during summer heat. Native of Europe and w Asia. [*T. erythrospermum* Andr. ex Besser] 🇺🇸

**Taraxacum officinale** F.H. Wigg., (medicinal), COMMON DANDELION. Terminal lobe of leaf blades rounded-triangular with convex sides. Same habitats, flowering, and growth habits as *T. laevigatum*; throughout TX. Native of Eurasia. A cosmopolitan weed nearly throughout the temperate zone. 🇺🇸

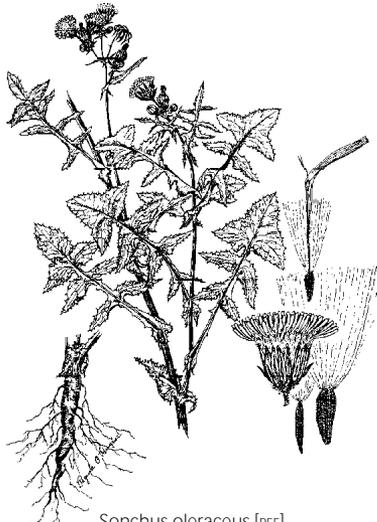
## TETRAGONOTHECA NERVERAY, SQUAREHEAD

Herbaceous perennials; leaves opposite, distinct or connate-perfoliate, the blades deltoid to oblong; heads large, 2–4 cm broad (including ligules); phyllaries apparently in 2 series; outer series 4(–5) foliaceous, conspicuous, to 14 mm long and 9 mm wide; inner series (actually bracts of receptacle) 6–15, small, each subtending a ray flower; ray flowers pistillate, fertile, with ligules conspicuous, yellow, often with some reddish or brown venation; disk flowers numerous, perfect, fertile, the corollas yellow, sometimes with dark stripes; achenes 4-angled; pappus of scales or absent.

☛ A genus of 4 species of the se United States. (Greek: *tetragonos*, four-angled, and *theca*, a case, from the shape of the involucre) (tribe Heliantheae)

REFERENCE: Turner & Dawson 1980.

1. Leaf blades toothed, usually very broad, the upper leaves often broadest, or at least very broad at base, very conspicuously connate-perfoliate, to 11 cm wide; stems (0.3–)0.6–1.2 m tall; in sandy habitats in n part of nc TX \_\_\_\_\_ **T. ludoviciana**
1. Leaf blades pinnatifid, usually narrow, the upper leaves usually not broadest near base, incon-



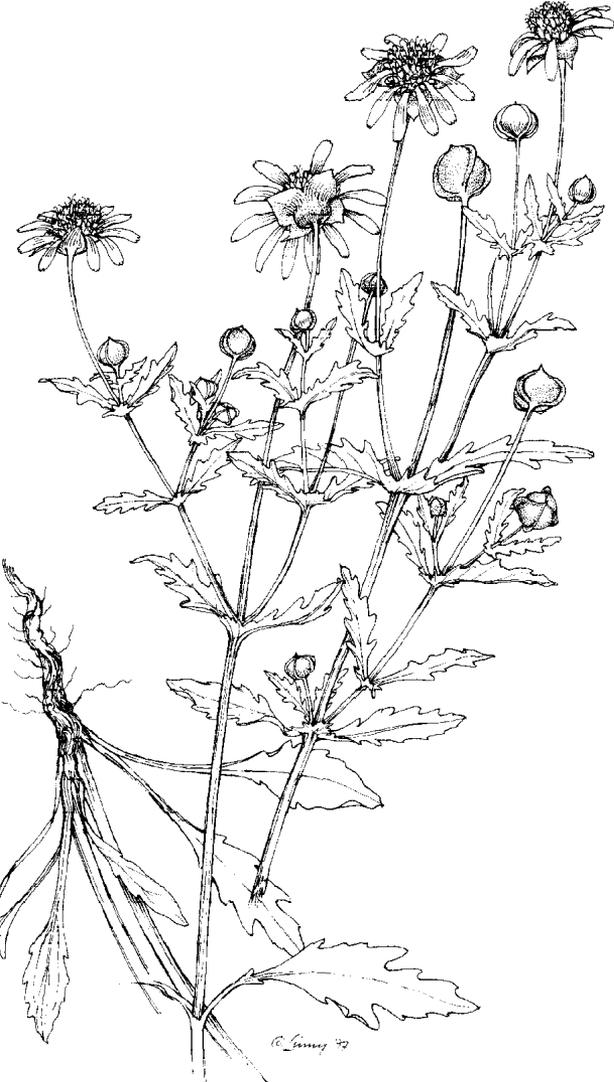
*Sonchus oleraceus* [REE]



*Taraxacum laevigatum* [BB1]



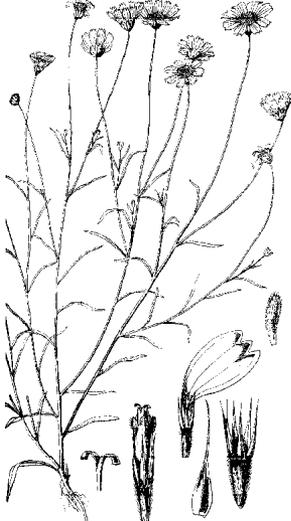
*Taraxacum officinale* [REE]



*Tetragonotheca texana* [HEA]



*Tetragonotheca ludoviciana* [HEA]



*Tetraneuris linearifolia* [PL]

spicuously connate-perfoliate, to 4.5 cm wide, usually much less; stems 0.2–0.5(–0.7) m tall; in calcareous habitats in s part of nc TX \_\_\_\_\_

**T. texana**

**Tetragonotheca ludoviciana** (Torr. & A. Gray) A. Gray ex Hall, (of Louisiana), SAWTOOTH NERVERAY. Leaf blades ovate to oblong, 5–7(–20) cm long, prominently toothed; ray flowers ca. 10, the ligules to 14 mm long; achenes ca. 4 mm long. Sandy woodlands; Denton, Parker, and Tarrant cos.; mainly se and e TX. May–Aug.

**Tetragonotheca texana** Engelm. & A. Gray ex A. Gray, (of Texas), PLATEAU NERVERAY, SQUARE-BUD DAISY. Leaf blades pinnatifid, narrowly ovate to elliptic or oblong in outline, 3–10 cm long. Calcareous soils, uplands; s Blackland Prairie (Mahler 1988) s to Edwards Plateau and s TX. Apr–Sep.

## TETRANEURIS

Small annuals or perennials, ± soft-pilose or woolly-pubescent to glabrate; leaves basal or cauline, alternate, or subopposite, simple, the blades entire or few-lobed, linear to oblanceolate with petiolar base, minutely resin-dotted; heads terminal, rather large, long-peduncled, solitary; ray flowers pistillate, fertile; ligules deep yellow or orangish yellow with brown-red lines beneath, toothed at tip, reflexed and persistent in age and becoming almost whitish; disk corollas perfect, fertile, orangish yellow; pappus scales awn-tipped.

☛ A New World genus of ca. 11–15 species; it is a segregate of *Hymenoxys* and has sometimes been treated in that genus (e.g., Karis & Ryding 1994; Mabberley 1997). We are following Kartesz (1994), Jones et al. (1997), J. Kartesz (pers. comm. 1997), and Bierner and Jansen (1998) in recognizing the genus. A molecular study by Bierner and Jansen (1998) showed *Tetranneuris* to be a monophyletic clade and supported its recognition as a separate genus. (Greek: *tetra*, four, and *neura*, cord or nerve) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCES: Seeligmann & Alston 1967; Bierner & Jansen 1998.

1. Annuals with branched, conspicuously leafy stems; ray flowers with ligules 5–10 mm long; phyllaries 2.5–4(–4.5) mm long \_\_\_\_\_ **T. linearifolia**

1. Perennials with basal or nearly basal leaves only, the flowering stalks (= peduncles) apparently unbranched, very scapose in appearance; ray flowers with ligules 8–22 mm long; phyllaries 4.5–6 mm long \_\_\_\_\_ **T. scaposa**

**Tetranneuris linearifolia** (Hook.) Greene, (linear-leaved). Plant to ca. 40(–60) cm tall; stems ranging from heavily pilose to glabrate; rosette leaves soon deciduous, with blades oblanceolate to linear-lanceolate, entire to few-lobed; cauline leaves persistent, with blades narrowly linear, 3–6(–8) cm long, 3–10 mm wide; heads on naked peduncles above the leaves; ray flowers variable in number, 6–22; achenes ca. 2 mm long; pappus scales ca. 2 mm long. Prairies, in calcareous clay or rocky soils; nearly throughout TX. Mar–May, re-branching and producing additional smaller heads to Jul. [*Hymenoxys linearifolia* Hook.]

**Tetranneuris scaposa** (DC.) Greene, (with scapes), PLAINS YELLOW DAISY, YELLOW PAPER-FLOWER, FOUR-NERVE DAISY. Plant 10–30+ cm tall; stems densely to slightly pilose; leaf blades linear to linear-lanceolate, entire to with a few short lobes, 2–10 cm long, 1.5–9(–11) mm wide; petioles 0.5–1.5 mm wide, with clasping base; axils densely long hairy; heads solitary on naked scapes; ray flowers 12–31; achenes 2–3.5 mm long; pappus scales 1–ca. 3 mm long. Gravelly or rocky prairies on limestone; in nc TX mainly Grand Prairie, also Dallas Co. (Correll & Johnston 1970); nc TX s and w to s TX and Trans-Pecos. Mar–May, sporadically through summer, often repeating in Sep–Oct. [*Hymenoxys scaposa* (DC.) K.L. Parker] The leaves are dotted with thin granules of a resin-like substance which gives them a bitter taste (Ajilvsgi 1984). The common name YELLOW PAPER-FLOWER is probably derived from the tendency of the rays to remain on the heads long after maturity, eventually turning almost white.

*Tetraneuris turneri* (K.L. Parker) K.L. Parker, (for Billie Lee Turner, 1925-, botanist at Univ. of TX), cited for vegetational area 4 (Fig. 2) by Hatch et al. (1990), apparently occurs only to the s of nc TX. It is a perennial with leaves mostly basal, phyllaries 5.5–8.5 mm long, and petioles 2–6 mm wide. [*Hymenoxysturneri* K.L. Parker]

### THELESPERMA GREENTHREAD

Perennial (rarely annual) herbs; leaves opposite, compound or deeply lobed, the segments linear-lanceolate to filiform; heads terminal on naked peduncles, solitary or corymbose, large; phyllaries in 2 series, the outer phyllaries herbaceous, the inner hyaline- or yellow-margined, basally fused for 1/4–1/2 their length; ray flowers with ligules yellow or golden yellow or ray flowers absent; disk corollas unequally lobed, yellow with reddish brown veins to dark reddish brown; achenes linear to linear-oblong, 2–7 mm long; pappus of 2(–3) awns or minute or absent.

☛ A genus of 15 species native to w North America and s South America; similar in appearance to and sometimes confused with *Coreopsis*; however, *Thelesperma* has the inner phyllaries basally united for 1/4 to 1/2 their length and the disk corolla lobes often linear, while *Coreopsis* has the phyllaries all separate or nearly so and the disk corolla lobes triangular to ovate. (Greek: *thele*, nipple, and *sperma*, seed, in reference to the papillose achenes) (tribe Heliantheae)

REFERENCES: Shinners 1950a; Alexander 1955; Greer 1997.

1. Ray flowers present.
  2. Corollas of disk flowers dark reddish brown.
    3. Outer phyllaries 3–12 mm long, usually at least 1/2 as long as inner phyllaries; leaves  $\pm$  evenly distributed on stem \_\_\_\_\_ **T. filifolium**
    3. Outer phyllaries very small, usually 1–2 mm long, < 1/4 as long as the inner phyllaries; leaves mostly in a rosette and on basal 1/3 of stem \_\_\_\_\_ **T. ambiguum**
  2. Corollas of disk flowers yellow (veins can be reddish brown).
    4. Leaves on upper 1/3 of stem (and sometimes most leaves) with only 1–3 narrow divisions; pappus absent or of minute tooth-like awns; disk corollas with shallowly lobed limb (to ca. 1/5 limb length) \_\_\_\_\_ **T. simplicifolium**
    4. All leaves much divided with many narrow divisions; pappus of well-developed retrorsely barbed awns 0.5–2 mm long; disk corollas with deeply lobed limb (1/2–3/4 limb length) \_\_\_\_\_ **T. filifolium**
1. Ray flowers absent.
  5. Corollas of disk flowers reddish brown; leaves mostly on basal 1/3 of stem \_\_\_\_\_ **T. ambiguum**
  5. Corollas of disk flowers yellow (veins can be reddish brown); leaves often  $\pm$  evenly distributed on stem or sometimes mostly on basal 1/2 \_\_\_\_\_ **T. megapotamicum**

**Thelesperma ambiguum** A. Gray, (ambiguous). Perennial 22–50 cm tall; ray flowers usually present, yellow, occasionally absent; disk corollas deeply lobed. Open limestone areas; mainly s 1/2 of TX, possibly to sw part of nc TX. Summer–fall. [*T. megapotamicum* var. *ambiguum* (A. Gray) Shinners]

**Thelesperma filifolium** (Hook.) A. Gray, (thread-leaved), GREENTHREAD, THREAD-LEAF THELESPERMA. Annual or short-lived perennial blooming the first year, 20–70 cm tall; ray corollas with ligules yellow or golden yellow, sometimes with reddish tinge near base, ca. 9–22 mm long, 9–17 mm wide, 3-lobed at apex; disk corollas yellow or reddish brown; achenes 3.5–6.5 mm long. Prairies, roadsides, and disturbed areas. Apr–Jun, sporadically to Sep.

1. Plants 25–70 cm tall; ray corollas with ligules golden yellow; outer phyllaries usually > 1/2 as long as inner; widespread in nc TX \_\_\_\_\_ var. **filifolium**
1. Plants 20–30(–40) cm tall; ray corollas with ligules yellow; outer phyllaries ca. 1/2 as long as inner; sw margin of nc TX; mainly w part of TX \_\_\_\_\_ var. **intermedium**

var. **filifolium**. Blackland Prairie and Grand Prairie; widespread in TX. [*T. trifidum* (Poir.) Britton]

var. **intermedium** (Rydb.) Shinnery, (intermediate). Usually smaller than var. *filifolium*. Burnet Co. (Shinnery 1950a) near sw margin of nc TX; mainly Rolling Plains, also Edwards Plateau and Trans-Pecos. [*T. intermedium* Rydb.]

**Thelesperma megapotamicum** (Spreng.) Kuntze, (of the big river), COTA, INDIAN TEA, NAVAJO TEA, COLORADO GREENTHREAD, RAYLESS THELESPERMA. Perennial 30–75 cm tall, spreading by creeping rootstocks; outer phyllaries 1–2(–3) mm long; ray flowers very rarely present; if so this species would key to *T. simplicifolium* from which it can be distinguished by pappus and disk corolla differences; disk corollas deep or brownish yellow, with deeply lobed limb (lobed 1/2–5/6 limb length); pappus well-developed, of 2 triangular, retrorsely barbed awns 1.5–3 mm long. Sandy or rocky prairies and roadsides; Clay and Young cos., also Archer Co. (Shinnery 1950a); w margin of nc TX s and w to w TX. Apr–Oct. Reportedly used as a tea by the Pueblo peoples of Arizona and New Mexico (Kirkpatrick 1992).

**Thelesperma simplicifolium** A. Gray, (simple-leaved), SLENDER GREENTHREAD. Perennial, glabrous and usually glaucous; stems 30–70 cm tall; leaves often few, the plant thus often with a naked appearance; disk corollas with shallowly lobed limb (to ca. 1/5 its length); pappus of 2 minute tooth-like awns. Limestone outcrops; West Cross Timbers and Lampasas Cut Plain s and w to w TX. May–Sep. Greer (1997) indicated that *T. curvicaupum* Melchert, originally described as a TX endemic from Burnet and Coleman cos. (Melchert 1963), is “... only a rare achene form that occurs in populatons of both *T. simplicifolium* and *T. filifolium*” He further suggested, “I therefore feel that *T. curvicaupum* should no longer be considered a separate species deserving nomenclatural recognition.”

## THYMOPHYLLA DOGWEED, FOETID-MARIGOLD

Annual or perennial, aromatic herbs; plants 10–30 cm tall; leaves pinnately divided, opposite or alternate, often with scattered oil glands; involucre 3–7 mm high; ray flowers with corollas yellow to yellowish orange; disk corollas yellow to yellowish orange;  $x = 8$ .

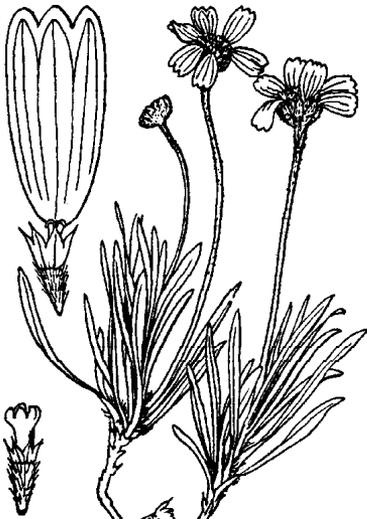
☛ A genus of 17 species native to the sw U.S. and Mexico. It is sometimes placed in *Dyssodia* (Jones et al. 1997); we are following Karis and Ryding (1994), Kartesz (1994), and J. Kartesz (pers. comm. 1997) in treating it separately. (Greek: *thymos*, thyme, and *phyllum*, leaf) (tribe Helenieae, sometimes lumped into Heliantheae)

REFERENCES: Johnston 1956; Johnston & Turner 1962; Strother 1969, 1986; Gandhi & Thomas 1984.

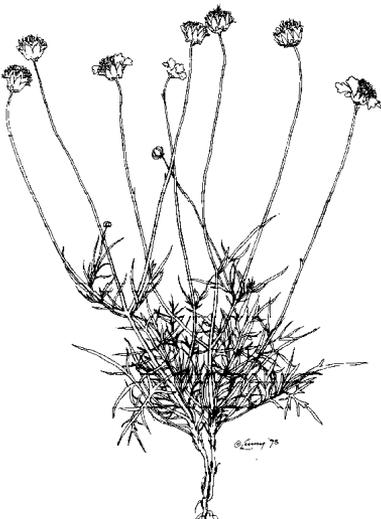
1. Phyllaries united up to ca. 1/2 their length, each free phyllary apex with 1 or more linear to oblong glands; leaves opposite \_\_\_\_\_ **T. pentachaeta**
1. Phyllaries united nearly to apex (only short, ± triangular teeth free); top of the united portion of the phyllaries with a ring of oblong to round glands; leaves mostly alternate \_\_\_\_\_ **T. tenuiloba**

**Thymophylla pentachaeta** (DC.) Small, (five-bristled), COMMON DOGWEED, PARRALENA. Short-lived perennial 10–20 cm tall; leaf lobes 5–7, linear, sparsely gland-dotted; peduncles 5–10 cm long; involucre 4–6 mm high; ray flowers 8–13, the ligules 2–8 mm long, yellow to yellow-orange; disk corollas dull yellow; achenes 2–3 mm long; pappus of ca. 10 awnless and awned scales, often alternating. Sandy, often calcareous soils; Brown and Coleman cos. on the w margin of nc TX s and w to w TX. Mar–Jul, Sep–Nov. [*Dyssodia pentachaeta* (DC.) B.L. Rob.] The foliage has an unpleasant scent if handled (Ajilvsgi 1984).

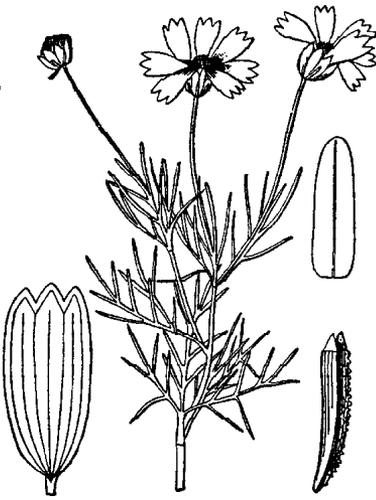
**Thymophylla tenuiloba** (DC.) Small var. **tenuiloba**, (slender-lobed), BRISTLE-LEAF DYSSODIA, TINY-TIM. Annual or short-lived perennial 10–30 cm tall, sometimes forming dense clumps; leaves dissected into 7–15 linear lobes; peduncles 3–8 cm long; involucre 5–7 mm high; ray flowers



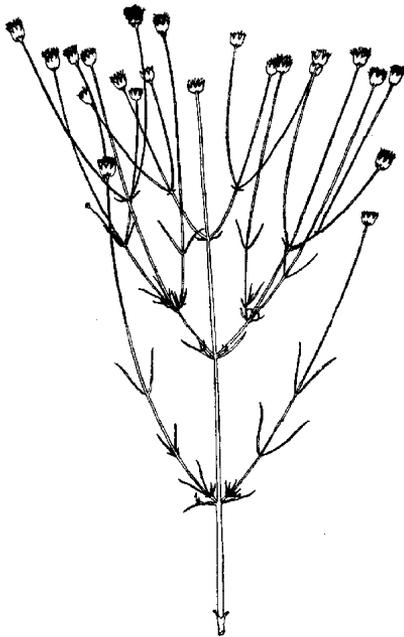
*Tetraeneuris scaposa* [BB2]



*Thelesperma ambiguum* [HEA]



*Thelesperma filifolium* var. *filifolium* [BB2]



*Thelesperma megapotamicum* [STE]



Linn 97



*Thelesperma simplicifolium* [HEA]

with ligules golden yellow to yellow-orange, 4-10 mm long; disk corollas yellow-orange; achenes 2-3.2 mm long; pappus of 10-12 similar small scales 2-3.4 mm long, each bearing 3-5 awns. Sandy, often calcareous soils; Brown and Burnet cos., also Hamilton Co. (Mahler 1988); se and e TX w to nc and c TX. May-Oct. [*Dyssodia tenuiloba* (DC.) B.L. Rob.]

*Thymophylla tenuiloba* (DC.) Small var. *wrightii* (A. Gray) Strother, (for Charles Wright, 1811-1885, TX collector), cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), apparently occurs only to the s of nc TX, mostly on sandy soils of the coastal plain. This variety can be distinguished by its mostly spatulate, entire leaves (sometimes with a few lateral lobes).

### TOWNSENDIA EASTER DAISY

☛ A genus of 25 species native to w North America; some are cultivated as ornamentals. (Named for D. Townsend, 1787-1858, amateur U.S. botanist from Pennsylvania) (tribe Astereae)  
REFERENCES: Larsen 1927; Beaman 1957.

**Townsendia exscapa** (Richardson) Porter, (without scapes), STEMLESS TOWNSENDIA, EASTER DAISY. Tufted or matted, appressed-pubescent, dwarf perennial, the woody stems barely out of the ground; leaves ± in rosettes; leaf blades linear-oblongate, 1-5(-8) cm long, 2-6 mm wide, entire; heads large in relation to plant size, 3-4 cm across, sessile or short-pedunculate; ray flowers 20-40, with ligules white to pinkish or rosy-lavender, often with a darker stripe below, showy, 12-22 mm long, curling under at night or in age; disk corollas yellow, often pink- or purple-tipped or -tinged; pappus of barbellate bristles 6-13 mm long. Eroding limestone slopes; Hamilton, Hood, and Johnson cos., also Bell (Beaman 1957) and Brown (HPC) cos.; Grand Prairie s and w to w TX. Jan-Apr. This is one of the earliest blooming native wildflowers in nc TX.

### TRAGOPOGON SALSIFY, GOAT'S-BEARD

Biennial herbs with stout taproot; sap milky; stems 20-80 cm tall; leaves alternate, sessile and clasping, long and narrow (monocot-like), to 30 cm long, tapered from base to a long, narrow tip, entire; heads solitary, terminal, large, on swollen peduncles, opening mainly in morning; flowers all ligulate; phyllaries equaling or longer than corollas, ca. 2.4-4 cm long in flower; achenes 2-5 cm long including elongate beak; pappus of very conspicuous plumose (= feather-branched) bristles; achenes with their pappuses in a ball-like arrangement resembling the infructescence of a giant dandelion.

☛ A temperate Eurasian and Mediterranean genus of ca. 110 species of taprooted herbs with monocot-like leaves. While both species occurring in nc TX are diploids, hybridization and polyploidy are well-documented in the genus; *T. miruus* Ownbey, an allotetraploid resulting from hybridization between *T. dubius* and *T. porrifolius*, is known from the Pacific northwest (Ownbey 1950a; Roose & Gottlieb 1976; Soltis & Soltis 1989, 1991; Novak et al. 1991; Soltis et al. 1995). (Greek: *tragos*, goat, and *pogon*, beard, in reference to the conspicuous pappus) (tribe Lactuceae)

REFERENCES: Shinnars 1949a; Ownbey 1950a; Vuilleumier 1973; Roose & Gottlieb 1976; Soltis & Soltis 1989, 1991; Novak et al. 1991; Soltis et al. 1995.

1. Corollas lemon-yellow; phyllaries typically 13 per head (sometimes less on depauperate plants)

\_\_\_\_\_ **T. dubius**

1. Corollas purple; phyllaries ca. 8 per head \_\_\_\_\_

\_\_\_\_\_ **T. porrifolius**

**Tragopogon dubius** Scop., (doubtful), GOAT'S-BEARD, WESTERN SALSIFY, NOON-FLOWER. Plant 0.3-1 m tall. Becoming rather common in West Cross Timbers (Mahler 1988); migrating from the Panhandle and South Plains e to at least Grayson Co. Apr-Jun. Native of Eurasia. [*T. major* Jacq.] ☛



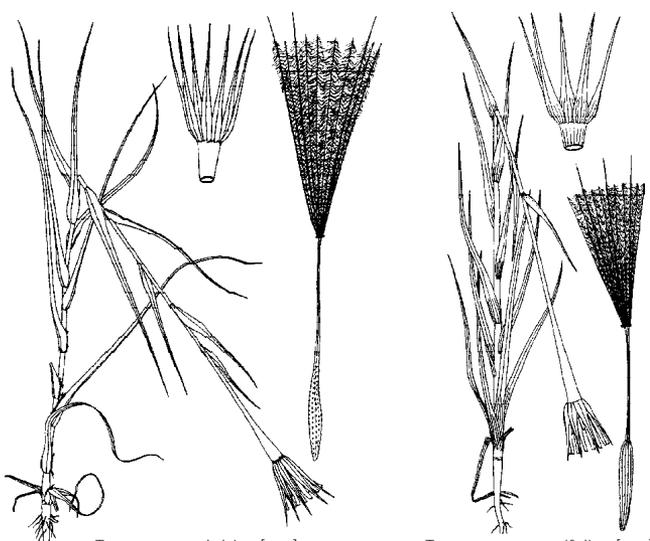
*Thymophylla pentachaeta* [HEA]



*Thymophylla tenuiloba* var. *tenuiloba* [HEA]



*Townsendia exscapa* [Ho]



*Tragopogon dubius* [PNW]

*Tragopogon porrifolius* [PNW]



*Verbesina alternifolia* [GLE]

**Tragopogon porrifolius** L., (with leaves like leek, in the Porrum group of genus *Allium*), SALSIFY, VEGETABLE-OYSTER SALSIFY, OYSTERPLANT. Plant 0.4–1 m tall. Reported by Reverchon as “naturalized in gardens” at Dallas in 1903 (Mahler 1988); a single plant found in vacant lot in University Park, Dallas, in 1946; 1977 collection from freeway waste area in downtown Dallas; also observed in Harry S. Moss Park, Dallas (R. May, pers. comm.); also w TX. Apr–Jun. Native of Eurasia. Cultivated for its edible root (Mabberley 1987). ☞

### VERBESINA CROWN-BEARD, FLAT-SEED-SUNFLOWER, WINGSTEM

Ours herbaceous annuals or perennials, pubescent; leaves usually alternate, sometimes opposite; leaf blades ovate to deltoid, usually serrate; petioles usually winged, the wings in some species extending along the stem; phyllaries in 2 to several series, subequal; ray flowers pistillate, fertile or infertile, the ligules yellow or in one species white; disk flowers perfect, fertile, the corollas yellow or in one species white; achenes flattened, often winged; pappus of 2 deciduous or persistent awns or absent.

☞ A genus of ca. 300 species of trees, shrubs, and herbs of warm areas of the Americas; some are cultivated as ornamentals. (Name said to be modified from *Verbena*, reason unknown) (tribe Heliantheae)

REFERENCES: Robinson & Greenman 1899; Coleman 1966, 1968, 1977; Olsen 1979, 1985.

1. Stems not winged; ligules of ray flowers prominently 3-lobed apically, the lobes 1.5–4 mm long; plants annuals with taproot; leaf blades usually gray-canescens beneath \_\_\_\_\_ **V. encelioides**
1. Stems usually winged, a thin wing of leaf-like tissue extending from the leaves along the stem (but not winged in the rare *V. lindheimeri* and rarely not winged in other species); ligules of ray flowers only slightly 3-toothed apically; plants perennials with fibrous or fleshy fibrous roots; leaf blades not gray-canescens beneath.
  2. Ray flowers 1–5, the ligules white, ca. 5–10 mm long \_\_\_\_\_ **V. virginica**
  2. Ray flowers 2–15+, the ligules yellow, ca. 10–30 mm long.
    3. Heads usually many, (10–)20–100 per plant; phyllaries few, soon deflexed (= bent downward); ray flowers 2–10, the ligules drooping; achenes spreading in all directions forming globose heads, some achenes deflexed; known in nc TX only from Dallas and Grayson cos. \_\_\_\_\_ **V. alternifolia**
    3. Heads solitary–few, usually 1–10(–20) per plant; phyllaries numerous, imbricated, not deflexed; ray flowers 8–15+, the ligules spreading ± horizontally; achenes only slightly spreading, none deflexed; widespread in nc TX.
      4. Stems winged; leaves mostly alternate, not harshly scabrous or only somewhat so; phyllaries lanceolate to linear-oblong, acute to acuminate apically; widespread in nc TX w to East Cross Timbers and in Red River drainage to Cooke Co. \_\_\_\_\_ **V. helianthoides**
      4. Stems not winged; leaves mostly opposite (but alternate in head-bearing region), mostly harshly scabrous; phyllaries broadly oblong to ovate or obovate, rounded to subacute apically; rare in nc TX, found locally only in Lampasas Cut Plain \_\_\_\_\_ **V. lindheimeri**

**Verbesina alternifolia** (L.) Britton ex Kearney, (alternate-leaved), WINGSTEM. Stems 1–2(–3) m tall, usually winged; leaves alternate, the blades lanceolate to elliptic or ovate, coarsely serrate to subentire; heads numerous in a ± open arrangement; achenes winged. Woods of tributaries; Dallas and Grayson cos. are the only records located for TX. Sep.

**Verbesina encelioides** (Cav.) Benth. & Hook.f. ex A. Gray, (resembling *Encelia*, another genus of Asteraceae), COWPEN DAISY, GOLDEN CROWNBEARD, FEVERWEED, BUTTER DAISY. Stems 0.1–0.9 m tall; leaves opposite towards base, tending to alternate upward; leaf blades deltoid to ovate, toothed; petioles usually winged and auriculate at base; heads 1(–3) at ends of branches, large and conspicuous; ray flowers 10–15, the ligules ca. 1–2.5 cm long, yellow, showy; achenes usually

winged. Disturbed areas, often in sandy soils; nearly throughout TX. May–Nov. [*Ximenesia encelioides* Cav.] The foliage has an unpleasant odor if crushed or touched; Native Americans reportedly used the plant in treating skin diseases (Ajilvsgi 1984).

**Verbesina helianthoides** Michx., (resembling *Helianthus*—sunflower), GRAVELWEED CROWNBEARD. Stems 0.5–1.2 m tall; leaves alternate, the blades lanceolate to narrowly ovate, serrate; heads usually few in a compact arrangement; achenes winged. Disturbed areas; sandy woods; e TX w to East Cross Timbers, in Red River drainage to Cooke Co. May–Jun.

**Verbesina lindheimeri** B.L. Rob. & Greenm., (for Ferdinand Jacob Lindheimer, 1809–1879, German-born TX collector), LINDHEIMER'S CROWNBEARD. Stems (0.2–)0.4–0.6(–1) m tall, not winged; leaf blades ovate-deltoid, cuneate basally; heads few; achenes winged. Juniper-oak woodlands, shaded slopes, on limestone; Coryell Co., also Bell (Fort Hood–Sanchez 1997) and Burnet (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.) cos; endemic to Lampasas Cut Plain and e part of Edwards Plateau. Late summer–fall. 🌱

**Verbesina virginica** L., (of Virginia), FROSTWEED, ICEPLANT, WHITE CROWNBEARD, VIRGINIA CROWNBEARD, RICHWEED, SQUAW-WEED, INDIAN-TOBACCO. Stems 4–5-winged, coarse, to 2 m tall; leaves alternate; heads numerous in cymose arrangement; ray and disk corollas white; ligules of ray corollas to 10 mm long. Disturbed woody areas; se and e TX w to West Cross Timbers and Edwards Plateau. Aug–Oct. When exposed to the first freezing temperatures of the year, the stems split and exude a sap with freezes into conspicuous ice formations—hence several of the common names (Ajilvsgi 1984). The roots were used by Native Americans to relieve cramps, chills, and fevers (Burlage 1968).

## VERNONIA IRONWEED

Ours clump-forming or rhizomatous perennial herbs; leaves cauline, evenly distributed along the stem, alternate, simple, toothed; heads many, rather small, corymbose; phyllaries herbaceous but rather stiff or hard, sometimes purple-tinged, in several rows, strongly imbricated, the outer successively shorter; ray flowers absent; disk corollas usually purple (rarely white), deeply lobed, usually more than 12 per head; pappus of many, long, scabrous, white to brownish or purplish hairs, plus a few very small outer scales.

☞ A genus of ca. 500 species of the Old World tropics and tropical and warm areas of North America; timber trees to herbs; some medicinally important. Interspecific hybridization is well-known in *Vernonia* (Urbatsch 1972; Jones & Faust 1978). The rich purple corollas make *Vernonia* species a showy component of the summer flora of ne TX. (Named for William Vernon, 16?–1711, English botanist who collected in Maryland) (tribe Vernonieae)

REFERENCES: Gleason 1906, 1922, 1923; Jones 1970, 1982; Faust 1972; Urbatsch 1972; Faust & Jones 1973; King & Jones 1975; Chapman & Jones 1978; Jones & Faust 1978; Keeley & Jones 1979.

1. Phyllaries appressed-pubescent over the back (= abaxially), white or grayish; leaf blades narrowly linear, densely white-woolly beneath; stems densely gray-woolly \_\_\_\_\_ **V. lindheimeri**
1. Phyllaries glabrous or spreading-pubescent, not whitish or grayish; leaf blades narrow to wide, not densely white-woolly beneath; stems glabrous to pubescent, but not gray-woolly.
2. Leaf blades scabrous or pubescent to tomentose on the lower surface, the larger ones linear to lanceolate or ovate, not pitted below OR pitted (only in *V. texana*); upper stem leaves with blades of various widths, often wider than 10 mm; widespread in nc TX.
3. Stems usually with curly, spreading hairs (sometimes short, use lens); leaf blades slightly pubescent to tomentose on the lower surface, not pitted, those at mid-stem lanceolate to ovate-lanceolate to elliptic, 10–45 mm wide.
4. Involucres in flower 2–6 mm in diam. at equator; flowers 9–34 per head; leaves almost glabrous to with various pubescence beneath; including species widespread in nc TX.

5. Phyllaries with shiny resiniferous glands; middle phyllaries with tips acute to acuminate, usually recurved or spreading; hairs on lower leaf surfaces curly; widespread in nc TX \_\_\_\_\_ **V. baldwinii**
5. Phyllaries without resiniferous glands; middle phyllaries with tips subacute to obtuse or mucronate, appressed, not recurved or spreading; hairs on lower leaf surfaces appressed; rare in nc TX, apparently known from a single Blackland Prairie location \_\_\_\_\_ **V. gigantea**
4. Involucres in flower 5.5–10 mm in diam. at equator; flowers 32–55(–60) per head; leaves densely tomentose beneath; on e margin of nc \_\_\_\_\_ **V. missurica**
3. Stems glabrous except at summit; leaf blades sparsely scabrous-pubescent on the lower surface, pitted, those at mid-stem linear to lanceolate, 1–14 mm wide \_\_\_\_\_ **V. texana**
2. Leaf blades glabrous, the larger ones linear, with numerous small but conspicuous pits on the lower surface (can appear as black dots under low magnification); upper stem leaves with blades 3–10 mm wide; in nc TX known only from West Cross Timbers \_\_\_\_\_ **V. marginata**

**Vernonia baldwinii** Torr., (for its discoverer, William Baldwin, 1779–1819, botanist and physician of Pennsylvania), BALDWIN'S IRONWEED, WESTERN IRONWEED. Plant 40–150 cm tall; middle stem leaves with blades lanceolate to narrowly ovate, 3.7–17 cm long, 2–6 cm wide. Open woods, low ground; widespread in TX. Jul–Sep. The bitter foliage apparently prevents herbivory by cattle and the plant is thus sometimes common in overgrazed pastures (Ajilvsgi 1984).

**Vernonia gigantea** (Walter) Trel. ex Branner & Coville, (gigantic), TALL IRONWEED. Plant 100–150(–350) cm tall; middle stem leaves with blades linear-lanceolate to lanceolate or oblanceolate, 10–75 mm wide. Open weedy areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990) and locality mapped apparently in e part of nc TX by Urbatsch (1972); mainly e U.S. to the e of TX. Aug–Nov. [*V. altissima* Nutt.] Urbatsch indicated that this species hybridizes with *V. missurica* and *V. baldwinii*.

**Vernonia lindheimeri** A. Gray & Engelm., (for Ferdinand Jacob Lindheimer, 1809–1879, German-born TX collector), WOOLLY IRONWEED. Plant 25–75 cm tall, clump-forming. Limestone outcrops; Dallas and Tarrant cos. s and w to Edwards Plateau and Trans-Pecos, also se TX. Summer.

**Vernonia marginata** (Torr.) Raf., (margined), PLAINS IRONWEED, NARROW-LEAF IRONWEED. Plant 30–100 cm tall; middle stem leaves with blades broadly linear; upper stem leaves sessile, 3–10 mm wide. Low areas; Palo Pinto and Shackelford cos.; West Cross Timbers s and w to w TX. Jul–Aug. Avoided by grazing livestock because of its bitter taste (Kirkpatrick 1992).

**Vernonia missurica** Raf., (of Missouri), MISSOURI IRONWEED. Plant to 150 cm tall; middle stem leaves with blades lanceolate to narrowly ovate. Open woods, low ground; Henderson and Lamar cos. on e margin of nc TX; mainly se and e TX. Jul–Oct.

**Vernonia texana** (A. Gray) Small, (of Texas), TEXAS IRONWEED. Plant 40–150 cm tall; upper leaves markedly reduced. Sandy woods; Bell, Fannin, Henderson, Lamar, Limestone, and Milam cos., also collected at Dallas by Reverchon; mainly se and e TX. Summer.

Two hybrids are also known from nc TX:

*Vernonia* × *guadalupensis* A. Heller [*baldwinii* × *lindheimeri*], (for the Guadalupe River area of the Edwards Plateau). Phyllaries appressed pubescent over the back as in *V. lindheimeri*, but differing in having leaf blades gray-green beneath with thin pubescence to nearly glabrous (versus densely white-woolly beneath in *V. lindheimeri*). This hybrid is known from several Dallas Co. specimens, also Bell Co. (Fort Hood–Sanchez 1997).

*Vernonia* × *vultrina* Shinnery [*baldwinii* × *marginata*], (for Buzzards Spring in Dallas, TX). Leaves glabrous as in *V. marginata* but differing in the upper stem leaves with petioles 2–3



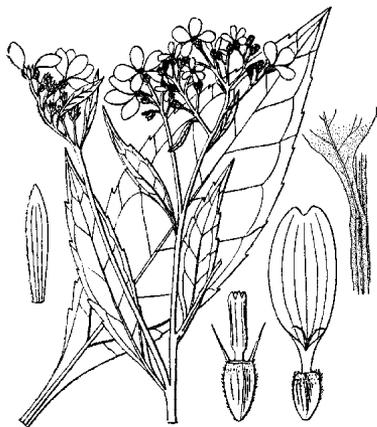
*Verbesina encelioides* [BB1]



*Verbesina helianthoides* [BB1]



*Verbesina lindheimeri* [HEA]



*Verbesina virginica* [BB1]



*Vernonia baldwinii* [REE]



*Vernonia gigantea* [GLE]



*Vernonia marginata* [BB2]



*Vernonia lindheimeri* [B73]

mm long and blades 15–25 mm wide. This hybrid is known only from a top of an apparently large plant, collected by Reverchon at Buzzards Spring, Dallas (now a residential area).

### VIGUIERA GOLDEN-EYE

☛ A genus of 180 species native to warm and tropical areas of the Americas; a few are cultivated as ornamentals. (Named for L.G.A. Viguier, 1790–1867, French physician and botanist) (tribe Heliantheae)

REFERENCES: Blake 1918; Robinson 1977.

**Viguiera dentata** (Cav.) Spreng., (toothed), SUNFLOWER GOLDEN-EYE. Herbaceous perennial; leaves opposite below, alternate above; leaf blades ovate or rhombic-ovate, cuneate to truncate, serrate; phyllaries in 3 series, imbricated, ovate basally, indurate with herbaceous linear tips; ray flowers 10–12, pistillate, infertile, the ligules yellow, ca. 7–15 mm long, 3–7.5 mm wide; disk flowers perfect, fertile, the corollas yellow; achenes black or mottled, appressed-pubescent, 3.5–4 mm long; pappus awns 2, 2.2–2.8 mm long, squamellae (additional small pappus scales) 4, squarish, fimbriate. Calcareous soils; Bell, Hill, McLennan, and Williamson cos., also Coryell Co. (Fort Hood—Sanchez 1997); s part of nc TX through Edwards Plateau to Trans-Pecos. Oct–Nov.

### WEDELIA

☛ A genus of 100 species of tropical and warm areas of the world; 4 species are found in the United States; a number of taxa have sometimes been treated in *Zexmenia*. (Named for Georg Wolfgang Wendel, 1645–1721, professor of botany at Jena, Germany) (tribe Heliantheae)

REFERENCES: Turner 1988a, 1992; Strother 1991.

**Wedelia texana** (A. Gray) B.L. Turner, (of Texas) ORANGE ZEXMENIA, HAIRY WEDELIA, ORANGE DAISY. Small shrub 0.5–1 m tall; herbage strigose-hispid; leaves opposite, sessile; leaf blades narrowly ovate, usually 5 cm or more long, cuneate basally, coarsely toothed to slightly lobed; heads long-peduncled, solitary or in a cyme of 3; phyllaries in 2 series; ray flowers pistillate, fertile, the ligules conspicuously yellowish orange; disk flowers perfect, fertile, the corollas similar in color to ligules of ray flowers; achenes of ray and disk flowers usually 2- or 3-angled, usually winged; pappus of 2 or 3 short awns subtended by short, hyaline scales. Calcareous soils; Burnet Co., also Brown, Comanche (Mahler 1988), and Somervell (R. O'Kennon, pers. obs.) cos.; sw part of nc TX s through Edwards Plateau to s TX and w to Trans-Pecos. Apr–Nov. [*W. acapulcensis* Kunth var. *hispida* of authors, not (Kunth) Strother, *W. hispida* of authors, not Kunth, *Zexmenia hispida* of authors, not (Kunth) A. Gray ex Small] We are following Jones et al. (1997) and J. Kartesz (pers. comm. 1997) for nomenclature of this taxon which has long been associated with the epithet *hispida*.

### XANTHISMA SLEEPY DAISY

☛ A monotypic genus native to TX, NM, and OK. The common name probably refers to the late morning expansion of the ray flowers. (Greek: *xanthisma*, that which dyes yellow) (tribe Astereae)

REFERENCE: Semple 1974.

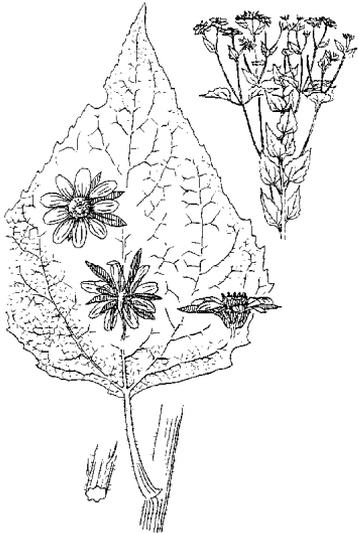
**Xanthisma texanum** DC. subsp. **drummondii** (Torr. & A. Gray) Semple, (sp.: of Texas; subsp.: for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), TEXAS SLEEPY DAISY. Glabrous annual 10–75 cm tall; leaves sessile or subsessile, the blades lanceolate, entire, toothed, or the lower often pinnately lobed; heads rather large, solitary and terminal on main stem and branches; receptacles with chaffy scales; ray flowers yellow, expanded from late morning to late afternoon, becoming erect and with tips nearly touching, the head closed during the night. Sandy open woods, roadsides, and pastures; Hill, Montague,



*Vernonia missurica* [BB2]



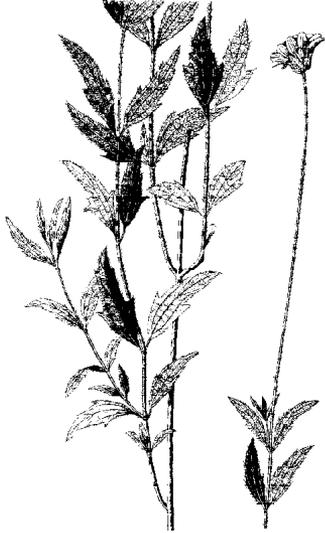
*Vernonia x vultrina* [BT3]



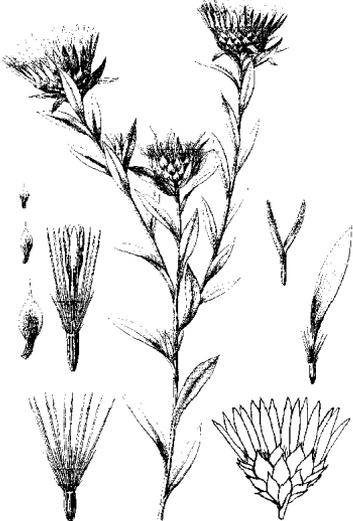
*Vigüera dentata* [VE]



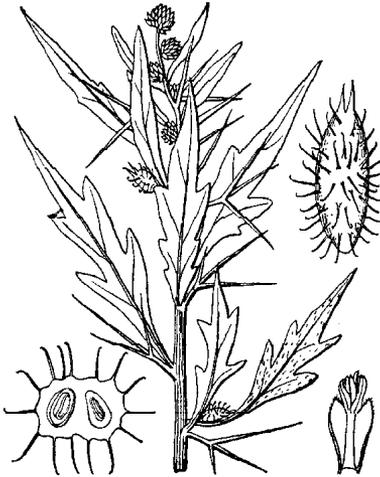
*Vernonia texana* [BT3]



*Wedelia texana* [USH]



*Xanthisma texanum* subsp. *drummondii* [BT3, RBM]



*Xanthium spinosum* [BB2]



*Xanthium strumarium* var. *canadense* [REE]

and Tarrant cos. w through West Cross Timbers to Panhandle; also Edwards Plateau. May–Oct. [*Xanthisma texanum* DC. var. *drummondii* (Torr. & A. Gray) A. Gray] Burlage (1968) reported the plant to contain a saponin and to be poisonous. ☠

### XANTHIUM COCKLEBUR, BURWEED

Coarse, monoecious annuals with taproots; leaves alternate; heads small, axillary, nearly sessile, unisexual; ray flowers absent; staminate heads with 1–3 series of separate phyllaries; disk flowers with minute corollas; anthers 5, separate; pistillate heads with phyllaries united into a prickly bur or “fruit”; bur completely enclosing 2 flowers which lack corolla and pappus; achenes 2 per bur.

☞ A cosmopolitan (now) genus of ca. 3 species with conspicuous, accrescent involucre covered with hooked prickles used for animal dispersal. A cladistic study by Karis (1995) suggested that *Xanthium* is a monophyletic ingroup in a paraphyletic *Ambrosia*. According to the VELCRO® Industries homepage (www.velcro.com), in the early 1940s, a Swiss inventor, George de Mestral, after a walk noticed “cockleburrs” [presumably *Xanthium*] on his dog and his pants. He examined the hooked prickles under a microscope and derived the idea for the well-known two-sided fastener—one side with stiff, cocklebur-like “hooks” and the other side with soft “loops” like the cloth of his pants. The word velcro comes from the French words *velours*, velvet, and *croch*, hooked. (Greek name of some plant used to dye the hair, from *xanthos*, yellow) (tribe Heliantheae)

REFERENCES: Millspaugh & Sherff 1919; Rydberg 1922; Löve & Dansereau 1959; Karis 1995.

1. Nodes with a conspicuous, 3-pronged, yellowish spine; bur ca. 1 cm long; leaf blades tapering or wedge-shaped at base; rare in nc TX \_\_\_\_\_ **X. spinosum**
1. Nodes without spines (the only spiny or prickly part of the plant is the bur or “fruit”); bur usually (1–)2–3 cm long; leaf blades truncate or cordate at base; widespread in nc TX \_\_\_\_\_ **X. strumarium**

**Xanthium spinosum** L., (spiny), SPINY COCKLEBUR, CLOTBUR. Stems 0.3–1(+) m tall; leaves entire or with a few teeth or lobes, slightly pubescent or glabrate on upper surface, densely silvery-pubescent on lower surface, tapering to a short petiole; bur finely pubescent, with numerous, hooked prickles ca. 2 mm long. Disturbed and waste places; included based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990), also Brown Co. (J. Stanford, pers. comm.); mainly w 1/2 of TX. Jul–Oct. Introduced, region of origin unclear, probably the Americas. The plant can cause mechanical injuries; ingestion by pigs can result in toxic symptoms including prostration and convulsions (Burlage 1968). ☠ 🐷

**Xanthium strumarium** L. var. **canadense** (Mill.) Torr. & A. Gray, (sp. of swellings or tumors; var. of Canada), COCKLEBUR, COMMON COCKLEBUR, ABROJO. Stems usually 0.4–2 m tall; leaf blades to 15 cm long, ovate to deltoid, suborbicular, or reniform, serrate or with shallow lobes, scabrous; petioles elongate, to 15 cm long; bur (1–)2–3+ cm long, ca. 1.5 cm in diam., terminated by 2 prominent spines, covered with stiff, hooked prickles ca. 5 mm long; bur and bases of spines densely pubescent. Disturbed moist areas or sandy soils; throughout TX. Fruiting Jul–Nov. [*Xanthium italicum* Moretti] *Xanthium strumarium* is a very variable taxon questionably divisible into infraspecific taxa. Our plants seem to best fit var. *canadense*. Poisonous and potentially fatal to pigs and other livestock; the poisonous principle is hydroquinone or a diterpenoid glycoside and occurs in the seeds and seedlings (Sperry et al. 1955; Kingsbury 1964, 1965; Stephens 1980; Hardin & Brownie 1993). The burs can cause mechanical injury when eaten by livestock and are sometimes referred to as “porcupine eggs” (Barkley 1986). ☠

## YOUNGIA

☛ An Asian genus of ca. 40 species. (Named for William Young, 1742–1785, German-born American botanist, nurseryman, and gardener) (tribe Lactuceae)

REFERENCES: Babcock & Stebbins 1939; Vuilleumier 1973.

**Youngia japonica** (L.) DC., (of Japan), JAPANESE-HAWKWEED. Annual herb from taproot; sap milky; stems 0.1–0.9 m tall; basal leaves pinnatifid, crowded; stem leaves few and reduced; heads numerous, small, 6–7 mm long including pappus; involucre 3.5–5.7 mm high, glabrous; corollas all ligulate, yellow or yellow-orange; achenes 1.5–2.5 mm long, strongly compressed; pappus of numerous hair-like bristles 2.5–3.5 mm long. Flowerbeds, gardens, weedy areas; Dallas and Tarrant cos.; also scattered in se and e TX. Oct–Nov. Native of Asia. 🌿

## ZINNIA

☛ A genus of 11 species from the U.S. to Argentina, especially Mexico; herbs and low shrubs with opposite or whorled leaves and alkaloids; some are cultivated as ornamentals; *Z. elegans* Jacq., COMMON ZINNIA, YOUTH-AND-OLD-AGE, was cultivated by the Aztecs. (for Johann Gottfried Zinn, 1727–1759, German professor of botany at Göttingen known for his botanical work in Mexico) (tribe Heliantheae)

REFERENCE: Torres 1963.

**Zinnia grandiflora** (L.) DC., (large-flowered), PLAINS ZINNIA, ROCKY MT. ZINNIA. Low much-branched perennial 8–22 cm tall; stems from a woody base; leaves opposite, linear, 10–30 mm long, to ca. 2 mm wide, strigose; heads terminating stems, not much raised above the leaves; involucre 5–8 mm high; phyllaries broadly obtuse and often red-tipped apically; receptacles chaffy; ray flowers 3–6, pistillate, fertile; ligules to 18 mm long, ovate to orbicular, yellow; disk flowers perfect, fertile, the corollas red or green, 5-toothed with 1 tooth often larger; chaffy bracts membranous, enclosing the achenes; ray achenes 3-angled, with lateral awns ± adnate to ligule or only the tip free, the awn of inner angle minute or absent; disk achenes oblanceolate, 4–5 mm long, with (1–)2(–4) awns or awns absent. Dry calcareous areas; Brown Co.; extreme w margin of nc TX w to w TX. Summer–fall. 🌿/108

## BALSAMINACEAE TOUCH-ME-NOT FAMILY

☛ A medium-sized (850 species in 2 genera), mainly Old World tropical family with a few in temperate regions; they are generally herbs or rarely subshrubs. *Hydrocera*, native to Indomalesia, has only a single species. Family name conserved from *Balsamina*, a genus now treated as *Impatiens* (the name *Impatiens* was published earlier and thus has priority in terms of nomenclature). (Possibly from Greek: *balsamon*, a fragrant gum, or from ancient Arabic: *balassam*, for some species of *Impatiens*) (subclass Rosidae)

**FAMILY RECOGNITION IN THE FIELD:** herbs with translucent watery stems, alternate simple leaves, showy bilaterally symmetrical flowers with a conspicuous *spur*, and *explosively dehiscent* capsules.

REFERENCES: Rydberg 1910; Wood 1975.

### IMPATIENS TOUCH-ME-NOT, JEWELWEED, BALSAM, SNAPWEED

☛ Ours erect annual herbs; leaves alternate, simple; sepals 3, 2 small, 1 large and conspicuous, petal-like, saccate, and with a long nectar spur; petals apparently 3, the 2 laterals 2-lobed; anthers 5, united around stigma; pistil 1; ovary superior; fruit an explosively dehiscent, 5-valved capsule.

A genus of 849 species of tropical and temperate areas, especially India. Many *Impatiens* species are used as ornamentals (e.g., *I. walleriana* Hook.f.—BUSY-LIZZIE, SULTAN’S-FLOWER). Several

Middle Eastern and African species were used as a source of dyes (red, yellow, or black) (Baumgardt 1982). (Latin: *impatiens*, impatient, alluding to the explosive release of the seeds when the capsule is touched)

REFERENCE: Rust 1977.

1. Flowers of various colors, with extremely narrow opening; capsules densely pubescent; stems usually pubescent; petioles 0.5–2 cm long, often with conspicuous glands \_\_\_\_\_ **I. balsamina**
1. Flowers orange with crimson spots, with obvious, open, funnel-like shape; capsules glabrous; stems glabrous; petioles 0.5–10 cm long, without glands \_\_\_\_\_ **I. capensis**

**Impatiens balsamina** L., (balsamic, similar to balsam), GARDEN BALSAM, ROSE BALSAM. Stems to ca. 0.75 m tall; leaf blades elliptic-lanceolate to lanceolate, 5–10(–15) cm long, 1–3 cm wide, serrate; petioles 1–2 cm long; flowers axillary, solitary or in groups of 2–3, large and showy, ca. 25–50 mm across, of various colors including white to pink, red, or yellow, often spotted, often double-flowered; capsules 1–3 cm long. Cultivated; escaped to a creek bottom in Dallas Co. ?–Nov. Native of Asia. The flowers have been used to dye fingernails (Mabberley 1997). 🌿

**Impatiens capensis** Meerb., (of the Cape of Good Hope), SPOTTED TOUCH-ME-NOT, JEWELWEED, LADY'S-EARRINGS. Plant glabrous; stems to 1.5 m tall, succulent; leaves ovate to ovate-elliptic or elliptic, to 10(–13) cm long and to 8 cm wide (often much smaller), crenate, mucronate; petioles 0.5–10 cm long, those on flowering branches often rather short; flowers usually 2–4 on axillary inflorescences, pendulous on pedicels to ca. 20 mm long; flowers of 2 kinds, some large and showy, others small and cleistogamous; larger flowers 20–30 mm long; large sepal spurred, the spur ca. 6–25 mm long and bent backward parallel to the body of the sepal; stamens 5, pistil 1, ovary superior; capsules ca. 2 cm long. Stream bottom woods; Fannin and Lamar cos. in Red River drainage; mainly e TX. May–Jul. [*I. biflora* Walter] The common name is derived from the fruits being explosively dehiscent when touched or disturbed. The sap is reported by some to prevent POISON-IVY dermatitis when rubbed on the skin (McGregor 1986). Despite the specific epithet, this species is native to North America including e TX. Austin (1975) considered this species adapted for pollination by ruby-throated hummingbirds (*Archilochus colubris*).

## BASELLACEAE MADEIRA-VINE OR BASELLA FAMILY

☛ A very small (20 species in 4 genera), mainly tropical and warm area, especially American family of climbing vines containing betalain pigments; some are cultivated as ornamentals. The family is thought to be related to the Portulacaceae. Family name from *Basella*, MALABAR-NIGHTSHADE, a genus of 5 species of Madagascar, e Africa, and one pantropical. (Latinized version of the Malabar name for the plant) (subclass Caryophyllidae)

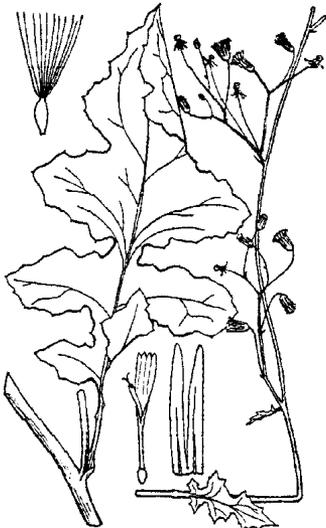
FAMILY RECOGNITION IN THE FIELD: the only nc TX species is an introduced, unarmed, non-tendriled, herbaceous vine with alternate, simple, entire, broadly ovate leaves and small white flowers on axillary spike-like racemes or panicles.

REFERENCES: Wilson 1932; Bogle 1969; Sperling & Bittrich 1993; Behnke & Mabry 1994; Nowicke 1996.

### ANREDERA MADEIRA-VINE

☛ A genus of 10–15 species of warm areas of the Americas; a number are cultivated as ornamentals. (Derivation of generic name unknown, possibly a personal name)

**Anredera cordifolia** (Ten.) Steenis, (with heart-shaped leaves), MADEIRA-VINE, MIGNONETTE-VINE. Twining, glabrous, herbaceous vine to ca. 6 m long, without tendrils or armature; perennial from a tuber-like root, hardy in nc TX; leaves alternate, simple, entire, broadly ovate, subcordate to cordate, to ca. 11 cm long, thin-fleshy, petiolate; inflorescence an axillary spike-like raceme or



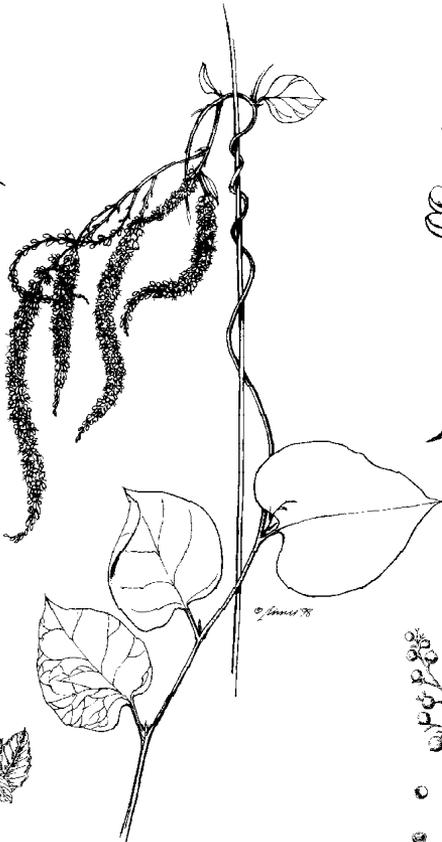
Youngia japonica [BR2]



Zinnia grandiflora [BB2]



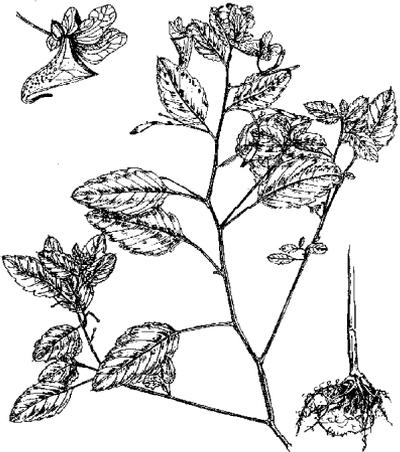
Impatiens balsamina [BL1]



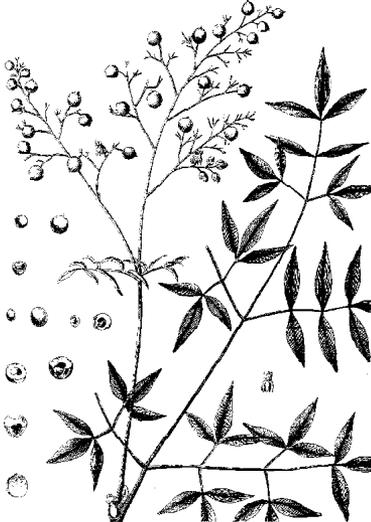
Anredera cordifolia [HEA]



Berberis trifoliolata [POW]



Impatiens capensis [CO1]



Nandina domestica [LAM]

panicle with 2–4 branches, with numerous, small, usually perfect flowers, 4–30 cm long; pedicels 1.5–2.5 mm long, with 2 minute bracteoles persistent at tip; 2 larger unwinged bracteoles slightly shorter than the perianth lobes present immediately below the 5-parted perianth; perianth to ca. 6 mm wide, white; stamens 5; pistil 1; style 3-divided ca. 1/4–3/4 of way to base; ovary superior; fruit not seen. Cultivated as an ornamental and escaping; Tarrant and Williamson cos.; we are not aware of other TX localities. Aug–Oct. Native of tropical South America. 

This species is often confused with the similar *A. baselloides* (Kunth) Baill., (resembling *Basella*—Malabar nightshade), which differs in having an undivided style and upper bracteoles with narrowly winged keels and slightly exceeding the perianth in length.

## BERBERIDACEAE BARBERRY FAMILY

Ours perennial herbs or shrubs; leaves alternate or apparently opposite, simple or compound, entire, toothed, or lobed; flowers solitary or in racemes or panicles; perianth parts in 3s, all nearly alike or distinctly differentiated into sepals and petals (1 to several rows of each), the outer usually falling as or soon after the flowers open, the innermost sometimes with glands or modified into prominent staminode-like nectaries; perianth sometimes with basal bracts; stamens as many as the petals or twice as many; anthers opening by apical valves or by a longitudinal slit; pistil 1; ovary superior; fruit in ours a berry.

☛ A medium-sized family of ca. 650 species in 15 genera (Whetstone et al. 1997a); a widespread, but especially in temperate family of trees, shrubs, or perennial herbs; often with alkaloids; tissues are often colored yellow due to the isoquinoline berberine; many are valued as ornamentals including *Berberis*, *Mahonia* (if segregated), and *Nandina*. Although the family has sometimes been split with *Podophyllum* and related genera recognized as the Podophyllaceae, a molecular study by Kim and Jansen (1996 [1997]) suggested the Berberidaceae *sensu lato* is a monophyletic group related to (sister group of) the Ranunculaceae. (subclass Magnoliidae)

FAMILY RECOGNITION IN THE FIELD: evergreen shrubs or perennial herbs with compound or deeply palmately lobed leaves; *flower parts in 3s* is a good field character for this otherwise obviously dicot family.

REFERENCES: Ernst 1964a; Norwicke & Skvarla 1981; Loconte & Estes 1989; Loconte 1993; Kim & Jansen 1996 [1997]; Whetstone et al. 1997a.

1. Evergreen shrubs; leaves numerous, with 3 leaflets or 2–3 times pinnately compound, not peltate; flowers numerous.
  2. Leaves with 3 leaflets; leaflets with spiny lobe-like teeth \_\_\_\_\_ **Berberis**
  2. Leaves 2–3 times pinnately compound; leaflets without spiny teeth \_\_\_\_\_ **Nandina**
1. Herbs; leaves 1 or 2 per plant, deeply palmately lobed, peltate; flower 1 per plant \_\_\_\_\_ **Podophyllum**

### BERBERIS BARBERRY

☛ A nearly worldwide genus of ca. 500 species (Whittemore 1997d) of usually spiny shrubs with alkaloids. Some serve as alternate hosts for cereal rusts; as a result, the sale or transport of certain species is illegal in the U.S. and Canada; a number are cultivated as ornamentals (e.g., *B. aquifolium* Pursh—OREGON GRAPE) and the berries of some species are edible. Some species were previously segregated as the genus *Mahonia*. However, species intermediate between *Mahonia* and *Berberis* (in the narrow sense) are known and recognizing segregate genera does not seem warranted (Whittemore 1997d). (Latinized from *berberys*, Arabic name of the fruit)

REFERENCES: Ahrendt 1961; McCain & Hennen 1982; Whittemore 1997d.

**Berberis trifoliolata** Moric., (with three leaflets), ALGERITAS, AGARITO, CURRANT-OF-TEXAS.

Densely leafy evergreen shrub to 2 m tall; wood yellow; leaves with 3 leaflets; leaflets narrowly oblong-lanceolate, blue-gray above, green beneath, with 1–3 pairs of spiny lobe-like teeth resembling those of HOLLY, glabrous; inflorescences of compact, axillary, umbel-like racemes; flowers small, yellow; perianth of 6–9 ± petal-like sepals, and 6 narrower, longitudinally cupped petals; anthers opening by apical valves; fruits globose, 8–10 mm in diam., red. Rocky limestone soils; Bell, Brown, Johnson, Palo Pinto, and Somervell cos., also McLennan and Parker cos. (Mahler 1988); s and w parts of nc TX s to s TX and w to Trans-Pecos. Late Feb–Mar. This species is sometimes recognized in the genus *Mahonia* [as *M. trifoliolata* (Moric.) Fedde] (e.g., Kartesz 1994). However, we are following Whittemore (1997d) and Jones et al. (1997) in treating it in *Berberis*. [*B. trifoliolata* var. *glauca* (I.M. Johnston) M.C. Johnston.] Jones et al. (1997) spelled the epithet *trifoliata*. According to Correll and Johnston (1970), an excellent jelly can be made from the fruits. The wood and roots were used as a source of yellow dye by early settlers (Kirkpatrick 1992). The stamens are reported to be touch sensitive; when touched by a pollinating insect, they spring out throwing pollen onto the pollinator (Wills & Irwin 1961; Kirkpatrick 1992). This species was reported to be susceptible to infection by the fungus, *Puccinia graminis* Pers., black stem rust of wheat (Whittemore 1997d); however, according to J. Hennen (pers. comm.), it is not susceptible; the species of *Berberis* in section *Mahonia* (sometimes treated as a separate genus) are not infected by *P. graminis*; rather they are susceptible to *Cumminsella texana* (Holw. & Long.) Arthur, an autoecious (= requires only 1 host) rust (J. Hennen, pers. comm.). The roots contain berberine and associated alkaloids and were used in folk medicine; however, in high concentrations they can cause poisoning (Powell 1988). ☠

### NANDINA SACRED-BAMBOO, HEAVENLY-BAMBOO

☞ A monotypic genus native from India to Japan; the single species is a much cultivated ornamental shrub, especially in Japan; sometimes segregated into the Nandianaceae. (Chinese name meaning plant from the south or from the Japanese name, *nanten*)

REFERENCE: Whetstone et al. 1997b.

**Nandina domestica** Thunb., (domesticated, frequently used as a house plant), SACRED-BAMBOO, HEAVENLY-BAMBOO. Evergreen shrub to ca. 1.5 m tall; leaves 2–3 pinnately compound, 50–100 cm long; leaflets lanceolate to elliptic-lanceolate, glabrous, often with reddish coloration; inflorescence a panicle to 20 cm long; flowers 3-merous, with whitish or cream-colored perianth 6–8 mm long; stamens 6; anthers opening by a longitudinal slit; fruits 6–9 mm in diam., red. Widely cultivated and escapes into sandy woods; Grayson Co., also Dallas Co. (E. McWilliams, pers. comm.) and Tarrant Co. (R. O'Kennon, pers. obs.). May–Jun. Native from India to e Asia. 🌿

### PODOPHYLLUM MAY-APPLE, MANDRAKE

☞ A genus of ca. 5 species native to e North America and the Himalayas to e Asia; sometimes segregated into the Podophyllaceae. (Greek: *podos*, foot, and *phyllon*, a leaf, probably referring to the stout petioles of the radical leaf)

REFERENCES: Swanson & Sohmer 1976; George 1997.

**Podophyllum peltatum** L., (peltate, shield-shaped), MAY-APPLE, WILD JALAP, AMERICAN-MANDRAKE. Rhizomatous perennial herb to 50 cm tall; leaves 2 (sometimes 1), appearing opposite at summit of stem, long-petioled; leaf blades large, to 30 cm or more in diam., typically peltate, suborbicular, with 5–9 segments, inconspicuously pubescent beneath; flower solitary, nodding, overtopped by the leaves; perianth white (rarely rose), of 12–15 broad tepals, the 6 outer shorter (= sepals) than the inner, falling early, the inner (= petals) 2–3.5 cm long; stamens twice as many as the petals; anthers opening by a longitudinal slit; fruit an ovoid, many-seeded, fleshy berry 3–5 cm long, yellow to purplish at maturity. Open woods and thickets, sandy soils; e TX w to Hunt Co. in South Sulphur River drainage (Mahler 1988), locally w in Red River drainage to Grayson

Co. (Buckner Preserve), and to Kaufman Co. in Trinity River drainage. Late Mar–mid-Apr. The unripe fruit is toxic but reported to be edible when ripe and is sometimes used to make preserves; all other parts of the plant are toxic, apparently including the seeds of the ripe fruit; there are over 15 biologically active compounds including the poisonous podophyllin, a bitter resin containing lignins and flavonols; podophyllin has strong cathartic and antineoplastic properties. Children have been poisoned by the unripe fruit and poisoning has resulted from the misuse of medicinal preparations. Eating large quantities of the plant or repeated applications of the resin to the skin can be fatal; workers handling the rootstocks sometimes develop dermatitis and conjunctivitis. The plant has long been used medicinally by Native Americans for warts; recently it has been used against venereal warts and testicular cancer (Muenscher 1951; Kingsbury 1964; Morton 1977; Mabberley 1987; Turner & Szczawinski 1991; Leung & Foster 1996). A rust fungus (*Puccinia podophylli* Schwein.) sometimes causes leaf lesions (J. Hennen, pers. comm.). ☞

## BETULACEAE BIRCH OR HAZELNUT FAMILY

Ours monoecious shrubs to small or large trees; leaves alternate, simple, deciduous, short-petioled; leaf blades pinnately straight-veined, serrulate or doubly serrate; stipules deciduous; perianth small or absent; staminate flowers in spreading or drooping catkins (= aments); pistillate flowers in spike-like or cone-like inflorescences; pistil 1; ovary inferior; fruit a 1-seeded samara (2-winged) or nutlet (unwinged).

☞ A small (ca. 125 species in 6 genera (Furrow 1997)), mainly n temperate family of wind-pollinated trees and shrubs with some on tropical mountains; species are variously important economically for timber, as a source of edible nuts, as ornamentals, and as aids in soil nitrification and stabilization; the two additional genera not occurring in Texas are the north temperate *Corylus* (source of hazelnuts and filberts) and the Asian *Ostryopsis*. The family was previously often split into two families, Betulaceae (*Alnus* and *Betula*) and Corylaceae (*Carpinus*, *Ostrya*, *Corylus*, and *Ostryopsis*); most modern authorities now recognize these groups at the subfamilial level (Furrow 1997). (subclass Hamamelidae)

FAMILY RECOGNITION IN THE FIELD: shrubs or trees with alternate, simple, sharp-toothed leaves, early deciduous stipules, and male flowers in long *catkins*; fruits 1-seeded, in cone-like or spike-like, obviously *bracteate* inflorescences.

REFERENCES: Little 1971; Furrow 1990, 1997; Kubitzki 1993a.

1. Leaves truncate (= as if cut or squared off) or broadly cuneate (= wedge-shaped) at base; fruits winged, subtended by a small (3–8 mm long) bract and grouped with bracts into a cone-like structure.
2. Trees with shaggy, conspicuously exfoliating bark; lower surface of leaves often grayish white, densely hairy when young; pistillate inflorescences solitary; bracts 3-lobed, 6–8 mm long, papery and eventually deciduous; buds not stalked \_\_\_\_\_ **Betula**
2. Shrubs or small trees with ± smooth bark; lower surface of leaves green, glabrous or nearly so even when young; pistillate inflorescences in groups of 2–3; bracts not lobed, 3–4 mm long, becoming woody and persistent; buds stalked \_\_\_\_\_ **Alnus**
1. Leaves rounded to subcordate at base; fruits wingless (but wing-like bract can be present), enclosed in or subtended by conspicuous sac-like or 3-lobed, wing-like bracts 8 mm or more long (well-developed bracts usually at least 15 mm long), these ± densely clustered together in a spike-like inflorescence.
3. Fruit subtended (not enclosed) by a 3-lobed bract; bark smooth, gray, the trunk appearing like rippling muscles; lower surface of mature leaves glabrous except for some hairs in the axils of the veins; none of the main side veins near the base of the leaf forked \_\_\_\_\_ **Carpinus**

3. Fruit enclosed by a pouch- or sac-like unlobed bract; bark rough, shreddy, brownish, the trunk not appearing rippled; lower surface of mature leaves pubescent; some of the main side veins near the base of the leaf forked \_\_\_\_\_ **Ostrya**

### ALNUS ALDER

☛ A genus of ca. 25 species (Furlow 1997) ranging from the n temperate zone s to Assam, se Asia, and the Andes of South America. ALDERS have a symbiotic relationship with species of the actinomycete *Frankia* (filamentous gram positive bacteria) resulting in root nodule formation and fixation of atmospheric nitrogen (Furlow 1997); as a result they can be important ecologically. Some species also produce useful timber. (Latin name for alder)

REFERENCE: Furlow 1979.

**Alnus serrulata** (Aiton) Willd., (somewhat serrate or saw-toothed), HAZEL ALDER, COMMON ALDER, SMOOTH ALDER. Shrub or small tree 2-5+ m tall; bark grayish brown or blackish gray to reddish brown; leaf blades elliptic to obovate, 1.6-12 cm long, usually widest beyond middle, cuneate to broadly cuneate basally, usually rounded to acute at apex, usually serrulate and occasionally somewhat undulate; staminate flowers 3 per bract; pistillate inflorescences cone-like, ca. 15-20 mm long, the bracts becoming woody and persistent. Along streams and wet areas; mainly deep e TX, disjunct w to Milam Co. near the e margin of nc TX, also in OK just n of the Red River. Mar-Apr.

### BETULA BIRCH

☛ A genus of ca. 35 species of n temperate and boreal zones of the n hemisphere (Furlow 1997); related to *Alnus* but the catkins shatter when ripe; some provide timber for furniture and plywood; the bark of *B. papyrifera* Marshall (PAPER BIRCH) is impervious to water and was used by Native Americans for canoes, baskets, cups, and wigwam covers. (Latin name for birch)

**Betula nigra** L., (black), RIVER BIRCH, RED BIRCH. Tree to 30 m tall; bark soft, shaggy, pinkish to tan, freely shedding; leaf blades roughly triangular to ovate, truncate to broadly cuneate at base, acute at apex, conspicuously doubly serrate at least beyond middle; staminate bracts ovate to suborbicular; staminate flowers 3 per bract, with calyx; pistillate inflorescences (= aments) up to 25-35 mm long; pistillate bracts divided from apex into 3 oblong-linear lobes, papery and eventually deciduous. Along streams and in low woods; Lamar Co. in Red River drainage, also Henderson and Limestone cos. on e edge of nc TX, also Fannin Co. (Little 1971); mainly se and e TX. Mar-Apr.

### CARPINUS HORNBEAM, IRONWOOD

☛ A genus of ca. 25 species (Furlow 1997) of the n temperate zone, especially e Asia; some provide good timber for turnery and tools; the very hard wood is used for such things as mallet heads, tool handles, and levers. According to Peattie (1948), the common name is derived from horn, for toughness, and beam, an old word for tree, related to the German, *baum*, tree. (Latin: *carpinus*, hornbeam, possibly derived from Latin: *carpentum*, a Roman horse-drawn vehicle with wheels made from its hard wood—Furlow 1997)

REFERENCES: Furlow 1987a, 1987b.

**Carpinus caroliniana** Walter, (of Carolina), AMERICAN HORNBEAM, BLUE-BEECH, WATER-BEECH, MUSCLETREE, LECHILLO, LEANTREE. Small tree with very hard wood to ca. 10 m tall; bark smooth, neither shedding nor peeling; leaf blades usually elliptic to ovate, sharply serrate, inconspicuously doubly so; staminate flowers 1 per bract, without calyx; staminate bracts acute, not awned; pistillate bracts with a long terminal lobe and 2 small lateral lobes near base. Rich or low woods and along streams; e TX w in Red River drainage to Lamar Co., also Henderson Co.,

also Hopkins Co. (Little 1971). Mar–May. This species is easily distinguished by its smooth gray bark and the rippled, muscle-like appearance of the stems. *Carpinus caroliniana* has an interesting geographic distribution—occurring mainly in the e U.S. but with disjunct populations in the mountains of Mexico and Guatemala (Miranda & Harrell 1950). This pattern is the result of a middle to late Miocene (Miocene epoch—24.6–5.1 mya) extension (during a period of climatic cooling) of deciduous forest and associated fauna (particularly amphibians) into Mexico. Subsequently, during Pliocene (Pliocene epoch—5.1–2 mya) and later times as the climate warmed and dried, these deciduous forests became disjunct, surviving in Mexico only in isolated pockets of appropriate microclimate in the highlands (Miranda & Sharp 1950; Graham 1993).

### OSTRYA HOP-HORNBEAM, IRONWOOD

☛ A genus of ca. 5 species (Furlow 1997) ranging from the n temperate zone to Central America; some provide timber. The hard wood has been used for such things as sleigh runners, airplane propellers, and mallet heads (Furlow 1997). (Greek: *ostrys*, shell, alluding to the inflated floral bracts)

**Ostrya virginiana** (Mill.) K. Koch, (of Virginia), IRONWOOD, EASTERN HOP-HORNBEAM, AMERICAN HOP-HORNBEAM, WOOLLY AMERICAN HOP-HORNBEAM, LEVERWOOD. Small tree with very hard wood to ca. 20 m tall; bark roughened, shreddy, brownish; leaf blades usually elliptic to ovate, sharply doubly serrate; staminate bracts abruptly narrowed to a spine tip (= awned); staminate flowers 1 per bract, without calyx; pistillate bracts pouch-like. Lowland or upland woods; e TX with a disjunct collection in the East Cross Timbers at Handley, Tarrant Co., in 1910, but not found there recently (Mahler 1988). Late Feb–Mar.

## BIGNONIACEAE CATALPA OR TRUMPETVINE FAMILY

Ours shrubs, trees, or woody vines; leaves opposite or the uppermost alternate, simple or pinnately compound, entire, toothed, or lobed; flowers rather large and showy, in terminal panicles or spike-like racemes, or in axillary clusters; calyces short, 2-lipped or unequally 4- to 5-toothed; corollas campanulate to funnellform, radially symmetrical to bilabiate, 5-lobed; stamens 2 or 4; pistil 2-carpellate; style and stigma 1; fruit a capsule; seeds numerous, winged.

☛ A medium-sized (750 species in 109 genera), mainly tropical family centered in n South America; nearly all species are woody, ranging from numerous lianas to trees and shrubs, or rarely herbs; it includes showy tropical ornamentals such as *Crescentia* (CALABASH-TREE), *Jacaranda*, *Kigelia* (SAUSAGETREE), *Spathodea* (AFRICAN-TULIPTREE, FLAMETREE), and *Tabebuia* (POUI) as well as some valuable for timber including *Tabebuia. Tecomastans* (L.) Juss. ex Kunth, (genus: from tecomaxochitl, a Mexican name; species: erect, upright), TRUMPET-FLOWER, a yellow-flowered small shrub (< 1 m tall), known mainly from the Trans-Pecos, was reported by Hatch et al. (1990) from vegetational area 4 (Fig. 2); this is apparently based on a collection near San Antonio (Correll & Johnston 1970) well to the s of nc TX. (subclass Asteridae)

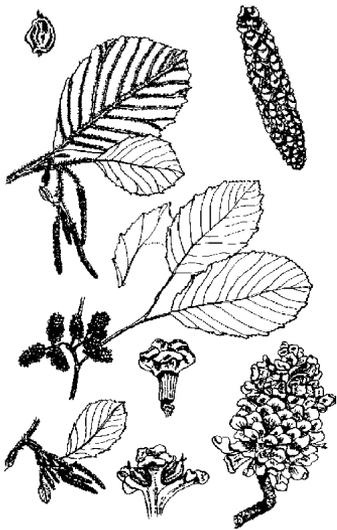
FAMILY RECOGNITION IN THE FIELD: shrubs, trees, or woody vines with large showy flowers in racemes, panicles, or axillary clusters; corollas sympetalous, tubular, bilaterally symmetrical, with 2 or 4 separate, epipetalous stamens; capsules usually large, woody, with winged seeds. The family shares a number of characters with the Scrophulariaceae (e.g., corolla shape, number of stamens) and the two are apparently related; however, all nc TX scrophs are herbs.

REFERENCE: Shinnery 1961.

1. Corollas bright yellow or greenish yellow to orange-red; leaves all opposite, mostly compound (usually 2–13 leaflets); trailing to high-climbing vines; fruits 8–17 cm long.
2. Tendrils present; leaflets (1–)2, entire, evergreen; flowers in axillary inflorescences \_\_\_\_\_ **Bignonia**
2. Tendrils absent; leaflets 7–13, sharply toothed, deciduous; flowers in terminal inflorescences \_\_\_\_\_ **Campsis**



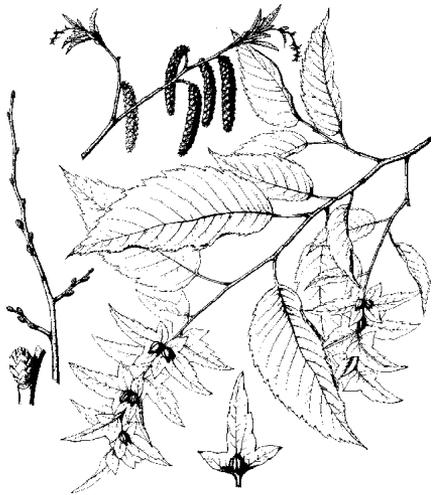
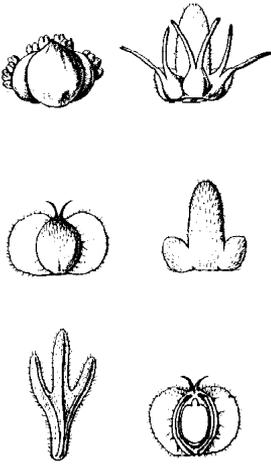
*Podophyllum peltatum* [LAM, nic]



*Alnus serrulata* [co1]



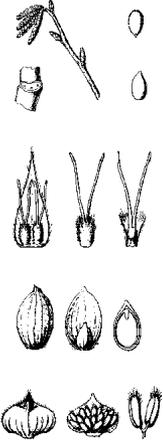
*Betula nigra* [SA3]



*Carpinus caroliniana* [SA3]



*Ostrya virginiana* [SA3]



1. Corollas white to rosy lavender with orange or purple markings inside; uppermost leaves usually alternate; leaves simple; shrubs or trees; fruits to 45 cm long.

3. Leaves subsessile, the blades linear-lanceolate, glabrous, unlobed \_\_\_\_\_ **Chilopsis**

3. Leaves petioled, the blades ovate, pubescent beneath, the larger lobed \_\_\_\_\_ **Catalpa**

### BIGNONIA CROSSVINE, QUARTERVINE

☛ A monotypic genus of the se United States. (Named for the Abbé Jean-Paul Bignon, 1662-1743, court-librarian at Paris and a friend of Tournefort)

**Bignonia capreolata** L., (winding or twining), CROSSVINE, QUARTERVINE. High-climbing, woody, evergreen vine; leaves typically 2-foliolate, terminated by a several-branched, disk-bearing tendril; leaflets cordate at base; petioles 1-2 cm long; flowers in axillary clusters; corollas red-orange, lighter inside, 4-5 cm long; capsules linear, flattened, 10-17 cm long. Moist woods in se and e TX, cultivated and spreads or escapes in nc TX; Dallas and Grayson cos. Mar-Jul. [*Anisostichus capreolata*(L.) Bureau]

### CAMPSIS TRUMPET-CREEPER

☛ A genus of 2 species of adventitious root-climbers; both are cultivated as ornamentals; one occurs in e North America and the other in e Asia.

This disjunct e Asia-e North America distribution pattern is an interesting one to plant geographers. In the geologic past, dispersal between the Eurasian and North American continents was possible, and the combined area is considered a single "Holarctic" biogeographic region. The fossil record shows that many plants had distributions across the Northern Hemisphere—temperate forests, for example, occurred very broadly and reached their maximum extension in the mid-Tertiary (the Tertiary extended from 65 million years ago to 5 mya). This widespread flora has been referred to as the Arcto-Tertiary flora or the Tertiario-mesophytic flora. Geohistorical events from the mid-Tertiary to the present have included alterations in the shapes of the northern land masses, fluctuations in sea levels, mountain building, and profound changes in the climate. As a result, there have been great changes in both the composition and the disposition of the flora and the ranges of many plant have been greatly restricted (e.g., eliminated from Europe and w North America). A significant number now survive in only two areas, e North America and e Asia. The genus *Campsis* is such an example (other nc TX examples include *Carya*, *Menispermum*, *Penthorum*, *Phryma*, *Sassafras*, *Saururus*, *Triadenum*, *Triosteum*, and *Veronicastrum*) (Li 1952b; Little 1970; Graham 1972; Boufford & Spongberg 1983; Hamilton 1983; Hsü 1983; Wu 1983; Ying 1983; Cox & Moore 1993; Graham 1993a).

(Greek: *campsis*, curvature, from the curved stamens)

**Campsis radicans** (L.) Seem. ex Bureau, (rooting), COMMON TRUMPET-CREEPER, COWITCH VINE, TRUMPET-HONEYSUCKLE. Shrubby vine climbing to 10 m or more, with aerial rootlets; leaves odd-pinnate; flowers in terminal panicles; calyx teeth about 1/5 as long as the tube; corollas 2-2.5 cm long, with 5 short recurved lobes, orange to orange-red with orange-red to scarlet lobes; capsules cylindrical-oblong, 8-12 cm long. Stream banks, disturbed ground, along fences, also cultivated; e 1/2 of TX. Jun-Aug. This species is sometimes planted as an ornamental but can get out of control and become problematic. The flowers are visited by and presumably pollinated by ruby-throated hummingbirds (*Archilochus colubris*) (James 1948). Dermatitis has been reported in some individuals from handling the leaves or flowers (Muenscher 1951; Burlage 1968). ☛ ☒/81

### CATALPA INDIAN CIGARTREE, CIGARTREE

☛ A genus of 11 species of e North America (including the West Indies) and e Asia; this disjunct distribution pattern is discussed under the genera *Campsis* (Bignoniaceae) and *Carya*

(Juglandaceae); cultivated as ornamentals and used for timber. (The Native American name)  
 REFERENCE: Weniger 1996.

**Catalpa speciosa** (Warder) Warder ex Engelm., (showy, good-looking), NORTHERN CATALPA, CATAWBA-TREE, CIGARTREE, HARDY CATALPA. Deciduous tree to 30 m tall; leaf blades ovate to ovate-oblong, 15–30 cm long, truncate to cordate at base, acuminate at apex; petioles to 15 cm long; inflorescence a showy, few-flowered panicle; corollas to ca. 50 mm long, white, with yellow lines and brown-purple markings inside; fruit a long (20–45(–60) cm), cylindric, cigar-like capsule ca. 1.5 cm thick; seeds flat, 30–40 mm long, 4–5(–8) mm wide. Cultivated, roadsides, along streams; escapes in e 1/2 of TX. May. Native of Mississippi Valley. When damaged by herbivores, the leaves produce extrafloral nectar which attracts insects that deter the leaf-eating herbivores (Mabberley 1987).

### CHILOPSIS DESERT-WILLOW, MIMBRE

☛ A monotypic genus of the sw United States and Mexico; the branches are used to make baskets. (Greek: *chil*, lip, and *opsi* appearance, from flower shape resembling lips)  
 REFERENCES: Fosberg 1936; Henrickson 1985.

**Chilopsis linearis** (Cav.) Sweet, (narrow, with sides nearly parallel), DESERT-WILLOW, FLOWERING-WILLOW, WILLOW-LEAF CATALPA, DESERT-CATALPA, FLOR DE MIMBRE, BOW-WILLOW. Shrub or small tree to 10 m tall; leaves opposite or alternate; leaf blades linear-lanceolate, entire; inflorescences terminal racemes to 30 cm long; flowers sometimes sterile (J. Stanford, pers. comm.); corollas variable in color, usually white with purple lower lip and yellow lines in throat to rarely both lips white or purplish red with purple stripes; fruits to 30 cm long, usually ca. 6 mm thick. Cultivated and long persists, planted along highways, escapes; Tarrant Co., also long persisting (ca. 100 years) in Hamilton Co. (J. Stanford, pers. comm.). May–Sep. Native of Mexico and sw U.S. e to wc TX.

## BORAGINACEAE FORGET-ME-NOT OR BORAGE FAMILY

Ours pubescent, bristly-hispid, or glabrous annual or perennial herbs; leaves alternate, simple, entire, usually sessile; flowers terminal or axillary, solitary, in small cymes, or uncurling, 1-sided, spike-like or raceme-like inflorescences (= scorpioid cymes); sepals 5, barely united at base; corollas 5-toothed or -lobed, rotate, tubular, funnellform, or salverform; stamens 5, attached near base of corolla or higher in tube; pistil 2-carpellate; ovary superior, usually 4-lobed; style and stigma 1; fruit usually breaking into 4 one-seeded achene-like mericarps (“nutlets”), sometimes reduced to fewer by abortion.

☛ A large (2,300 species in 130 genera) family of mainly temperate and subtropical herbs to shrubs, trees, and vines including a number of ornamentals such as *Heliotropium* (HELIO-TROPE), *Mertensia* (VIRGINIA BLUEBELLS) and *Myosotis* (FORGET-ME-NOT); some, including *Borago officinalis* L. (BORAGE) and *Symphytum officinalis* L. (COMFREY), have been used for flavorings or medicinally; most members of the family are characterized by a 1-sided inflorescence that uncoils as it matures; alkaloids are often present. The Boraginaceae are related to and sometimes lumped with the tropical family Ehretiaceae (Judd et al. 1994). There are also affinities with the Hydrophyllaceae and Verbenaceae. *Ehretia anacua* (Terán & Berland.) I.M. Johnston, (genus: for Georg Dionysius Ehret, 1708–1770, illustrator; sp: *anacua* or *anacahuite*, Mexican names for the plants), SUGARBERRY, KNOCKAWAY, ANAGUA, a tree to 15 m tall with orange or dark yellow drupes ca. 5–8 mm in diam., was cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2). While planted further n, it is apparently native only as far n as Travis Co. just s of nc TX (Correll & Johnston 1970). This genus of 50 species of tropical and warm areas is treated in the Boraginaceae by some authorities and in the Ehretiaceae by others. (Asteridae)

FAMILY RECOGNITION IN THE FIELD: herbs with alternate, coarse, rough-hairy leaves and round stems; flowers usually in *scorpioid* cymes (= 1-sided, uncurling inflorescences), with sympetalous, radially symmetrical corollas and 5 stamens; fruits of 4 mericarps.

REFERENCES: Johnston 1954a, 1966; Al-Shehbaz 1991.

1. Flowers in naked, spike-like or raceme-like cymes, none or only the lowest in the axils of leaves or bracts; corollas very small in all species keying here except the rare *Cynoglossum*.
2. Flowers sessile, crowded, remaining less than 5 mm apart in age; ovary unlobed \_\_\_\_\_ **Heliotropium**
2. Flowers sessile OR short- to rather long-pedicelled, becoming widely spaced, usually 5–30 mm or more apart during or after flowering; ovary 4-parted or lobed.
3. Calyces with ± appressed hairs; corollas usually pale to deep blue (rarely white), 8–12 mm broad; basal leaves large, to 26 cm long \_\_\_\_\_ **Cynoglossum**
3. Calyces with widely spreading or reflexed hairs; corollas white or yellow (rarely slightly bluish), very small; leaves small, < 7.5 cm long.
4. Flowers sessile; calyx hairs all straight and sharp-pointed; axis of spike with both wide-spreading (usually conspicuous with a hand lens) and appressed hairs.
5. Corollas white with greenish yellow eye, < 3 mm long; calyx lobes remaining close together and thus appearing fused even at maturity, only slightly spreading apart apically; mericarps essentially smooth but with a groove along 1 side \_\_\_\_\_ **Cryptantha**
5. Corollas light yellow, 4–5 mm long; calyx lobes often spreading and clearly separated at maturity; mericarps with toothed ridges and a conspicuously warty surface, without a groove \_\_\_\_\_ **Amsinckia**
4. Flowers pedicelled; calyx hairs (at least some) hooked; axis of racemes (except near base) with uniformly incurved, subappressed hairs \_\_\_\_\_ **Myosotis**
1. Flowers in the axils of leaves or bracts (these sometimes small); corollas of various sizes, very small to large.
6. Corollas strongly bilaterally symmetrical, funnellform, with the upper side longer, bright blue (rarely rose or white), showy, 10–20 mm long; stamens conspicuously exerted from the corolla, separate; rare introduced species \_\_\_\_\_ **Echium**
6. Corollas radially symmetrical, of various colors and sizes; stamens not exerted (except exerted in *Borago* where they form a cone around the style as in *Solanum*); widespread native and introduced species.
7. Corolla limb (= open face of corolla) 10–24 mm wide, pure white with yellow center OR blue or purplish; only in West Cross Timbers and e along rivers OR an escaped cultivar.
8. Corollas pure white with yellow center, with a distinct narrow tube 8–11 mm long; stamens not exerted; lower leaf blades ca. 18 mm or less wide; stem hairs mostly appressed; native in West Cross Timbers and e along rivers \_\_\_\_\_ **Heliotropium**
8. Corollas blue or purplish, rotate to bell-shaped, without a distinct tube; stamens strongly exerted, conspicuous; lower leaf blades 30–80 mm wide; stem hairs spreading at ± right angle to stem; escaped cultivar \_\_\_\_\_ **Borago**
7. Corolla limb < 10 mm wide, OR if more then yellow or orange-yellow; native and introduced species widespread in nc TX.
9. Corollas tubular (lobes not reflexed to form a flattened limb), white to green; leaf blades conspicuously 5–7 veined, the veins visible at a glance \_\_\_\_\_ **Onosmodium**
9. Corollas salverform or funnellform (lobes reflexed to form a somewhat flattened limb), variously colored; leaf blades with only the central vein conspicuous.
10. Corollas yellow to orange-yellow, 11–48 mm long (tube plus lobes); plants perennial \_\_\_\_\_ **Lithospermum**
10. Corollas variously colored but not yellow (except sometimes in very center), usually < 7.5 mm long, to 13 mm in one species with blue or purple flowers; plants usually annual.

11. Stems with wide-spreading hairs.
12. Corollas 4–5.5 mm long, white with a yellow center; fruits (= mericarps) not prickly or spiny, easily visible at maturity \_\_\_\_\_ **Lithospermum**
12. Corollas 3 mm or less long, blue to white, sometimes with a yellow center; fruits either prickly or spiny and easily visible at maturity OR not prickly or spiny and completely obscured from view by the calyx lobes.
13. Calyces rather coarsely pubescent with slender ± appressed hairs only; calyx lobes not significantly obscuring the fruit from view; fruits prickly or spiny, the prickles sometimes partly or almost completely united into a wing or cup-like structure \_\_\_\_\_ **Lappula**
13. Calyces prickly-hispid with spiny, conspicuously spreading hairs and pubescent with slender ones as well; calyx lobes completely obscuring the fruit from view; fruits essentially smooth, not prickly \_\_\_\_\_ **Cryptantha**
11. Stems with appressed hairs only.
14. Upper stem leaves short-petioled or with slender petiolar bases; fruiting calyx lobes conspicuously unequal; flowering late May and after \_\_\_\_\_ **Heliotropium**
14. Upper stem leaves sessile, often slightly clasping; fruiting calyx lobes ± equal in length; flowering early May or before \_\_\_\_\_ **Buglossoides**

### AMSINCKIA FIDDLENECK, TARWEED

☛ A genus of 15 species of w North America and w temperate South America. (Named for Wilhelm Amsinck, a burgomaster of Hamburg, who early in the 19th century gave important support to the botanical garden of that city)

REFERENCES: MacBride 1917; Ray & Chisake 1957a, 1957b, 1957c.

**Amsinckia menziesii** (Lehm.) A. Nelson & J.F. Macbr., (for Archibald Menzies, 1754–1842, British naval surgeon and botanist who accompanied Vancouver on his voyage of Northwest Pacific exploration, 1790–1795), SMALL-FLOWER FIDDLENECK. Bristly annual 30–60 cm tall; stems simple or freely branched, usually decumbent; inflorescences spike-like, becoming greatly elongated, with few or no bracts; fruiting calyces 6–8 mm long, the lobes narrowly to broadly elongate; corollas light yellow, narrowly funnellform, 4–5 mm long, the lobes small; mericarps 4, triangular, 2.5–3 mm long, the surface conspicuously ridged and roughened. Grasslands and dry areas; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); mainly c TX. Mar–May. Native of nw U.S. and adjacent Canada. [*A. micrantha* Suksd.]

### BORAGO

☛ A genus of 3 species native to the Mediteranean region, Europe, and Asia; cultivated as ornamentals. (Possibly from Latin: *burra*, a hairy garment, alluding to the leaves which are usually densely hairy)

**Borago officinalis** L., (medicinal), BORAGE. Coarsely hairy annual; stems ascending to erect, 20–70 cm tall; leaves alternate, entire, obovate to oblong; inflorescences open, leafy, cymose; calyces of 5 linear segments; corollas blue or purplish, large, the lobes 8–12 mm long and somewhat reflexed; anthers 5, connivent in an erect cone-like arrangement, 5–8 mm long; ovary 4-lobed; mericarps 4. Cultivated and escapes, weedy area; Tarrant Co. (R. O’Kennon pers. obs.); we are not aware of other TX localities. Spring–fall. Native to Mediterranean region. This species has been used as a flavoring, medicinally, and as an ornamental (Woodland 1997). *Borago* flowers are an example of the “vibrator” or “buzz” pollination syndrome; pollinators (such as bumblebees) shake the anthers by vibrating their thoracic flight muscles at a certain frequency; this sets up a resonance in the anthers or the space they enclose and the otherwise inaccessible pollen is released from the anthers and collected by the insect (Barth 1985; Proctor et al. 1996). The

turned back (reflexed) corollas and exposed anther-cone of “vibrator”-type flowers may be an adaptation to minimize dampening of vibration resonance or it may be an adaptation related to microclimate in the flower (e.g., to keep the pollen in a dry powdery condition so that it is easily dispersed) (Corbet et al. 1988; Proctor et al. 1996). 🌿

### BUGLOSSOIDES

☞ A temperate Eurasian genus of 15 species; it is sometimes lumped into *Lithospermum* (e.g., Mabberley 1997). (From the old genus name, *Buglossum* and the Greek, *-oides*, resembling)

**Buglossoides arvensis** (L.) I.M. Johnst., (pertaining to cultivated fields). Erect annual, 20–70 cm tall; stem leaves lanceolate to linear; flowers in leafy bracted racemes which at maturity are loosely flowered; corollas white (rarely yellowish or purplish); mericarps brown, tuberculate, wrinkled, or pitted, ca. 3 mm long. Ditch banks, roadsides, disturbed sites; se and e TX w to West Cross Timbers, also Edwards Plateau. Mar–May. Native of Europe. Sometimes recognized in the genus *Lithospermum* [as *L. arvense* L.] (e.g., Jones et al. 1997). 🌿

### CRYPTANTHA

☞ A genus of 100 species of w North America. (Greek: *krypta*, to hide, and *anthos*, flower, from cleistogamous flowers of some species)

REFERENCE: Johnston 1925.

**Cryptantha texana** (A. DC.) Greene, (of Texas), TEXAS CRYPTANTHA. Prickly-hispid annual with erect to decumbent stems to 40 cm long; flowers in uncurling, 1-sided inflorescences to ca. 15 cm long, without bracts; calyces with conspicuous sharp hairs; corollas white with greenish yellow eye, < 3 mm long; mericarp usually 1. Loose sandy soils; s Texas n to Somervell Co.; endemic to TX. Apr–May. 🌿

### CYNOGLOSSUM HOUND’S-TONGUE, BEGGAR’S-LICE

☞ A temperate and warm area, especially Old World genus of ca. 75 species; some have alkaloids; a few are cultivated as ornamentals and the European *C. officinale* L. (HOUND’S TONGUE) was formerly used medicinally. (Greek: *kyon* or *cyna*, dog, and *glossa* tongue, alluding to the strap-shaped, lumpy leaves)

**Cynoglossum virginianum** L., (of Virginia), BLUE COMFREY, BLUE HOUND’S-TONGUE, WILD COMFREY. Erect pubescent perennial, 30–80 cm tall; basal leaves large, to ca. 26 cm long, elliptic-oblong, with long petioles to ca. 7 cm long; stem leaves smaller, sessile and some ± clasping; inflorescences branched, long pedunculate; corollas blue to whitish, ca. 8–12 mm broad; mericarps 5.5–7 mm long, covered with bristles and sticking to hair or clothing. Sandy woods, low ground; Dallas Co.; mainly e TX. Mar–Apr. According to Burlage (1968), reputed to be poisonous. ☠️

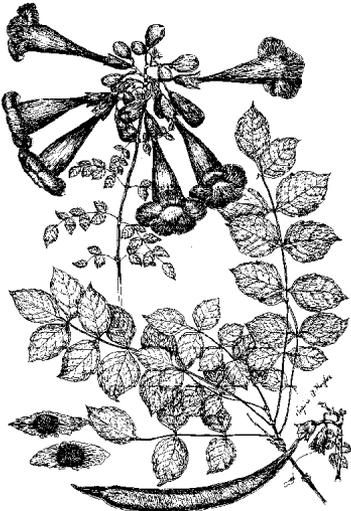
*Cynoglossum zeylanicum* (Hornem.) Thunb. ex Lehm., (of Ceylon, Ceylonese), native to Asia, is reported by Hatch et al. (1990) from vegetational area 4 (Fig. 2) and e TX; we have seen no TX specimens of this species. It differs from *C. virginianum* in having smaller mericarps (2.5–4 mm long) and smaller corollas (< 6 mm broad). 🌿

### ECHIUM VIPER’S-BUGLOSS

☞ An Old World genus of 60 species; a number are cultivated as ornamentals, some were used medicinally, and ☠️ some contain pyrrolizidine alkaloids (Kingsbury 1964). (A plant name used by Dioscorides, from Greek: *echis*, viper; from a supposed resemblance of the mericarps to a viper’s head)



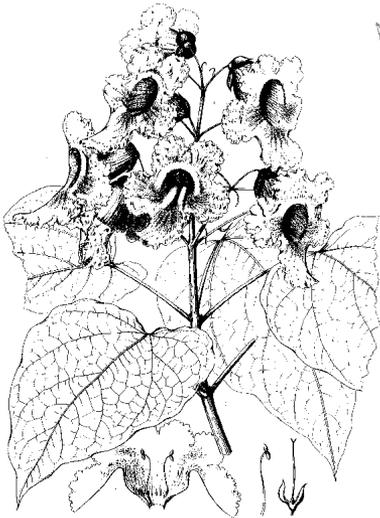
*Bignonia capreolata* [RAD]



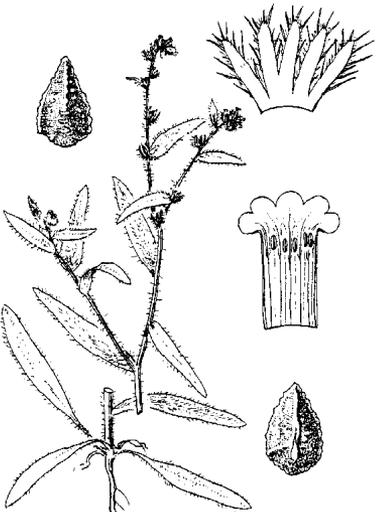
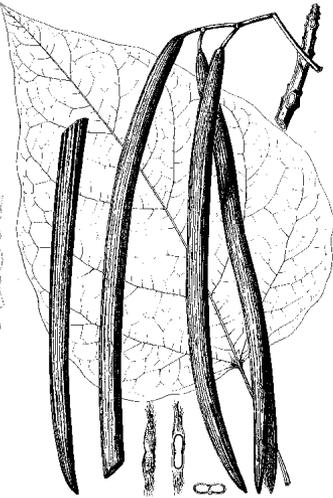
*Campsis radicans* [REE]



*Chilopsis linearis* [SA3]



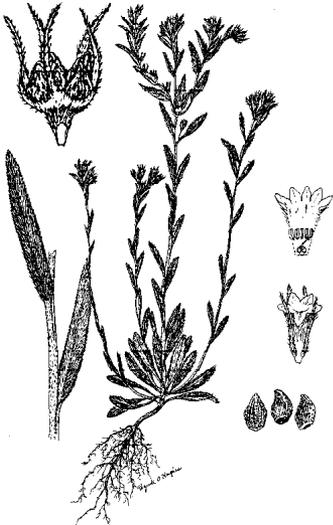
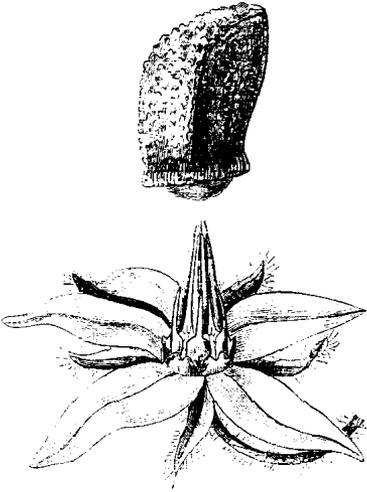
*Catalpa speciosa* [SA3]



*Amsinckia menziesii* [PWJ]



*Borago officinalis* [BEN, EN2]



*Buglossoides arvensis* [REE]

**Echium vulgare** L., (common), BLUEWEED, BLUEDEVIL, VIPER'S-BUGLOSS. Rough, bristly, biennial herb; stems erect, 30–90 cm tall; leaves alternate; lower leaves oblanceolate, broadly stalked, forming a non-persistent rosette; stem leaves reduced upward, the middle ones linear-lanceolate, 3–9 cm long, sessile; inflorescences panicle-like, the side branches one-sided, bracteate; corollas bright blue (rarely rose or white), showy, 10–20 mm long; stamens 5, 4 conspicuously exerted, the fifth included or barely exerted; mericarps 1–4, ca. 2 mm long, much shorter than the persistent calyces. Roadsides, waste places; Burnet Co. on sw margin of nc TX (portion of a single plant was collected by Chuck Sexton in 1997, pers. comm.); other TX locations not known. Native of Eurasia. This species can be an obnoxious weed in some parts of e North America (Fernald 1950a). Reported to contain poisonous pyrrolizidine alkaloids, consolicine and cynoglossine; toxicity is associated with the use of *Echium* in herbal teas; severe liver damage can result; the bristly hairs can also produce dermatitis (Muenscher 1951; Burlage 1968; Lampe & McCann 1985). ☣ 🌿

### HELIOTROPIUM HELIOTROPE, TURNSOLE

Ours annual to perennial, glabrous or pubescent herbs; flowers in terminal, bractless, 1-sided, uncoiling cymes or in bracted cymes or solitary in the upper axils and at the tips of branches; corollas funnelform to salverform, white to blue or purplish; mericarps 4, free or in pairs, sometimes seemingly 2.

☞ A tropical and temperate genus of ca. 250 species; a number are cultivated as ornamentals; ☣ some contain pyrrolizidine alkaloids and can cause severe liver damage; because toxicity is associated with their use as herbal teas (Lampe & McCann 1985), they should not be used in teas or ingested in other ways. (Ancient name from Greek: *helios*, the sun, and *trope*, a turn; ancient writers believed the flowers turned toward the sun; or because some species flower at summer solstice)

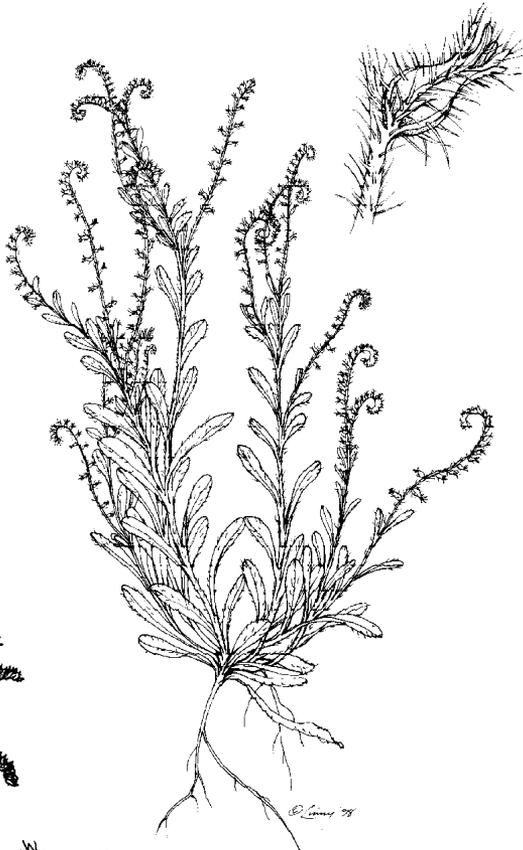
1. Flowers numerous, in 1-sided, bractless, conspicuously uncurling spike-like cymes.
  2. Plant glabrous and glaucous; leaves succulent \_\_\_\_\_ **H. curassavicum**
  2. Plant pubescent, not glaucous; leaves not succulent.
    3. Leaves with a very distinct petiole 4–10 cm long; leaf blades ovate to elliptic, 20–100 mm wide \_\_\_\_\_ **H. indicum**
    3. Leaves without a distinct petiole, sessile or nearly so; leaf blades oblong to oblanceolate, 18 mm or less wide \_\_\_\_\_ **H. amplexicaule**
1. Flowers solitary in leaf axils and at branch tips or relatively few in a leafy-bracted cyme that does not uncurl.
  4. Corolla limb (= open face of flower) 4–8 mm broad; leaf blades linear or linear-lanceolate, 1–3(–5) mm or less wide \_\_\_\_\_ **H. tenellum**
  4. Corolla limb 10–22 mm broad; leaf blades lanceolate to elliptic or ovate, to 18 mm wide \_\_\_\_\_ **H. convolvulaceum**

**Heliotropium amplexicaule** Vahl, (stem-clasping), VIOLET HELIOTROPE. Pubescent perennial 20–50 cm tall; inflorescence terminal on an essentially bractless peduncle 1–10 cm long, of 2–5 uncoiling, 1-sided, spike-like cymes; corollas funnelform, blue or purple (rarely white), the limb 4–8 mm across, the tube ca. 5 mm long. Cultivated and escaped to fields and waste places; Bell Co. and Milam–Bell Co. line; mainly e TX and Edwards Plateau. Apr–Aug. Native of Argentina and Uruguay. 🌿

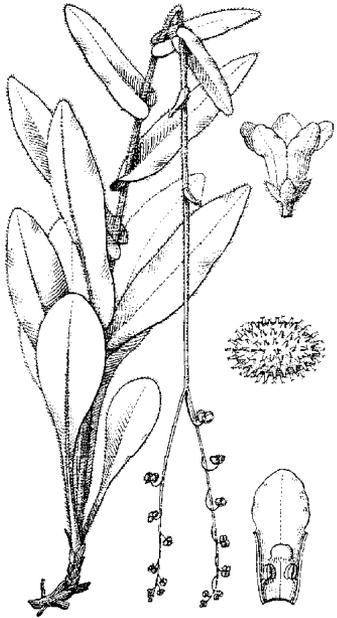
**Heliotropium convolvulaceum** (Nutt.) A. Gray, (resembling *Convolvulus*–bindweed), BINDWEED HELIOTROPE, Annual to ca. 40 cm tall; flowers axillary, not in well-defined inflorescences; corollas conspicuous, white with yellow throat, fragrant, with broad limb that is obscurely if at all lobed and narrow tube 8–11 mm long. Loose sandy soils; Panhandle to Trans-Pecos, e to Palo



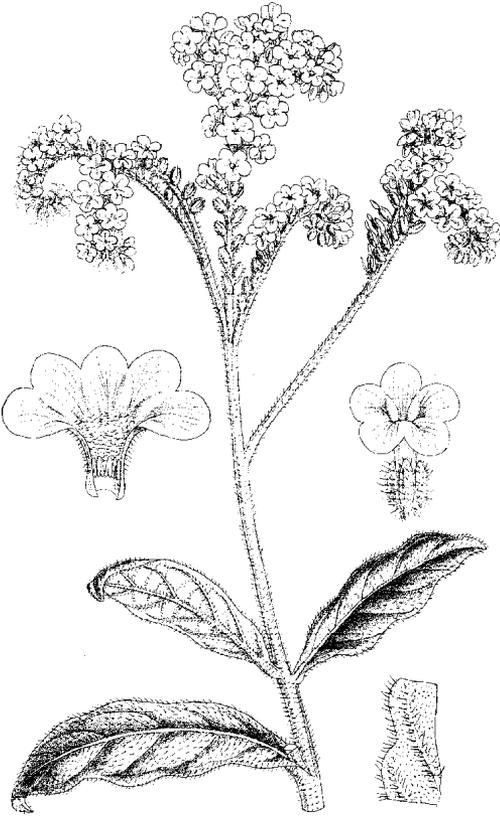
*Echium vulgare* [MUE]



*Cryptantha texana* [HEA]



*Cynoglossum virginianum* [ENI]



*Heliotropium amplexicaule* [CUR]

Pinto and Wichita cos. and e along Red River to Grayson and Lamar cos., also e along Brazos River to McLennan Co. (Correll & Johnston 1970). Late Jun–Sep. The hairs of this plant can be quite irritating.

**Heliotropium curassavicum** L., (of Curaçao in s West Indies), SALT HELIOTROPE, CHINESE-PULSEY, QUAILPLANT, SEASIDE HELIOTROPE, COLA DE MICO. Usually rhizomatous perennial with prostrate to half decumbent rubbery stems; corollas usually white or bluish, with yellow eye, small, the limb 4–7 mm across. Low alkaline places, saline situations; Archer, Brown, Dallas, Grayson, and Young counties, also Tarrant Co. (Mahler 1988); mainly Rolling Plains s and w to w TX, also coastal. Jun–Aug. The Spanish common name, COLA DE MICO, meaning monkey's tail, is presumably in reference to the uncoiling inflorescences. The species is considered native from the s U.S. s through the West Indies and Central America s to South America (Correll & Johnston 1970). Toxicity has been reported from the use of this plant in herbal teas (Mulligan & Munro 1990). ☣

**Heliotropium indicum** L., (of India), INDIA HELIOTROPE, TURNSOLE, ALACRANCILLO. Densely pubescent annual to 1 m tall; corollas blue or violet, rarely white, the limb to 4.5 mm across, the throat glabrous outside; fruits 2-lobed; mericarps smooth, strongly ribbed. Moist disturbed areas of creeks and ponds; se and e TX w to Grayson and Tarrant cos.; also w to Bexar Co. Jun–Oct. Despite the specific epithet, this species is considered to be native to the warmer parts of the New World; it is also present [introduced?] in the Old World tropics (Correll & Johnston 1970); Hatch et al. (1990) treated it as native to TX. Poisonous due to the presence of pyrrolizidine alkaloids (Burlage 1968; Lampe & McCann 1985). ☣

**Heliotropium tenellum** (Nutt.) Torr., (tender, soft), PASTURE HELIOTROPE. Erect annual to ca. 50 cm tall, appressed-pubescent; flowers solitary at branch tips and in upper axils, together sometimes appearing like a loose, bracted raceme; corollas white with a yellowish eye, the limb 5–6 mm across; mericarps 4, ribbed, at first paired and the fruit conspicuously 2-lobed. Limestone outcrops; most of e 1/2 of TX. May–Oct.

Two additional species, *H. procumbens* Mill., (prostrate), and *H. racemosum* Rose & Standl., (with flowers in racemes), cited by Hatch et al. (1990) for vegetational area 4 (Fig. 2), probably occur only to the s of nc TX. *Heliotropium procumbens* resembles *H. indicum* but has white corollas with the throat sparingly pubescent outside, while *H. racemosum* resembles *H. convolvulaceum* but has the corollas clearly lobed, the lobes triangular and acute, and the flowers in well-defined racemose inflorescences.

## LAPPULA STICKSEED

☞ A genus of 40 temperate Eurasian species and 5 in North America. (Latin: *lappa*, a bur, presumably in reference to the fruit)

REFERENCE: Johnston 1924.

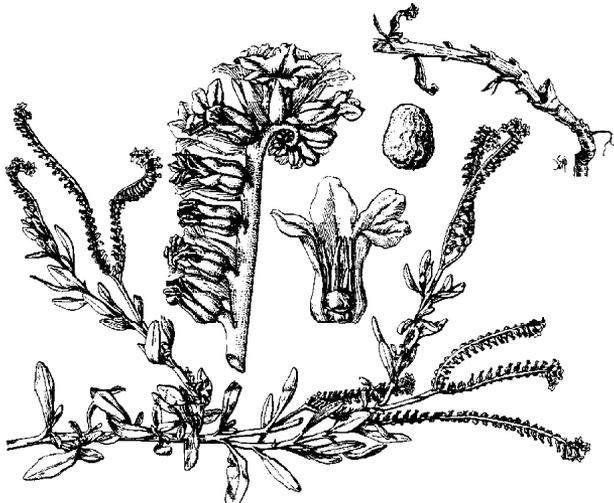
**Lappula occidentalis** (S. Watson) Greene, (western). Annuals 10–50 cm tall, hispid-villous; corollas pale blue to white, sometimes with yellow eye, small, the tube about 1.2 mm long; mericarps 4, smooth with margins of a single row of prickles, the prickles separate or united into wings. Sandy or gravelly open ground. Late Mar–May.

1. Prickles of fruits partly or almost completely joined into spiny-margined wings or a cup-like structure \_\_\_\_\_ var. **cupulata**
1. Prickles of fruits separate or nearly so \_\_\_\_\_ var. **occidentalis**

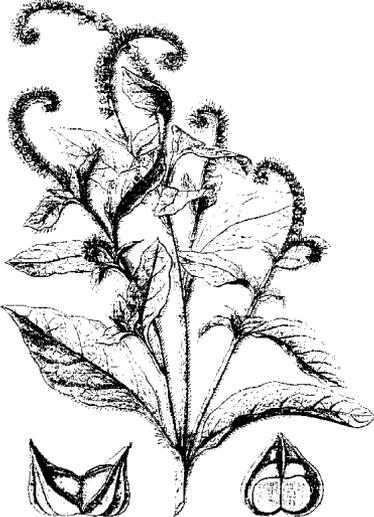
var. **cupulata** (A. Gray) L.C. Higgins, (cup-like), HAIRY STICKSEED, CUPSEED. Mills, Palo Pinto, and Wichita cos. w and s to w TX, local e to Fort Worth (Tarrant Co.) where probably introduced. [L.



*Heliotropium convolvulaceum* [PL]



*Heliotropium curassavicum* [MAS]



*Heliotropium indicum* [EN2]



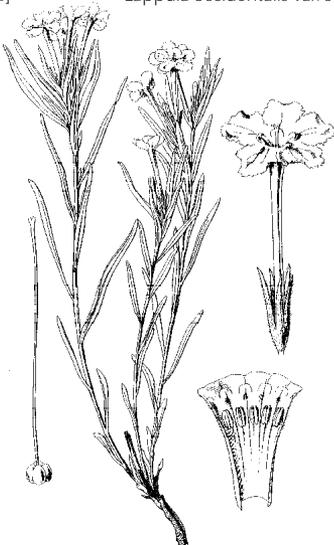
*Heliotropium tenellum* [GLE]



*Lappula occidentalis* var. *cupulata* [BB2]



*Lithospermum carolinense* [GLE]



*Lithospermum incisum* [HO1]

*redowskii* of authors, not (Hornem.) Greene var. *texana* (Scheele) Brand, *L. redowskii* of authors, not (Hornem.) Greene var. *cupulata* (A. Gray) M.E. Jones, *L. texana* (Scheele) Britton]

var. **occidentalis** (S. Watson) Rydb., FLAT-SPINE STICKSEED. Mainly Palo Pinto and Wichita cos. s and w to w TX. [*L. redowskii* of authors, not (Hornem.) Greene, *L. redowskii* of authors, not var. *occidentalis* (S. Watson) Rydb.]

### LITHOSPERMUM PUCCOON, GROMWELL

Ours low, pubescent perennials or annuals with rather showy yellow to orange-yellow flowers (or flowers small and white with yellow centers in one species rare on s margin of nc TX) in leafy-bracted terminal inflorescences; mericarps smooth or pitted, sometimes with a constriction above the base.

☛ A genus of 45 species in temperate regions of the world except Australia; some are cultivated as ornamentals or used medicinally; the roots of some U.S. species were used by Native Americans and early settlers as a source of a red dye; it is still used today in dyeing weaver's wool (Ajilvsgi 1984). (Greek: *lithos*, stone, and *sperma*, seed, from the hard mericarps)

REFERENCES: Johnston 1952; Govoni 1973.

1. Corollas white with yellow centers; corolla tubes < 2 mm long; plants annual; on s margin of nc TX. \_\_\_\_\_ **L. matamorensis**
1. Corollas yellow to orange-yellow; corolla tubes 7–37 mm long; plants perennial; widespread in nc TX.
  2. Corolla lobes toothed or ruffled; corolla tubes 13–35 mm long; stems appressed-pubescent; leaves usually acute \_\_\_\_\_ **L. incisum**
  2. Corolla lobes entire; corolla tubes 7–14 mm long; stems spreading-pubescent; leaves usually obtuse \_\_\_\_\_ **L. caroliniense**

**Lithospermum caroliniense** (Walter ex J.F. Gmel.) MacMill., (of Carolina), PUCCOON, CAROLINA GROMWELL, CAROLINA PUCCOON. Erect perennial 30–100 cm tall; corollas orange-yellow, the limb to ca. 22 mm across; basal leaves often dried up or absent by flowering time; upper stem leaves 3–7 times as long as wide, to ca. 10 mm wide; mericarps 3–3.5 mm long, smooth or pitted, lustrous, white. Sandy woods; mainly se and e TX w to West Cross Timbers, also in Panhandle. Apr–May.

**Lithospermum incisum** Lehm., (incised, cut), NARROW-LEAF GROMWELL, NARROW-LEAF PUCCOON. Erect perennial to ca. 40 cm tall; basal leaves sometimes dried up or absent by flowering time; stem leaves usually 3–6 mm wide; upper stem leaves 8–20 times as long as wide; spring inflorescences with usually sterile flowers, the corollas showy, lemon- or deep-yellow, the limbs 9–20 mm across; late spring and summer inflorescences with minute, very fertile, cleistogamous flowers with permanently closed corollas 1–2.5 mm long; mericarps 2.5–3 mm long, smooth or pitted, lustrous, whitish. Prairies, open woods, and roadsides; throughout TX. Late Mar–Apr. After the production of conspicuous flowers in the spring, plants of this species typically produce large numbers of small cleistogamous flowers that are extremely fertile (Johnston 1952). The roots were the source of a red dye for Native Americans and settlers (Tveten & Tveten 1993). ☒/96

**Lithospermum matamorensis** DC., (of Matamoros, Mexico), ROUGH GROMWELL. Decumbent to erect annual; stems to 40 cm long; leaves obtuse or retuse apically, gradually reduced up the stem; basal leaves largest, to 9 cm long and 20 mm wide, often present at flowering time; corolla limb 4–7 mm across; mericarps 2.5–3 mm long, whitish or brownish, pitted. Thickets, open woods, floodplains, and weedy areas; Burnet Co. (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.) on s margin of nc TX; also San Saba Co. just s of nc TX, Sexton also indicates a Travis Co. location just s of nc TX; mainly Edwards Plateau to s TX.

**MYOSOTIS** SCORPION-GRASS, FORGET-ME-NOT

Ours small hairy annuals; inflorescences racemose, becoming loosely flowered; calyces hairy; corollas inconspicuous, usually white (or slightly bluish), 2–3.5 mm long; mericarps 4, ovoid to ellipsoid, smooth and shiny.

☛ A genus of ca. 100 species of temperate areas and tropical mountains; a number are cultivated as ornamentals and some have corollas changing from pink to blue in color. (Greek: *myos* of a mouse, and *oto*, ear, from shape of the leaves or the soft leaves in some species)

1. Pedicels obliquely spreading from base, straight or slightly curved; racemes elongating rapidly, the calyces soon becoming 5–30 mm apart; stem hairs mostly 1–1.5 mm long; fruiting calyces sometimes > 5 mm long; most mature calyx hairs hooked \_\_\_\_\_ **M. macrosperma**
1. Pedicels closely ascending or erect in their basal part, rather abruptly outcurved near tip; racemes elongating gradually, the calyces (except lowest) becoming 1–8 mm apart; stem hairs 0.5–1.1 mm long; fruiting calyces < 5 mm long; only a few of the mature calyx hairs hooked \_\_\_\_\_ **M. verna**

**Myosotis macrosperma** Engelm., (large-seeded), SPRING FORGET-ME-NOT. Plant erect, 20–50 cm tall. Sandy or silty woods, stream banks, fencerows, and roadsides; se and e TX w to West Cross Timbers, also Edwards Plateau. Apr–early May.

**Myosotis verna** Nutt., (of Spring), EARLY SCORPION-GRASS, SOUTHERN FORGET-ME-NOT. Sandy open woods, roadsides, and old fields; se and e TX w to West Cross Timbers, also Edwards Plateau. Apr–early May.

**ONOSMODIUM** MARBLESEED, FALSE GROMWELL

Ours conspicuously hairy, leafy perennials from a taproot; leaves alternate, entire, usually conspicuously 5–7 veined; flowers usually numerous in uncurling, 1-sided, terminal or branched racemes or occasionally axillary; corollas tubular, slightly enlarged just below junction of tube and 5 erect lobes, greenish white to whitish or yellowish white, 9–20 mm long; fruit usually of (by abortion) 1(–2–4) mericarp(s) 5 mm or less long, conspicuously white to whitish brown.

☛ A genus of 7 species native to Mexico, the United States, and closely adjacent Canada (Turner 1995a). We are following the recent treatment by Turner (1995a) for nomenclature of *Onosmodium*. The conspicuous mericarps give rise to the common name MARBLESEED. (Named from a likeness to the genus *Onosma*—an Old World genus of Boraginaceae, from Greek: *osnos* ass, and *osme*, smell, alluding to the roots)

REFERENCES: MacKenzie 1906; Johnston 1954a, 1954b; Turner 1995a.

1. Pedicels of flowers (both at flowering time and later) short, 0.5–5(–7) mm long; leaves with short strigose (= appressed) hairs on lower and upper surfaces under longer pubescence, at least near veins; larger corollas mostly 9–13 mm long; bracts lanceolate, usually not greatly enlarged; widespread in nc TX \_\_\_\_\_ **O. bejariense**
1. Pedicels of flowers (both at flowering time and later) elongate, usually 5–15 mm long, the lower ones often 10–15 mm long; leaves completely lacking short strigose hairs, having only erect or ascending bristles ca. 1 mm long on the leaves; larger corollas mostly (11–)17–20 mm long; bracts ovate or elliptic, much enlarged; mainly sc TX n to Williamson Co. on extreme s margin of nc TX \_\_\_\_\_ **O. helleri**

**Onosmodium bejariense** DC. ex A. DC., (presumably for Bexar County on se edge of the Edwards Plateau, location of San Antonio). Erect or ascending often suffruticose herb usually 0.4–1.1 m tall; mid-stem leaves lanceolate, oblanceolate to elliptic, 6–12 cm long, 2–4 cm wide, sessile or nearly so; calyces 4–9 mm long; larger corollas whitish or greenish white; mature styles extend-

ing from the corollas for 5–25 mm; mericarps mostly 3–5 mm long. According to Turner (1995a), who excluded *O. molle* from this species (see note below), the earliest name is *O. bejariense*.

1. Mid-stem hairs widely spreading, the vestiture mostly 2–4 mm high; mericarps mostly 3–4 mm long; widespread in nc TX \_\_\_\_\_ var. **bejariense**  
 1. Mid-stem hairs appressed or ascending, the vestiture mostly 1–2 mm high; mericarps mostly 4–5 mm long; in TX known only from Tarrant and Wichita cos. \_\_\_\_\_ var. **occidentale**

var. **bejariense**, BEJAR MARBLESEED. Grasslands or openings in forests, silty or silty-clay soils, limestone outcrops; se and e TX w to West Cross Timbers and Edwards Plateau; by far the most common nc TX MARBLESEED. Turner's treatment (1995a) differs significantly from previous ones (e.g., Correll & Johnston 1970) in that nearly all nc TX MARBLESEEDS are treated as *O. bejariense* var. *bejariense*. Apr–Jul. [*O. molle* Michx. var. *bejariense* (DC. ex A. DC.) Cronquist, *O. molle* subsp. *bejariense* (DC. ex A. DC.) Cochrane]

var. **occidentale** (Mack.) B.L. Turner, (western), WESTERN MARBLESEED. Shady areas; deep clay or rocky banks; according to Turner (1995a), this variety is known in TX only in Tarrant and Wichita cos. May–Jul. [*O. occidentale* Mack.]

var. *hispidissimum* (Mack.) B.L. Turner, (most hispid or bristly), ROUGH MARBLESEED. According to Turner (1995a), this variety, which can be distinguished from the 2 varieties occurring in nc TX by its shorter corollas (mostly 6–10 mm long versus mostly 11–17–20 mm) and mericarps mostly flared at base (versus mericarps mostly tapered to the base), is known only to the e of TX (ne U.S. sw to Louisiana); Correll and Johnston (1970) reported an 1880 collection from Dallas—however, given that this is several hundred miles w of the range of this variety, an error is suspected. [*O. hispidissimum* Mack.]

**Onosmodium helleri** Small, (for its discoverer, Amos Arthur Heller, 1867–1944, Pennsylvania botanist and collector of w plants), HELLER'S MARBLESEED. Erect herb 30–60 cm tall; stems pubescent with both reflexed and spreading coarse hairs, the vestiture 1–2 mm high; mid-stem leaves narrowly to broadly elliptic, mostly 8–16 cm long, (2–)3–8 cm wide, sparsely pilose on upper and lower surfaces, the hairs rough to the touch; calyces 6–10 mm long; larger corollas creamy white; styles extending beyond the corollas for 6–12 mm; mericarps 3–3.6 mm long. Juniper oak woodlands, on crumbly, rather bare limestone soils, typically on slopes; Williamson Co. (Turner 1995a), also Burnet Co. (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.); narrowly endemic to ca. 8 counties of the Edwards Plateau and s Lampasas Cut Plain. Mar–May. (TOES 1993: V)  

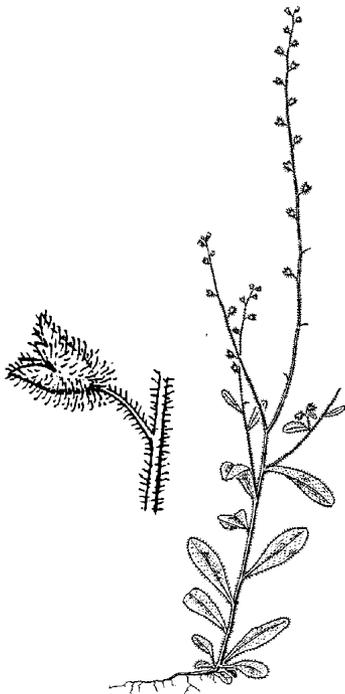
*Onosmodium molle* Michx., (soft). According to Turner (1995a), this species is limited to the cedar glades of c Tennessee and closely adjacent Kentucky and Alabama. Texas MARBLESEEDS previously treated as *O. molle* by a number of authors are now considered part of *O. bejariense*.

## BRASSICACEAE (CRUCIFERAE) MUSTARD FAMILY

Ours annual or perennial herbs; leaves basal or alternate, simple or pinnately compound, entire, toothed, or lobed; flowers in terminal or axillary racemes; sepals 4; petals 4 (or more numerous in cultivated plants), in a cross-like arrangement, commonly with an elongate claw and an abruptly spreading blade, equal or unequal (2 larger, 2 smaller), or petals absent; stamens 2–6 (when 6, 4 long and 2 short); pistil 1; ovary superior; fruit a silique (= dry, dehiscent, variously shaped, many-seeded, 2-valved capsule with valves splitting from the bottom and leaving a false partition known as a replum).



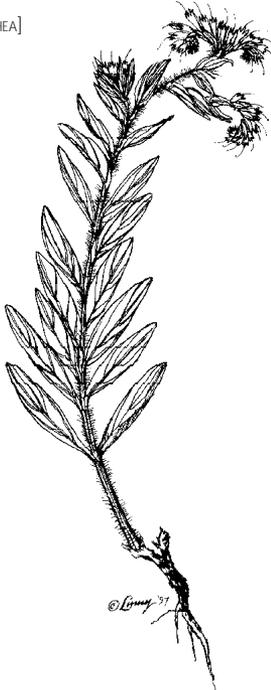
*Lithospermum matamorensis* [HEA]



*Myosotis macrosperma* [GLE]



*Myosotis verna* [GLE]



*Onosmodium bejariense* var. *bejariense* [HEA]



*Onosmodium helleri* [HEA]

☛ A large (3,250 species in 365 genera), economically important, cosmopolitan, but predominantly n temperate family of mostly herbs or rarely shrubs; ☛ sulfur-containing mustard oil glucosides are often present and frequently cyanogenic compounds as well; these can result in digestive problems or even death in livestock (Kingsbury 1964; Blackwell 1990). Many *Brassica* species are cultivated and yield a variety of foods (e.g., cabbage, turnip, mustard) and oils (e.g., rapeseed or canola oil); other genera (e.g., *Lobularia* -SWEET-ALYSSUM, *Lunaria* -HONESTY or MONEYPLANT) are cultivated as ornamentals, for landscapes, and for dried arrangements; some are aggressive weeds. Petal measurements in the treatments include both blade and claw (if present). Brassicaceae are closely related to Capparaceae and appear to represent an herbaceous clade within that family. From a cladistic standpoint they should be lumped with Capparaceae to form a more inclusive monophyletic family, which based on nomenclatural rules, should be called Brassicaceae (Judd et al. 1994). (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: herbs with alternate or basal leaves and flowers with 4 petals in a cruciform or *cross* arrangement (flower color variable, but typically yellow or white), stamens usually 4 long and 2 short or 2 or 4, and characteristic fruits (siliques) borne in racemes. Similar to Capparaceae but that family often has somewhat bilaterally symmetrical flowers (not cross-like), inflorescence bracts (these absent in Brassicaceae), stamens never 4+2, and fruits lacking a transverse partition (this present in Brassicaceae).

REFERENCES: Rollins 1981, 1993; Al-Shehbaz 1984, 1985a, 1985b, 1986b, 1987, 1988a, 1988b, 1988c; Judd et al. 1994.

1. Plants with auricled-clasping upper stem leaves.
  2. Stems glabrous.
    3. Petals 7–15 mm long including claw; fruits 3–11 cm long, much longer than broad.
      4. Petals deep yellow, with claw shorter to slightly longer than the blade; mature fruits 3–10 cm long; lower leaves often pinnately lobed or divided \_\_\_\_\_ **Brassica**
      4. Petals yellowish white, with claw 3–4 times as long as the blade; mature fruits 8–11 cm long; leaves neither lobed nor divided \_\_\_\_\_ **Conringia**
    3. Petals 1–5 mm long including claw OR petals absent; fruits < 2 cm long, often nearly as broad as long.
      5. Petals white; fruits flat, orbicular, 8–15 mm wide, deeply notched at apex \_\_\_\_\_ **Thlaspi**
      5. Petals greenish yellow or yellow, withering whitish OR petals absent (then sepals yellow); fruits not as above.
        6. Petals 3–4 mm long including claw; upper leaves widest at base; fruits roughly inverted triangular (widest distally, also with a small beak) \_\_\_\_\_ **Myagrum**
        6. Petals 0–2.5 mm long including claw; upper leaves narrow at base; fruits narrowly cylindrical \_\_\_\_\_ **Rorippa**
  2. Stems pubescent or pilose, at least in lower part.
    7. Petals 0–2.5 mm long including claw; fruits inverted triangular-heart-shaped \_\_\_\_\_ **Capsella**
    7. Petals 4–10 mm long including claw; fruits ± round.
      8. Pedicels loosely pubescent; petals rich yellow or orange-yellow; leaves pinnatifid to entire \_\_\_\_\_ **Lesquerella**
      8. Pedicels glabrous; petals light yellow or yellowish white; leaves entire or merely serrate \_\_\_\_\_ **Camelina**
1. Plants without auricled-clasping upper leaves.
  9. Petals light or greenish yellow to deep yellow or red-orange OR petals absent and sepals yellow.
    10. Petals 0–3 mm long including claw, not or slightly exceeding the sepals.
      11. Leaves simple (but can be lobed or pinnatifid), or only the lower compound and with lobed leaflets.
      12. Larger leaf blades with main lobes obtuse; young fruits 2–3 times as long as thick, ovoid, oblong, or cylindrical \_\_\_\_\_ **Rorippa**

12. Larger leaf blades with lobes acute; young fruits 5–10 times as long as thick, narrowly linear \_\_\_\_\_ **Sisymbrium**
11. Leaves all pinnately compound, the leaflets usually deeply once or twice pinnatifid and thus appearing highly dissected \_\_\_\_\_ **Descurainia**
10. Petals 3–15 mm long including claw, 1.5–2.5 times as long as the sepals.
13. Pedicels usually gray or silvery, with minute, appressed or subappressed, simple, stellate, or half-scaly pubescence (use lens).
14. Petals with wide claw shorter than or equaling the blade; mature fruits globose or nearly so, < 10 mm long \_\_\_\_\_ **Lesquerella**
14. Petals with slender claw longer than the blade; mature fruits much longer than wide, 40–120 mm long \_\_\_\_\_ **Erysimum**
13. Pedicels glabrous or with few loose hairs.
15. Pedicels elongating rapidly and becoming 2–many times as long as the calyces before the petals wither; plants ill-smelling; leaves crowded at base of plant; petals 5–8 mm long including claw; mature fruits 20–35 mm long, 1–2 mm in diam. \_\_\_\_\_ **Diplotaxis**
15. Pedicels elongating gradually, slightly shorter to slightly longer than the calyces before the petals wither; plants not with the above combination.
16. Stem leaves (except lowest) unlobed or deeply lobed only in basal half; large terminal portion of blade as wide as rest of leaf or wider, with convex (= out-curved) sides; sepals 3–11 mm long; petals bright yellow.
17. Buds when ready to open 4–10 mm long; mature fruits 10–100 mm long, linear or narrowly cylindrical.
18. Beak of fruits terete or narrowly conical, not containing a seed; valves of fruits with 1 most prominent nerve, the other nerves much weaker; leaves not clasping OR clasping; stems usually glabrous (or hirsute in *B. nigra*); fruits variable in length, 10–100 mm long \_\_\_\_\_ **Brassica**
18. Beak of fruits large, flat or conspicuously angled, usually containing 1 seed; valves of fruits with 3 parallel nearly equal veins; leaves not clasping; stems hispid-pubescent at least in lower part; fruits 35 mm or less long \_\_\_\_\_ **Sinapis**
17. Buds when ready to open 2–4 mm long; mature fruits (including beak) 3–9 mm long, of 2 distinct segments, the upper segment larger and nearly globose, the lower cylindrical \_\_\_\_\_ **Rapistrum**
16. Stem leaves deeply lobed; terminal portion of blade narrower than the rest of the leaf OR widely triangular with deeply indented sides; sepals 2–5 mm long; petals sulfur or light yellow.
19. Larger leaf blades with obtuse lobes; lower flowers usually with pinnatifid bracts; fruits 2–4 cm long; pedicels and fruits spreading-ascending; upper stem and axis of raceme usually pubescent \_\_\_\_\_ **Erucastrum**
19. Larger leaf blades with acute lobes; lower flowers usually without bracts; fruits 1–10 cm long; pedicels and fruits closely appressed to spreading-ascending; upper stem and axis of raceme glabrous \_\_\_\_\_ **Sisymbrium**
9. Petals yellowish white, white, pink, blue-purple, or purple OR petals absent and sepals green or partly reddish or purple-brown.
20. Fruits indehiscent, separating transversely into 1- or 2-seeded segments.
21. Petals blue-purple, 7–11 mm long including claw; mature fruits 1–2 mm wide; stigmas slender, minute \_\_\_\_\_ **Chorispora**
21. Petals white to pale purple, 15–20 mm long including claw; mature fruits 6–10 mm wide; stigmas broad, emarginate \_\_\_\_\_ **Raphanus**
20. Fruits dehiscent longitudinally by valves or manner of dehiscence unclear.

22. Fruits ending in 2 distinct very conspicuous horns (horns ca. 3–6 mm long), densely pubescent, grayish, 70–100 mm long; petals 15–20 mm long including claw, lilac or purple. \_\_\_\_\_ **Matthiola**
22. Fruits not ending in 2 distinct horns, usually glabrous (rarely pubescent), 2–90 mm long; petals 1.5–20 mm long including claw, variously colored.
23. Plants glabrous; sepals deep purple, not spreading, together urn-shaped; petals 12–20 mm long including claw; fruits 6–10 cm long, to 2 mm wide \_\_\_\_\_ **Streptanthus**
23. Plants without the above combination; petals 7 mm or less long including claw (except in *Raphanus* which has much wider fruits than *Streptanthus* and in *Iodanthus* which has fruits only 2–4 cm long).
24. Petals 15–20 mm long including claw, white to pale purple; mature fruits 40–50 mm long, 6–10 mm wide, round in cross-section \_\_\_\_\_ **Raphanus**
24. Petals 14 mm or less long including claw (usually 7 mm or less), variously colored; mature fruits 2–90 mm long, up to 3 mm wide, round or flat in cross-section.
25. Petals 7–14 mm long including claw, white to lavender; fruits 2–4 cm long \_\_\_\_\_ **Iodanthus**
25. Petals 7 mm or less long including claw, variously colored; fruits variable in length, 2–90 mm long.
26. Ovaries and young fruits more than twice as long as wide; fruits variable in length, 2–90 mm long.
27. Stems pubescent in upper part \_\_\_\_\_ **Draba**
27. Stems glabrous in upper part.
28. Petals 1.5–3 mm long including claw; stem leaves compound or deeply lobed; fruits 2–30 mm long.
29. Leaves compound, the leaflets distinctly narrowed at very base; fruits < 1 mm wide; lower leaves with 1–5(–6) leaflets on each side \_\_\_\_\_ **Cardamine**
29. Leaves lobed almost to midrib, appearing nearly compound but the rachis wing-margined, the lobes not narrowed at very base; fruits ca. 1.2–2 mm wide; lower leaves with 5–14 divisions on each side \_\_\_\_\_ **Sibara**
28. Petals 3–7 mm long including claw; stem leaves simple (can be fairly deeply lobed) OR compound (if compound the plant aquatic or semi-aquatic); fruits 10–90 mm long.
30. Stem leaves few or none, the leaves mostly basal; fruits 20–35 mm long; flowers lavender \_\_\_\_\_ **Diplotaxis**
30. Stem leaves conspicuously present; fruits 4–9 cm long OR if shorter the plant aquatic or semiaquatic; flowers white or lavender-pink.
31. Leaves simple; fruits 40–90 mm long; plants erect \_\_\_\_\_ **Arabis**
31. Leaves compound; fruits 10–20 mm long; plants floating, creeping, or ascending \_\_\_\_\_ **Rorippa**
26. Ovaries and young fruits less than twice as long as wide; fruits 8 mm long or less.
32. Ovaries and fruits inverted triangular-heart-shaped; axis of inflorescence and pedicels greatly elongating, the flowers becoming widely spaced and long-pedicelled (pedicels 8–15 mm long) \_\_\_\_\_ **Capsella**
32. Ovaries and fruits not inverted triangular-heart-shaped; axis of inflorescence and pedicels elongating gradually and moderately, the flow-

ers remaining rather crowded and short-pedicelled (pedicels to ca. 10 mm long at most).

33. Inflorescences terminal; fruits flattened, elliptic or orbicular in outline, the surfaces smooth \_\_\_\_\_ **Lepidium**

33. Inflorescences lateral; fruits not flattened, swollen, with 2 subglobose lobes, the surfaces wrinkled \_\_\_\_\_ **Coronopus**

## ARABIS ROCKCRESS

Annuals or perennials, glabrous or pubescent with simple hairs; seeds winged.

☛ A genus of 180 species in the n temperate zone and the Mediterranean to tropical African mountains; a number are cultivated as ornamentals. (Name from the country, Arabia, according to Linnaeus)

REFERENCES: Hopkins 1937; Rollins 1941.

1. Lower stem leaves sessile, entire or slightly toothed; petals white to yellowish white, 3–5 mm long, slightly longer than the sepals; fruits drooping; stems glabrous or nearly so \_\_\_\_\_ **A. canadensis**

1. Lower leaves petioled, deeply lobed; petals lavender-pink, 5–7 mm long, nearly twice as long as the sepals; fruits erect; stems densely spreading-pubescent below \_\_\_\_\_ **A. petiolaris**

**Arabis canadensis** L., (of Canada), SICKLEPOD. Perennial to 90 cm tall; fruits 50–90 mm long, 2–3 mm wide, curved. Woods; Grayson and Tarrant cos., also Dallas Co. (Mahler 1988); e TX w to East Cross Timbers, also Edwards Plateau. May–Jun.

**Arabis petiolaris** (A. Gray) A. Gray, (with a petiole or leaf stalk), BRAZOS ROCKCRESS. Annual to 90 cm tall; fruits 40–80 mm long, 3–4 mm wide, nearly straight. Sandy or rocky open ground; Bell, Burnet, Coleman, and McLennan cos., also Young Co. (Mahler 1988); s and w parts of nc TX s to Edwards Plateau; endemic to TX. Apr–May. 🌱

## BRASSICA

Ours all introduced annuals; leaves pinnately dissected or lobed, at least on lower portion of the stem; petals yellow, rather large and showy.

☛ An Eurasian and Mediterranean genus of 35 species of herbs, but sometimes woody; includes many crop plants such as TURNIP (*B. rapa* L.), MUSTARD (*B. nigra* (L.) Koch), *B. oleracea* (source of many foods as listed below), and *B. napus* L., the seeds yielding canola oil or rapeseed oil. 🌱 Some species can be poisonous to livestock due to the presence of mustard oil glycosides (Stephens 1980). (The Latin name of CABBAGE)

REFERENCES: Sun 1946; Lemke & Worthington 1991.

1. Lower stems glabrous or nearly so; mature fruits 3–6 cm or more long; leaves clasping or not so; beak of fruits 4 mm long or longer.

2. Sepals 4–6 mm long.

3. Upper leaves auricled-clasping \_\_\_\_\_ **B. rapa**

3. Upper leaves not auricled-clasping \_\_\_\_\_ **B. juncea**

2. Sepals 7–11 mm long \_\_\_\_\_ **B. oleracea**

1. Lower stems hirsute; mature fruits 1–2 cm long; leaves not clasping; beak of fruits 1–4 mm long \_\_\_\_\_ **B. nigra**

**Brassica juncea** (L.) Czern., (resembling *Juncus*—rush), CHINESE MUSTARD, LEAF MUSTARD, INDIAN MUSTARD. Plant to 2 m tall, essentially glabrous, somewhat glaucous; leaves petiolate or the upper sessile; siliques 3–6 cm long, with beak 4–8 mm long. Roadsides and fields; se and e TX w to Blackland Prairie, also one collection is known from Tarrant Co. in the Fort Worth Prairie. Apr–

May, sporadically to Sep. Native of e Europe and w Asia. This is the most common leaf mustard used for greens. 🌿

**Brassica nigra** (L.) W.D.J. Koch, (black), BLACK MUSTARD. Plant to 1.5(-2) m tall, hirsute below, glabrous above, green or slightly glaucous above; leaves all petioled, the lower pinnatifid; siliques quadrangular because of the stout midveins of the valves, closely appressed, with beak 1-4 mm long. Weedy areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); scattered in TX. May-Aug. Native of Eurasia. The seeds are a main source of table mustard. When the crushed seeds are mixed with “must” of old wine the result is “mustum ardens” or mustard; the flavor results from the pungent allyl isothiocynate released by enzymatic activity within 10 minutes of adding liquid to the powdered mustard seeds (Mabberley 1997). 🌿

**Brassica oleracea** L., (of the vegetable garden, a potherb used in cooking). Plant 0.3-0.9 m tall, essentially glabrous, glaucous; upper leaves sessile or wing-petioled, slightly clasping; petals 10-25 mm long; siliques up to 10 cm long, with beak 4-8(-10) mm long. Cultivated, in modified varieties, as BROCCOLI, BRUSSELS-SPROUTS, CABBAGE, CAULIFLOWER, COLLARDS, ORNAMENTAL KALE, and KOHLRABI; reseeds in gardens; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); widely scattered in TX. Apr-Jun, sporadically later. Derived from plants native to coastal Europe. 🌿

**Brassica rapa** L., (the Latin name for turnip), TURNIP, BIRD'S RAPE, RAPE. Plant 0.4-2 m tall; stems glabrous, usually glaucous; petals 6-10 mm long; siliques 3-7 cm long, with beak 8-15 mm long. Commonly cultivated for its root and greens; frequent as an escape and maintaining itself on roadsides or in waste places, especially in sandy soils; Dallas, Delta, Grayson, Henderson, Hill, and Tarrant cos.; mainly se and e TX w to East Cross Timbers. Mid-Mar-early May. Native of Europe. [*B. campestris* L.] Cultivated plants have a greatly enlarged taproot; wild ones vary from with noticeable thickening to none. This species is now often planted with winter WHEAT and OATS for forage after grain harvesting; it is thus becoming widespread (J. Stanford, pers. comm.); Burlage (1968) reported it can cause abortion and a decrease in milk flow in cattle. 🌿 🌿

## CAMELINA

Annual or biennial [?]; pubescence stellate and simple; flowers white to pale yellow; fruits round, beaked.

🌿 A genus of 6-7 species native to Europe and the Mediterranean to c Asia. McGregor (1985c) gave a detailed review of the genus in central North America. (Greek: *chamai*, dwarf, and *linon*, flax, from inhibition of flax plants)

REFERENCES: McGregor 1984c, 1985c; Akeroyd 1993.

1. Basal leaf rosette usually withered at flowering time; petals 2-5(-6) mm long; lower stems usually with long simple hairs and an understory of branched hairs, the simple hairs sometimes absent or rare; stems unbranched or with ascending or erect branches; pedicels 10-15(-20) mm long in fruit \_\_\_\_\_ **C. microcarpa**
1. Basal leaf rosette green at flowering time; petals (5-)6-9 mm long; lower stems ± densely covered with long, simple, unbranched hairs, branched hairs absent or rare; stems usually much branched, with spreading or ascending branches; pedicels 7-10(-14) mm long in fruit \_\_\_\_\_ **C. rumelica**

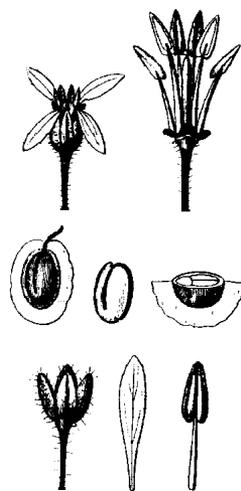
**Camelina microcarpa** Andr. ex DC., (small fruited), LITTLEPOD, FALSE FLAX, SMALLSEED FALSE FLAX. Annual or biennial[?] to 75 cm tall; stems with long spreading pubescence, at least below; leaves (except lowest) sessile; leaf blades auricled-clasping, oblong- or triangular-lanceolate, with long ± spreading pubescence (often stellate), ciliate marginally; fruiting raceme elongate, usually rather dense; petals pale yellow; fruits ca. 5-7 mm in diam.;  $2n = 40$ . Railroads, road-



*Arabis petiolaris* [HEA]



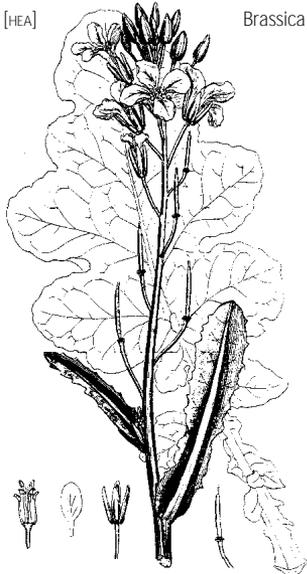
*Arabis canadensis* [BEL]



*Brassica juncea* [ROB]



*Brassica nigra* [REE]



*Brassica oleracea* [SMI]



*Brassica rapa* [SMI]

sides, and waste ground; various soils; Collin, Dallas, Grayson, Shackelford, and Tarrant cos.; se and e TX w to nc TX and Edwards Plateau. Late Mar–May. Native of Europe. 🌿

**Camelina rumelica** Velen., (of Roumelia, se Europe). Erect annual or biennial[?] 14–30(–60) cm tall, similar to *C. micnocarpa*; fruiting raceme elongate, lax (less dense); petals white to pale yellow; fruits ca. 5–8 mm in diam.;  $2n = 12, 26$ . Along railroads; Denton and Wise cos. (locally abundant); in TX only known from nc part of state and Hemphill and Ochiltree cos. in the Panhandle (McGregor 1985c). Late Mar–Apr. Native of Europe. 🌿

### CAPSELLA SHEPHERD’S-PURSE

☛ A temperate and warm area Eurasian genus of 5 species. (Diminutive of Latin: *capsa*, a box)

**Capsella bursa-pastoris** (L.) Medik., (shepherd’s purse, the fruits resembling the scrotum of a sheep used as a purse by shepherds), SHEPHERD’S-PURSE, PICKPOCKET. Inconspicuously pubescent annual to 60 cm tall; basal leaves forming a rosette, petioled, the blades pinnatifid; stem leaves mostly sessile, usually auricled-clasping; flowers usually self-pollinated; petals white or yellowish, rarely absent; fruits inverted triangular-heart-shaped (= obovate-triangular), flattened, 5–8 mm long, 3.5–6 mm wide. Roadsides, lawns, and disturbed sites; common, especially in cities and towns; essentially throughout TX. Reverchon (1880) indicated that it was seen for the first time in Dallas Co. in 1865. Feb–May. Native of Europe, but now a cosmopolitan weed. Used medicinally by Chinese for eye disease and dysentery; apparently used by humans for 1,000s of years—collected seeds have been found at an ancient site nearly 8,000 years old (Mabberley 1987). The seeds of SHEPHERD’S PURSE appear to be carnivorous; a chemical released by the seed appears to attract organisms such as protozoans, nematodes, or mobile bacteria; subsequently, an enzyme secreted by the seed digests the protein of the victim and allows the seed to absorb the material (Pietropaolo & Pietropaolo 1986). 🌿

Two forms, treated as species by European authors, occur in nc TX but appear to intergrade. They are about equally common, and do not appear to be distinct: *C. bursa-pastoris*, with petals 1.7–2.5 mm long, markedly exceeding the sepals; and *C. rubella* Reut., with petals 1–1.7 mm long, shorter than to slightly exceeding the sepals.

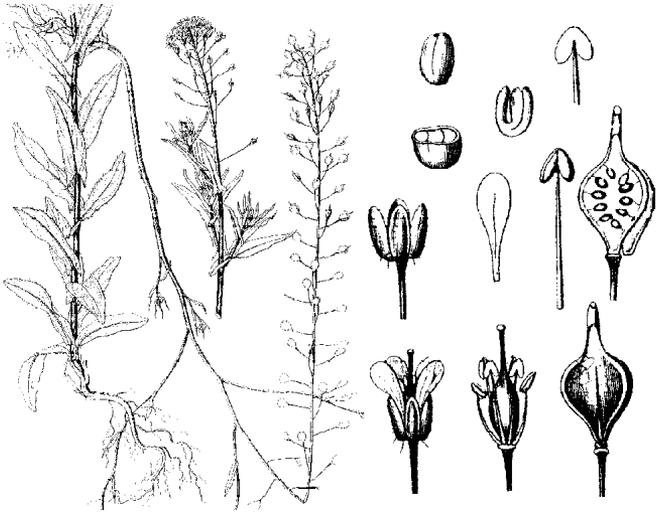
### CARDAMINE BITTERCRESS

Ours annual or biennial with fibrous roots; basal rosette present; leaves pinnatifid or pinnately lobed (simple in an e TX species); fruits linear, compressed; seeds in single row in each locule, wingless.

☛ A genus of 200 species of temperate areas and tropical mountains; it includes cultivated ornamentals and weeds. (A Greek name, *kardamon*, used by Dioscorides for some cress with medicinal uses, perhaps in treating heart problems; presumably from *cardia* or *kardia*, heart)

1. Petioles of lower stem leaves ciliate, at least basally; stamens 4; basal leaves larger and more conspicuous than the relatively few stem leaves \_\_\_\_\_ **C. hirsuta**
1. Petioles of stem leaves glabrous; stamens 6; basal leaves and lower and middle stem leaves ± similar.
  2. Lateral leaflets narrow; terminal leaflet usually 1–4 mm wide, usually not conspicuously larger than laterals; nearly all leaflets distinct, not decurrent along rachis; stems glabrous throughout; widespread in e part of nc TX \_\_\_\_\_ **C. parviflora**
  2. Lateral leaflets broad; terminal leaflet usually 4–17 mm wide, usually conspicuously larger than laterals; distal leaflets often slightly decurrent along rachis; stems hispid basally; known in nc TX only from Dallas Co. \_\_\_\_\_ **C. pensylvanica**

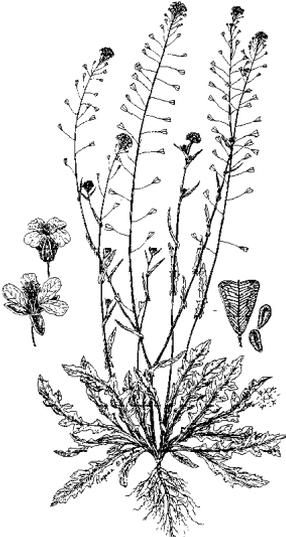
**Cardamine hirsuta** L., (hairy), HAIRY BITTERCRESS. Annual similar to *C. parviflora*; stems 10–30 cm tall; rosette leaves 3–8 cm long; stem leaves usually smaller; petals white, 2–3 mm long;



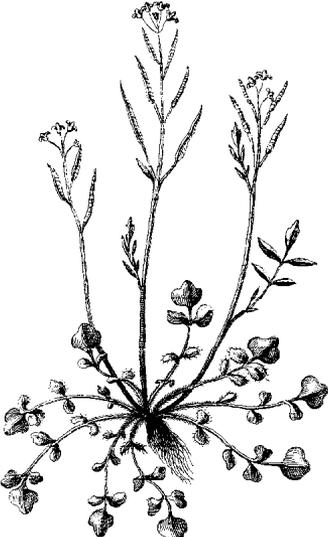
*Camelina microcarpa* [BEL]



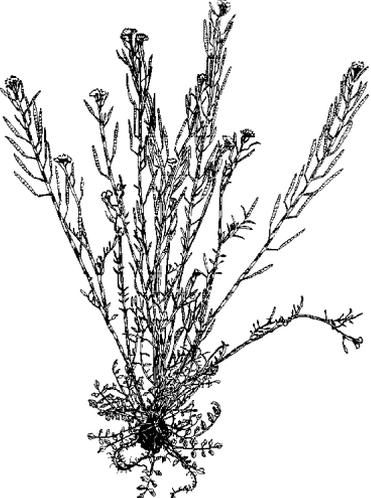
*Camelina rumelica* [HEA]



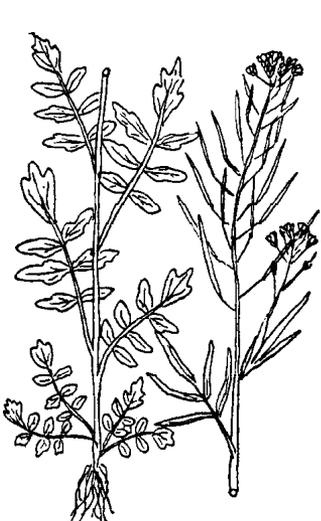
*Capsella bursa-pastoris* [REE]



*Cardamine hirsuta* [SCO]



*Cardamine parviflora* var. *arenicola* [REE]



*Cardamine pennsylvanica* [RVD]



*Chorispora tenella* [ENZ]

styles 0.5 mm or less long; mature fruits 15–25 mm long, ca. 1 mm wide; beak 0.5–1 mm long. Roadsides, weedy areas; Lamar Co. in Red River drainage (Carr 1994); mainly se and e TX. Feb–Apr. Native of Europe. 🌿

**Cardamine parviflora** L. var. **arenicola** (Britton) O.E. Schulz, (sp.: small-flowered; var.: growing in sandy places), SAND BITTERCRESS. Glabrous, somewhat delicate annual to 25(–40) cm tall; leaves mostly 2–4 cm long; petals white, 1.5–3.5 mm long; style 0.2–0.7 mm long; mature fruits beakless, 20–30 mm long. Damp thickets, ditches, and stream banks; se and e TX w to Grayson Co., also Edwards Plateau. Late Feb–Apr.

**Cardamine pensylvanica** Muhl. ex Willd., (of Pennsylvania), BITTERCRESS. Annual or biennial similar to *C. parviflora*; plant to 75 cm tall, glabrous except for hispid basal region of stem; leaves mostly 4–8 cm long; petals white, 1.5–4 mm long; style 0.5–2 mm long; mature fruits short beaked. Lawns, roadsides, and weed in nursery; Dallas Co; rare; mainly se and e TX. Mar–Apr, Nov. Brown and Marcus (1998) in a recent paper tentatively indicated that some TX specimens (including the Dallas Co. collection) previously identified as *C. pensylvanica* are actually *C. debilis* D. Don, an introduced Old World species. Schulz (1903), in his monograph of the genus, treated both of these similar taxa as members of the same species (a variable *C. flexuosa* With.). Rollins (1993) indicated that *C. debilis* has fruits < 1 mm wide and fibrillose roots, while *C. pensylvanica* has fruits > 1 mm wide and the roots mostly thicker and scarcely fibrillose. Examination of the limited material available does not allow us to make a firm determination and consequently we are tentatively continuing to call this entity *C. pensylvanica*. However, the nearly glabrous basal region of the stem (typical of *C. debilis*), makes us suspicious that Dallas collections may belong to *C. debilis* as suggested by Brown and Marcus. Further work on this complex is needed.

*Cardamine bulbosa* (Schreb. ex Muhl.) Britton, Sterns, & Poggenb., (bulbous), (BULB BITTERCRESS, SPRING CRESS), a tuberous perennial with entire or shallowly dentate, simple leaves, occurs in se and e TX just to the e of nc TX. Jones et al. (1997) recognized this species as [*C. rhomboidea* (Pers.) DC.]

## CHORISPORA BLUE-MUSTARD

☛ An e Mediterranean and c Asian genus of 13 species. (Latin: *choris*, asunder, and *spora*, seed, from fruit breaking apart between seeds)

**Chorispora tenella** (Pall.) DC., (tender, soft), BLUE-MUSTARD. Annual, sparsely stipitate-glandular, 20–50 cm tall; lower leaves sharply incised; sepals 3.5–6 mm long; petals blue-purple, 7–12 mm long, clawed, with claws longer than blade, the blade 3–5 mm long; fruits indehiscent, breaking at maturity into 2-seeded segments, 3–4.5 cm long including beak; beak ca. 1–1.5 cm long. Disturbed areas; in TX apparently known only from Dallas, Deaf Smith, El Paso, and Tarrant cos. Reported as new for TX by Lipscomb (1984). Mar–May. Native of Asia. 🌿

## CONRINGIA

☛ A genus of 6 species native from the Mediterranean and Europe to c Asia. (Named for Hermann Conring, 1606–1681, professor at Helmstadt, Germany)

**Conringia orientalis** (L.) Andrz., (eastern), TREACLE HARE'S-EAR, HARE'S-EAR-MUSTARD, HARE'S-EAR. Glabrous glaucous annual to 110 cm tall; basal rosette absent; leaves oblong to ovate or oblong-lanceolate, entire, cordate clasping; petals yellowish white; fruits linear, 4-angled, 8–11 cm long, 2–3 mm in diam. Along railroads or less often in disturbed areas; gravelly or sandy soils; Dallas, Denton, Grayson, and Navarro cos., also Tarrant Co. (Mahler 1988); e TX w to East Cross Timbers. Apr–early May. Native of se Europe. 🌿

## CORONOPUS WARTCRESS

☛ A nearly cosmopolitan genus of 10 species including weeds. (Greek: *korone*, crow, and *pous*, foot, from the deeply cleft leaves)

**Coronopus didymus** (L.) Sm., (in pairs, as of stamens), SWINE WARTCRESS. Rank-scented annual, usually decumbent, slightly pubescent or glabrous; stems 10–40 cm long; leaf blades deeply pinnatifid, almost compound; flowers in mostly lateral spike-like racemes, borne nearly from base to tip of stems; sepals green with white margins; petals white, shorter than the sepals; fruits with 2 lobes, very small, to ca. 1.7 mm long, 2–2.3 mm broad, wrinkled, notched at apex. Lawns or disturbed areas in cities, towns, chiefly in sandy soils; Dallas and Milam cos.; mainly se and e TX. Apr–May. Native of s South America. ☛

## DESCURAINIA TANSY-MUSTARD

Annuals or biennials with pinnately compound leaves, the leaflets pinnatifid or again compound, usually pubescent with branched hairs; petals small, yellow to whitish, clawed, slightly shorter to slightly longer than the greenish yellow sepals.

☛ A genus of 40 species of temperate and cool n hemisphere areas and s Africa. (Named for Francois Descourain, 1658–1740, French apothecary and botanist)

REFERENCES: Detling 1939; Shinnars 1949f.

1. Fruits 1.5–2 mm wide, usually 5–12 mm long, ca. as long as to shorter than pedicels, subclavate (= somewhat club-like); seeds usually in 2 rows, rarely 1 \_\_\_\_\_ **D. pinnata**
1. Fruits 0.5–1.5 mm wide, 8–30 mm long, usually distinctly longer than pedicels, linear; seeds always in 1 row.
  2. Stem leaves 2–3 times pinnate; petals 2–2.5 mm long, shorter than or equaling the relatively long (2–2.5 mm) sepals; fruits 10–30 mm long; upper stems and inflorescences without glandular pubescence (non-glandular pubescence may be present) \_\_\_\_\_ **D. sophia**
  2. Stem leaves once pinnate; petals 1.5–2 mm long, longer than the short (1–1.5 mm) sepals; fruits 8–15 mm long; upper stems and inflorescences glandular-pubescent \_\_\_\_\_ **D. incana**

**Descurainia incana** (Bernh. ex Fisch. & C.A. Mey.) Dorn subsp. **viscosa** (Rydb.) Kartesz & Gandhi, (sp.: hoary, quite gray; subsp.: sticky, clammy). Plant to ca. 120 cm tall. Open areas; included based on citation for vegetational area 5 (Fig. 2) by Hatch et al. (1990); also Trans-Pecos. Jun–Sep. [*D. richardsonii* subsp. *viscosa* (Rydb.) Detling, *Sophia viscosa* Rydb.]

**Descurainia pinnata** (Walter) Britton, (pinnate, feathery). Plant 5–80 cm tall. Open stream bottoms, roadsides, and waste ground, often sandy soils. Mar–Apr. Oil can be obtained from the seeds. There is apparently introgression among the varieties, which are frequently difficult to distinguish. Subspecies *pinnata* and subsp. *halictorum* are particularly difficult to separate and are here recognized as distinct with some hesitation. Reportedly poisonous to livestock with symptoms similar to those of selenium poisoning; animals can become blind, wander aimlessly, and lose the ability to swallow; the condition is sometimes referred to as blind staggers or paralyzed tongue (Kingsbury 1964; Stephens 1980; James et al. 1992). ☛

1. Leaf blades moderately to densely pubescent, gray-green.
    2. Terminal segment of middle stem leaves elliptic-lanceolate to ovate or rhombic, toothed or lobed like the lateral segments, resembling them in size and shape \_\_\_\_\_ subsp. **pinnata**
    2. Terminal segment of middle stem leaves oblong-lanceolate to linear, entire or toothed, longer and less divided than the lateral segments \_\_\_\_\_ subsp. **halictorum**
  1. Leaf blades glabrous (petioles and lower rachis sometimes pubescent), green \_\_\_\_\_ subsp. **brachycarpa**
- subsp. **brachycarpa** (Richardson) Detling, (short-fruited). Stems with rather abundant gland-

tipped hairs but little or no branched pubescence; lobing of leaf blades as in subsp. *halictorum*. W part of nc TX w to Panhandle and s to Edwards Plateau. [*D. pinnata* var. *brachycarpa* (Richardson) Fernald]

subsp. **halictorum** (Cockerell) Detling, (hoary, quite gray). Stems with branched hairs. W part of nc TX nw to Panhandle and s to Edwards Plateau. [*D. pinnata* var. *osmiarum* (Cockerell) Shinnery]

subsp. **pinnata**. PINNATE TANSY-MUSTARD. Stems with branched hairs. Nearly throughout TX.

**Descurainia sophia** (L.) Webb ex Prantl, (old generic name), FLIXWEED TANSY-MUSTARD. Plant 15–80 cm tall. Roadsides and waste ground; various soils; Denton and Grayson cos.; mostly w 1/2 of TX. Apr–May. Native of Europe. The seeds are sometimes used like mustard. ☞

## DIPLLOTAXIS

☞ A genus of 27 species native to Europe and the Mediterranean to nw India. (Greek: *diplos*, double, and *taxis*, row or arrangement, alluding to the biserrate seeds or with two shields)

**Diplotaxis muralis** (L.) DC., (of walls), STINKING WALLROCKET, SANDROCKET, WALLROCKET. Ill-scented, inconspicuously hispid annual to perennial, to 60 cm tall; leaves crowded near base, rather thick and fleshy, the blades toothed or pinnatifid; flowers few in elongated racemes; petals 5–8 mm long, sulfur yellow to lavender; fruits 20–35 mm long, 1–2 mm in diam. Road margins, limestone areas; Collin, Dallas, Ellis, Grayson, and Hamilton cos.; also Edwards Plateau; first collected in TX in 1947 (Cory 1948a). Mar–Sep. Native of Europe. ☞

## DRABA WHITLOW-GRASS

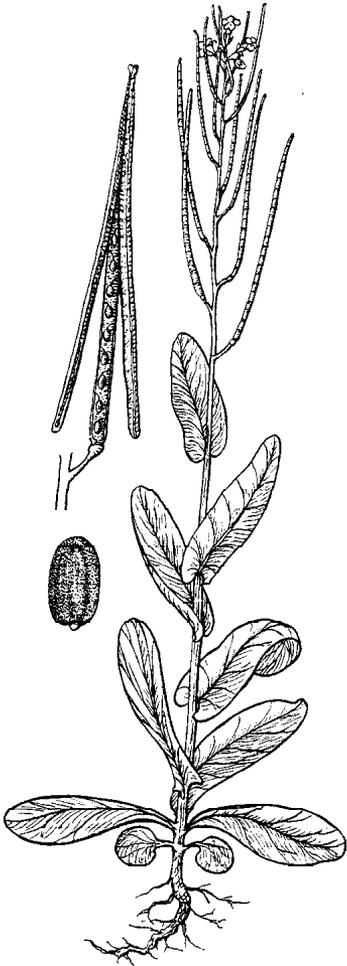
Ours small annuals, pubescent, the hairs simple or branched; petals white or absent.

☞ A genus of ca. 300 species of n temperate and boreal areas and mountains of South America; some are cultivated as rock-garden ornamentals; it is the largest genus in the family. (Greek: *drabe*, acrid; applied by Dioscorides to some cress)

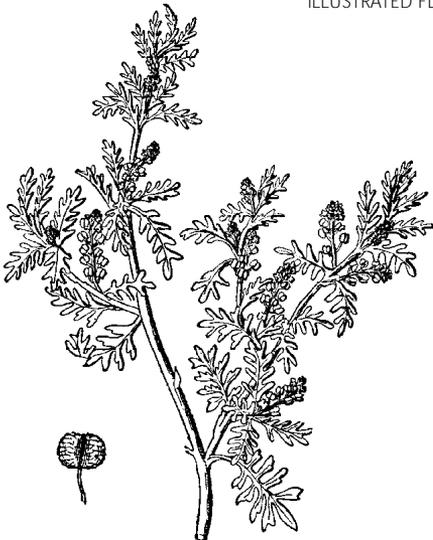
REFERENCES: Fernald 1934; Hartman et al. 1975.

1. Mature fruits 2–4(–5) mm long, 0.6–1 mm wide; leaves of main stem more than twice as long as wide, narrowly oblong or oblanceolate, entire; plants pubescent with sessile branched hairs \_\_\_\_\_ **D. brachycarpa**
1. Mature fruits 5–15 mm long, 1–3 mm wide; leaves of main stem (at first all nearly basal) usually not more than twice as long as wide, entire or toothed; plants with either simple hairs or stalked branched hairs (use hand lens or conspicuous with a dissecting scope).
  2. Leaves entire; fruits erect or strongly ascending on glabrous pedicels; fruits usually glabrous \_\_\_\_\_ **D. reptans**
  2. Leaves with 1 or more pairs of coarse teeth; fruits widely spreading on pubescent pedicels; fruits often with short hairs.
    3. Fruits lanceolate-elliptic, usually 5–8 mm long, 2–3 mm wide; stem leaves 4–10, scattered up the stem; stems with largely simple pubescence \_\_\_\_\_ **D. platycarpa**
    3. Fruits elliptic to oblong, 8–16 mm long, 1–3 mm wide; stem leaves 1–7 (or apparently none), crowded near base; stems with spreading, stalked, branched pubescence \_\_\_\_\_ **D. cuneifolia**

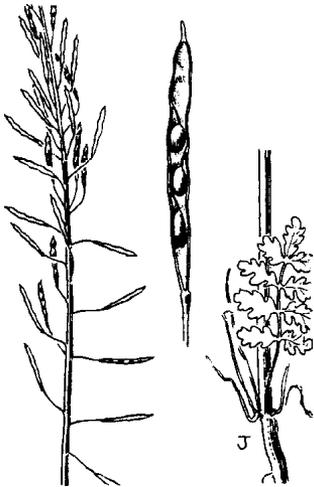
**Draba brachycarpa** Nutt. ex Torr. & A. Gray, (short-fruited), SHORT-POD DRABA. Stems erect, to ca. 20 cm tall; basal leaves to ca. 15 mm long; petals absent or 1.2–3 mm long; fruits glabrous or hispid. Woods, roadsides, and open ground; sandy soils; e TX w to Rolling Plains and Edwards Plateau. Feb–Mar.



Conringia orientalis [ROB]



Coronopus didymus [BB1]



Descurainia incana subsp. viscosa [ABR]



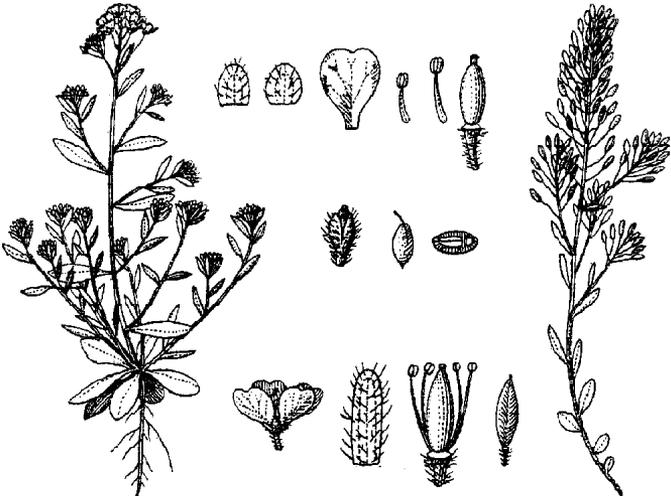
Descurainia pinnata subsp. pinnata [EN1]



Descurainia sophia [SMI]



Diplotaxis muralis [BB2]



Draba brachycarpa [EN1]

**Draba cuneifolia** Nutt. ex Torr. & A. Gray, (wedge-leaved), WEDGE-LEAF DRABA, WHITLOW-WORT. Similar to *D. platycarpa*; stems erect, to ca. 30 cm tall. Sandy and gravelly soils; nearly throughout TX. Late Feb–Apr.

**Draba platycarpa** Torr. & A. Gray, (broad-fruited), BROAD-POD DRABA. Petals 3–3.5 mm long, rarely absent. Rocky slopes, bare spots in prairies, disturbed sites, sand or calcareous clay; e Blackland Prairie w to Rolling Plains and Edwards Plateau. Mar–Apr, main period 1 or 2 weeks later than *D. cuneifolia*

**Draba reptans** (Lam.) Fernald, (creeping), CAROLINA DRABA. Petals absent or 3–4 mm long. Open woods, fields, and roadsides, sandy or rocky soils; Blackland Prairie w to High Plains. Feb–Mar [*D. reptans* (Lam.) Fernald var. *micrantha* (Nutt.) Fernald]

## ERUCASTRUM

☛ A genus of 20 species native to the Mediterranean, c and s Europe, and Macaronesia. (Latin: resembling *Eruca*, a Mediterranean genus whose name derives from the Latin name for an edible species)

REFERENCE: Luken et al. 1993.

**Erucastrum gallicum** (Willd.) O.E. Schulz, (of Gaul or France), ROCKET SALAD, ROCKET WEED, DOG-MUSTARD. Annual to 60(–80) cm tall; leaf blades deeply pinnatifid, the lobes coarsely toothed, obtuse; petals 7–8 mm long, pale yellow; fruits 2–4 cm long, 1–2 mm wide. Roadsides and railroads; Grayson Co., also Denton, Hill, and Tarrant cos. (Mahler 1988); nc TX s to Edwards Plateau; first collected in the U.S. in Wisconsin in 1903 and in Texas in 1926 (Luken et al. 1993). Late Mar–Apr. Native of Europe. 🌿

## ERYSIMUM WALLFLOWER

Annuals or perennials, gray with minute, appressed, simple or both simple and stellate hairs; leaves linear-lanceolate to oblong, entire, toothed, or pinnatifid; petals long-clawed.

☛ A genus of ca. 200 species of the Mediterranean, Europe, Asia, and North America; it includes weeds and cultivated ornamentals. (Greek: *eryomai*, help or save, from supposed medicinal properties of some species or *eryo*, to draw out, alluding to the blistering properties of some species)

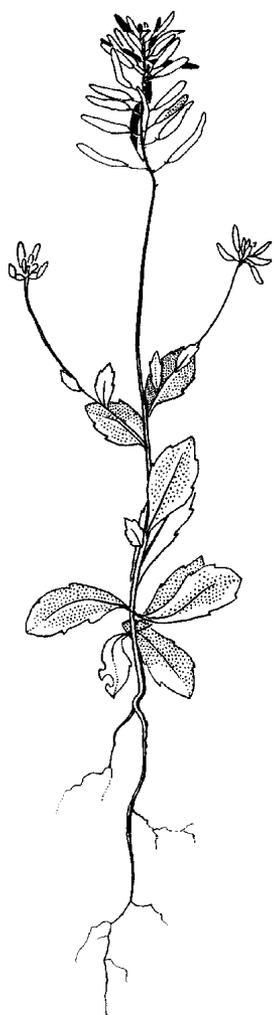
REFERENCE: Rossbach 1958.

1. Petals greenish yellow, 5–8 mm long; pedicels 2–4 mm long \_\_\_\_\_ **E. repandum**
1. Petals yellow to orange-red, 15–25 mm long; pedicels 5–10 mm long.
  2. Petals yellow (rarely orange-yellow); mature fruits widely spreading, usually 8–12 cm long; plants often 40 cm or less tall \_\_\_\_\_ **E. asperum**
  2. Petals yellow to orange or orange-red; mature fruits erect (rarely merely ascending), usually 5–8 cm long; plants usually 40–100 cm tall \_\_\_\_\_ **E. capitatum**

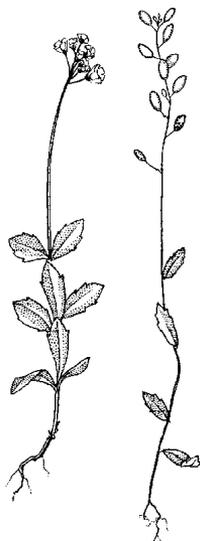
**Erysimum asperum** (Nutt.) DC., (rough), WESTERN WALLFLOWER. Perennial to 40(–75) cm tall. Limestone outcrops, hillsides, prairies; Lampasas and Wise cos., also Limestone Co. (Mahler 1988); nc TX w to Plains Country. Apr–May. 🌿/89

**Erysimum capitatum** (Douglas ex Hook.) Greene, (headed), PLAINS ERYSIMUM, WESTERN WALLFLOWER, PRAIRIE-ROCKET. Coarse biennial or perennial [?] to 40–100 cm tall; young plants without mature fruits are often very similar to *E. asperum*. Rocky outcrops, roadcuts, dry streambeds, open wooded slopes; Limestone Co.; Post Oak Savannah w through much of TX. Apr–Jun.

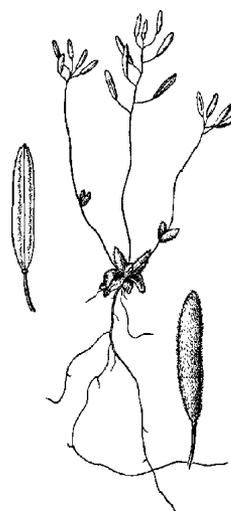
**Erysimum repandum** L., (with wavy margins), SPREADING ERYSIMUM, BUSHY WALLFLOWER. Annual to ca. 40 cm tall; fruits 4–7 cm long. Railroads and roadsides, various soils; Callahan,



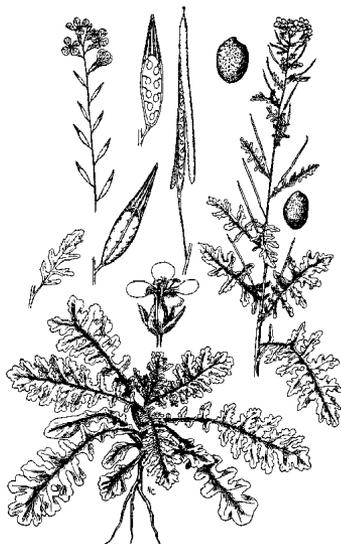
*Draba cuneifolia* [BR3]



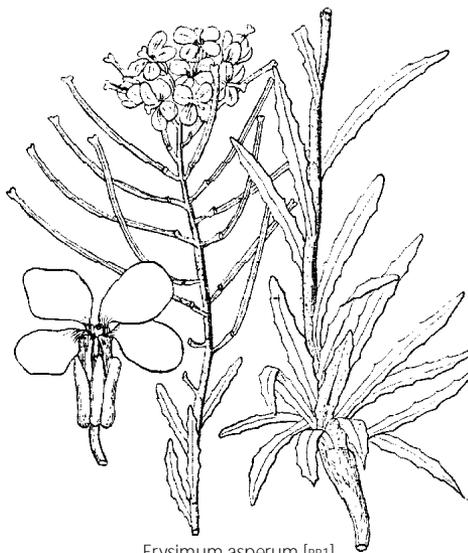
*Draba platycarpa* [BR3]



*Draba reptans* [CLF]



*Erucastrum gallicum* [MUE]



*Erysimum asperum* [BB1]



*Erysimum capitatum* [ABR]



*Erysimum repandum* [BB2]



*Iodanthus pinnatifidus* [BB2]

Cooke, Dallas, Grayson, and Somervell cos., also Denton Co. (Mahler 1988); nc TX s to Edwards Plateau and se TX, apparently spreading; first collected in TX in Pecos Co. in 1944 (Cory 1947, 1948a, 1950). Apr–May. Native of Europe. 🇪🇺

## IODANTHUS

☛ A genus of 4 species, 1 in e North America and 3 in Mexico. (Greek: *iodes*, violet-colored, and *anthos*, flower)

REFERENCE: Rollins 1942.

***Iodanthus pinnatifidus*** (Michx.) Steud., (pinnately cut), PURPLE-ROCKET. Perennial, glabrous or nearly so; stems erect, 30–100 cm tall; leaves ovate to lanceolate, usually sharply toothed; lower leaves 5–20 cm long, usually with winged petioles with small lobes and basal auricles clasping the stem; upper leaves sessile and cuneate; sepals erect, often purplish, 3–5 mm long; petals white to lavender; fruits 2–4 cm long, linear. Low and rich woods; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); c and e TX. Apr–Jun.

## LEPIDIUM PEPPERWEED, PEPPER-GRASS

Our species annuals; leaves mostly toothed or pinnatifid; flowers small; petals white or absent.

☛ A cosmopolitan, but especially temperate genus of ca. 140 species. The fruits of some have a tasty, peppery flavor; a number have been cultivated as salad plants and are usually eaten at cotyledon or seedling stage. (Greek: *lepidion*, little scale, alluding to the fruit)

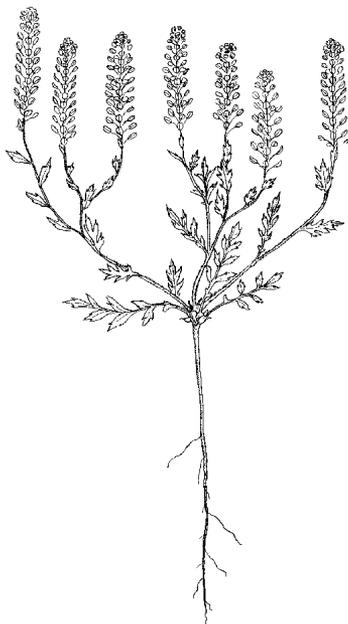
REFERENCES: Hitchcock 1936, 1945; Al-Shehbaz 1986a.

1. Uppermost leaves deeply toothed or lobed; stem leaves rather uniform in size, deeply pinnatifid; plants prostrate to ascending, usually much branched near base \_\_\_\_\_ **L. oblongum**
1. Uppermost leaves entire or nearly so; stem leaves gradually much reduced upward, the lower leaves toothed to deeply pinnatifid, the upper shallowly pinnatifid to entire; plants ± erect, usually single stemmed below, branched above.
  2. Stems glabrous or minutely and inconspicuously pubescent.
    3. Lower leaves usually bipinnatifid; fruits 1–2(–2.5) mm broad, ovate to broadly elliptic; plants ill-smelling \_\_\_\_\_ **L. ruderale**
    3. Lower leaves usually incised to pinnatifid, not bipinnatifid; fruits 2–3.3 mm broad, elliptic to orbicular; plants usually not ill-smelling.
      4. Pedicels about as long as fruits or shorter; petals rudimentary, shorter than sepals OR petals absent; fruits 2–3.5 mm long \_\_\_\_\_ **L. densiflorum**
      4. Pedicels usually slightly longer than the fruits; petals typically conspicuous, usually as long as or longer than sepals; fruits 2.5–4.2 mm long \_\_\_\_\_ **L. virginicum**
  2. Stems moderately to densely hispid-pilose, the hairs conspicuous (with a hand lens) and spreading at right angles \_\_\_\_\_ **L. austrinum**

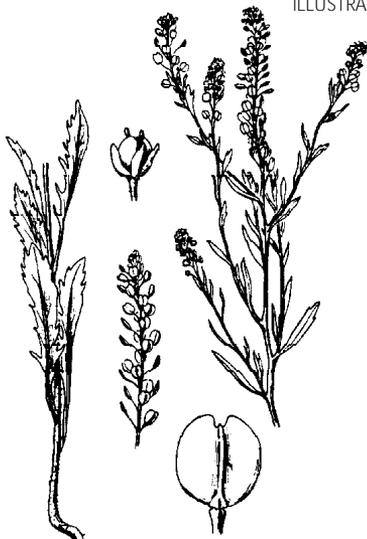
***Lepidium austrinum*** Small, (southern), SOUTHERN PEPPERWEED. Similar to *L. virginicum*; petals frequently absent. Disturbed areas; mainly Blackland Prairie w to Rolling Plains and s to s TX. Late Mar–May. Apparently hybridizes introgressively with *L. virginicum*.

***Lepidium densiflorum*** Schrad., (densely-flowered), PRAIRIE PEPPERWEED, GREEN-FLOWER PEPPER-GRASS. Plant somewhat erect, to ca. 50 cm tall; basal leaves usually deeply serrate-incised, rarely somewhat pinnatifid; fruits ovate or rarely suborbicular. Sandy soils in disturbed areas; Brown Co. on western margin of nc TX; scattered nearly throughout TX. Feb–Jun.

***Lepidium oblongum*** Small, (oblong), VEINY PEPPERWEED. Stems prostrate to ascending, much branched from base, to ca. 20 cm long, minutely pubescent; basal leaves pinnatifid to



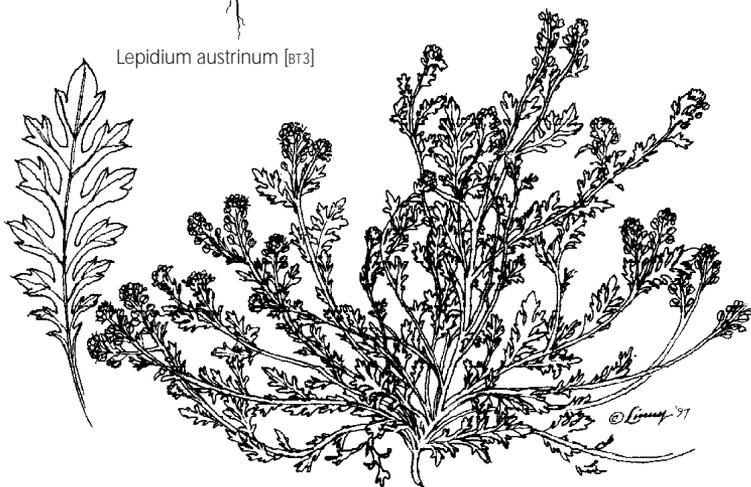
*Lepidium austrinum* [BT3]



*Lepidium densiflorum* [ABR]



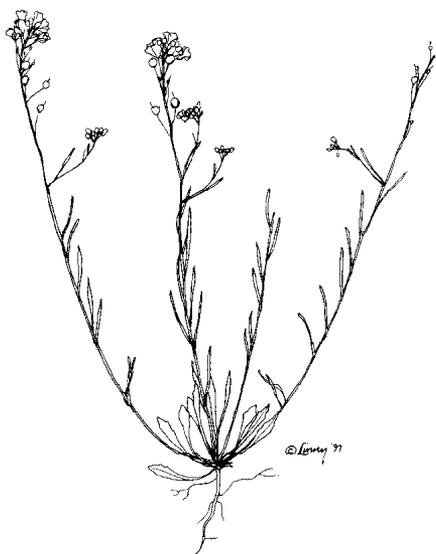
*Lepidium ruderale* [SMI]



*Lepidium oblongum* [HEA]



*Lepidium virginicum* [REE]



*Lesquerella angustifolia* [HEA]



*Lesquerella auriculata* [HEA]

bipinnatifid; petals minute or absent. Sandy or silty ground; Tarrant Co. (Mahler 1988); mainly Rolling Plains and Edwards Plateau w to w TX. Mid-Mar–Apr.

**Lepidium ruderale** L., (of rubbish). Stems to ca. 30 cm tall; basal leaves usually bipinnatifid, rarely only pinnatifid. Roadsides, waste places, and disturbed areas; included based on citation for vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); scattered in e 1/2 of TX. Mar–Jul. Native of Europe. 🇪🇺

**Lepidium virginicum** L., (of Virginia), VIRGINIA PEPPER-GRASS, POORMAN'S-PEPPER, AMERICAN PEPPER-GRASS, LENTEJILLA. Plant erect, to 60 cm tall; basal leaves usually pinnatifid; inflorescences at least sparingly pubescent; pedicels terete; petals usually longer than the sepals, linear-oblancoolate to obovate, rarely shorter or absent; fruits usually nearly orbicular, less often broadly elliptic to obovate. Usually sandy soils, disturbed areas; throughout TX. Mar–May. Two varieties, var. *medium* (Greene) C.L. Hitchc. and var. *virginicum*, are sometimes recognized (Kartesz 1994). Variety *medium* supposedly differs in having the inflorescences usually glabrous and the pedicels slightly inflated. However, consistent differences in nc TX material could not be found.

### LESQUERELLA BLADDERPOD, WILD MUSTARD

Low, pubescent or scurfy annuals or perennials; hairs usually branched or stellate, the rays sometimes fused and the hairs then semi-peltate or peltate and scale-like; leaves (except lowest) sessile or subsessile, entire or toothed or pinnatifid; flowers in racemes; petals yellow; fruits globose or nearly so.

☛ A North American genus of 40 species. (Named for Leo Lesquereux, 1805–1889, distinguished American bryologist and paleobotanist)

REFERENCES: Payson 1921; Rollins 1955, 1956; Rollins & Shaw 1973; Clark 1975; Nixon et al. 1983.

1. Plants annual (rarely biennial), not from a woody base; petals (including claw) usually 4–8 mm long; fruits 3–6 mm long (to 7 mm in *L. gordonii*).
  2. Stem leaves distinctly auriculate.
    3. Lower stems pubescent with appressed branched hairs; stems 20–70 cm long; sepals ca. 4–6 mm long \_\_\_\_\_ **L. grandiflora**
    3. Lower stems with spreading simple hairs; stems to ca. 22 cm long; sepals ca. 3–4 mm long \_\_\_\_\_ **L. auriculata**
  2. Stem leaves not auriculate or only obscurely so.
    4. Fruiting pedicels uniformly recurved (= bent downward) and the fruits therefore pendant; buds when ready to open (yellow-green in color, petals not yet visible) 2.5–3.5 mm long \_\_\_\_\_ **L. recurvata**
    4. Fruiting pedicels various but not uniformly recurved; buds when ready to open 4–6 mm in diam.
      5. Pedicels sigmoid (curved into an S-shape); mainly West Cross Timbers w to w TX \_\_\_\_\_ **L. gordonii**
      5. Pedicels straight or simply curved, not sigmoid; distribution various.
        6. Inflorescence dense, the flowers crowded at end of stem; inflorescence closely subtended by upper leaves even after fruit has formed; stellate hairs ca. 0.3–0.4 mm across (with a dissecting scope), distinctly hair-like; in nc TX known only from s Grand Prairie \_\_\_\_\_ **L. densiflora**
        6. Inflorescence quickly elongating, not dense, the flowers not crowded at end of stem; inflorescence separated a short distance from the uppermost leaves by the time a few flowers have opened; stellate hairs ca. 0.1–0.2 mm across, so small as to appear almost scale-like; widespread.
          7. Stem leaves 4–10 cm long, 1–3.5 mm wide; ovules 2 per locule; fruits with a minute stipe (0.5 mm or less long) or none connecting it to the pedicel; in nc TX only known from Red River Co. \_\_\_\_\_ **L. angustifolia**

7. Stem leaves 1–5 cm long, 2–20 mm wide; ovules 8–10 per locule; fruits with a stipe (ca. 0.75–2 mm long) connecting it to the pedicel; widespread \_\_\_\_\_ **L. gracilis**

1. Plants perennial from a woody base; petals usually 8–12 mm long; fruits 4.5–8 mm long.

8. Plants densely pubescent and grayish green but not conspicuously silvery-gray; inflorescence dense and crowded at end of stem; rays (= branches) of stellate hairs free or fused basally only (use dissecting scope); fruits with stipe ca. 0.5–1 mm long; style 4–8 mm long \_\_\_\_\_ **L. engelmannii**

8. Plants conspicuously silvery-gray pubescent; inflorescence usually elongated and loose (at least with age); rays of stellate hairs fused together from their base to 1/2 their length; fruits usually without a stipe or occasionally with a very short stipe; style 3–5 mm long \_\_\_\_\_ **L. fendleri**

**Lesquerella angustifolia** (Nutt. ex Torr. & A. Gray) S. Watson, (narrow-leaved), NARROW-LEAF BLADDERPOD. Annual with stems to ca. 40 cm long; stems and leaves scurfy with peltate or semi-peltate hairs. Rocky limestone soils; central Red River Co. in extreme ne part of nc TX and nearby OK; rare. Apr–May.

**Lesquerella auriculata** (Engelm. & A. Gray) S. Watson, (eared, with an ear-shaped appendage), EAR-LEAF BLADDERPOD. Annual densely hirsute with long simple hairs and shorter several-rayed ones beneath; stems erect to decumbent, to 22 cm long; basal leaves dentate to lyrate, sometimes nearly entire; cauline leaves 1–4 cm long, 3–10 mm wide, sessile and auriculate; fruits 4–6 mm long, globose to slightly longer than broad. Prairies and disturbed soils; Kaufman Co. (Reverchon collection in 1903, “sands, common”), also Navarro Co. (Rollins & Shaw 1973); ne Blackland Prairie e to e TX. Mar–May.

**Lesquerella densiflora** (A. Gray) S. Watson, (densely flowered), DENSE-FLOWER BLADDERPOD. Annual or biennial with erect to decumbent stems to ca. 40 cm long; stems and leaves rather densely pubescent with loosely appressed, stellate hairs; leaves rather numerous and crowded, elliptic- or oblong-lanceolate; fruits 2.5–4.5 mm long. Sandy or gravelly ground; Burnet and Somervell cos., also Brown, Comanche, Eastland, Hood, Palo Pinto (Rollins & Shaw 1973), and McLennan (Mahler 1988) cos.; mainly s Grand Prairie s to Edwards Plateau and w to Rolling Plains; endemic to TX. Late Mar–Apr. 📍

**Lesquerella engelmannii** (A. Gray) S. Watson, (for George Engelmann, 1809–1884, German-born botanist and physician of St. Louis), ENGELMANN’S BLADDERPOD. Perennial with several stems to ca. 50 cm tall; stems and leaves silvery with dense, appressed, stellate pubescence; stem leaves linear to narrowly oblong-oblancoate; raceme at first short, umbel-like; fruits 5.5–5.8 mm long; ovules 5–8 per locule. Rocky limestone slopes; Cooke, Dallas, Ellis, Erath, Parker, Tarrant, and Wise cos., also Lampasas Co. (Rollins & Shaw 1973); Blackland Prairie to West Cross Timbers s to s TX. Apr–May.

**Lesquerella fendleri** (A. Gray) S. Watson, (for August Fendler, 1813–1883, one of the first botanists to collect in New Mexico and Venezuela), FENDLER’S BLADDERPOD, POPWEED. Perennial to 40 cm tall, branched from base, conspicuously silvery-gray pubescent by stellate hairs with rays fused to about middle; fruits 4.6–8 mm long, globose to broadly ellipsoid or ovoid; ovules 10–16 per locule. Roadsides, open sandy or rocky, often calcareous soils; Shackelford Co., also Brown and Coryell cos. (Rollins & Shaw 1973); w part of nc TX w to w TX. Apr.

**Lesquerella gordonii** (A. Gray) S. Watson, (for James Gordon, d. ca. 1781, correspondent of Linnaeus and London nurseryman), GORDON’S BLADDERPOD, POPWEED, BEADPOD. Stellate pubescent annual; stems prostrate, decumbent or erect, to 40 cm long, usually branched; fruits 4–7 mm long, ca. globose to broadly ellipsoid. Sandy and gravelly soils; Brown, Burnet, Callahan, Shackelford, Somervell, and Young cos., also Comanche, Eastland, Jack, and Johnson cos. (Rollins & Shaw 1973); mainly West Cross Timbers w to w TX. Mar–Jun. The dry fruits pop when stepped on giving rise to the common name (Kirkpatrick 1992).

**Lesquerella gracilis** (Hook.) S. Watson, (graceful). Annual with erect to decumbent stems to 50 cm tall, younger parts gray with appressed, stellate pubescence, older parts sparsely pubescent and green; fruits 3–5 mm in diam. Prairies, roadsides, and disturbed ground, calcareous clay. Late Mar–May.

1. Fruits globose to ellipsoid \_\_\_\_\_ subsp. **gracilis**

1. Fruits obpyriform (= pear-shaped with attachment at narrow end), usually with a distinct basal shoulder \_\_\_\_\_ subsp. **nuttallii**

subsp. **gracilis** (Hook.) S. Watson, WHITE BLADDERPOD, LAX BLADDERPOD, PEAR-FRUIT BLADDERPOD, CLOTH-OF-GOLD. Blackland Prairie and Grand Prairie; nc to sc TX.

subsp. **nuttallii** (Torr. & A. Gray) Rollins & E.A. Shaw, (for Sir Thomas Nuttall, 1786–1859, English-American botanist). Dallas, Grayson, and Kaufman cos. (Rollins & Shaw 1973); ne TX. [*L. nuttallii* (Torr. & A. Gray) S. Watson, *L. gracilis* (Hook.) S. Watson var. *repanda* (Nutt.) Payson]

**Lesquerella grandiflora** (Hook.) S. Watson, (large-flowered), BIG-FLOWER BLADDERPOD. Annual (biennial?) with erect to decumbent stems to 70 cm long, densely pubescent with often 5-rayed hairs; basal leaves dentate to bipinnatifid; fruits 4–6 mm long, globose or slightly longer than broad. Loose sandy soils; included based on citation for vegetational area 4 (Fig. 2) by Hatch et al. (1990); n to at least Travis Co. just s of nc TX (Rollins & Shaw 1973); s and c TX; endemic to TX. Mar–Apr. 🌿

**Lesquerella recurvata** (Engelm. ex A. Gray) S. Watson, (curved backward), SLENDER BLADDERPOD. Resembling smaller, delicate forms of *L. gracilis*; stems scurfy with peltate or semi-stellate hairs; leaves stellate-pubescent with subappressed hairs. Limestone outcrops and gravelly calcareous prairies; mainly Blackland and Grand prairies from Ellis, Hood, and Johnson cos. s to c TX; endemic to TX. Mar–Apr. 🌿

## MATTHIOLA STOCK

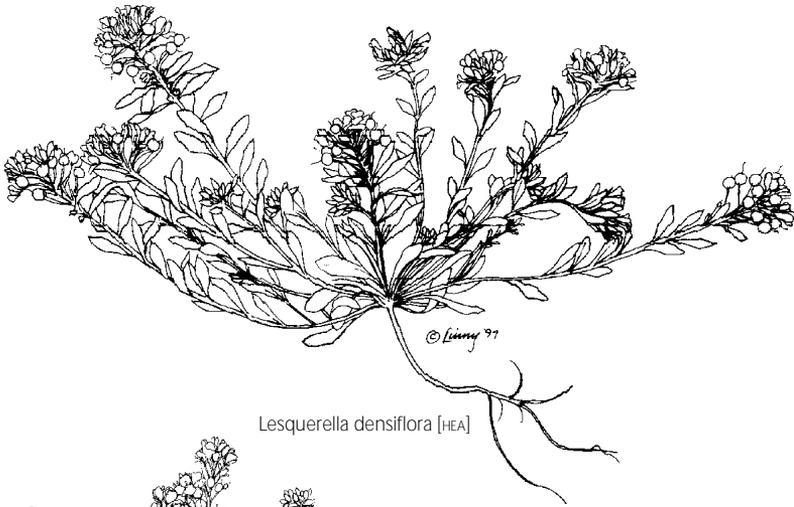
☛ An Old World genus of 55 species native to w Europe, the Mediterranean region, and Macaronesia; some are cultivated as ornamentals. (Named for Pietro Andrea Matthiola, 1500–1577, Italian botanist and physician)

**Matthiola longipetala** (Vent.) DC., (long-petaled), EVENINGSTOCK, PERFUMEPLANT, GILLIFLOWER, STOCK. Annual or biennial with dense, grayish, branched pubescence; leaves linear-lanceolate to lanceolate, entire to dentate; flowers sessile, lilac or purple, fragrant; petals 1.5–2 cm long; fruits 7–10 cm long, forked apically into 2 conspicuous horns. Escapes from cultivation, weedy areas; Bell Co., also Edwards Plateau. Spring–summer. Native of the Old World. [*M. bicornis* (Sibth. & Sm.) DC.] 🌿

## MYAGRUM

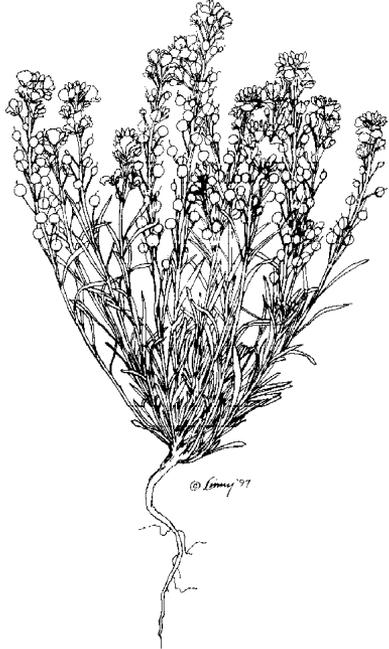
☛ A monotypic genus native of the Mediterranean area and c Europe to India. (Greek: *mya*, mouse, and *agra*, trap)

**Myagrum perfoliatum** L., (perfoliate, with leaves surrounding the stem). Glabrous annual to 70(–100) cm tall; stem leaves sessile, auricled-clasping, mostly entire, oblong- or triangular-lanceolate; flowers crowded, in spike-like racemes; petals light yellow, 3–4 mm long; fruits roughly triangular (club-shaped, much wider distally), ca. 5–6 mm long. Fields and roadsides in black clay; Dallas, Delta, Fannin, Grayson, and Johnson cos., also Denton (C. Taylor, pers. obs.) and Rockwall (VDB) cos. and Bryan Co., OK (C. Taylor, pers. obs.); also Edwards Plateau; thought to have been introduced into Texas (Delta Co.) with vetch seed from Oregon in 1949 (Cory 1950); abundant and spreading. Apr–May. Native of the Mediterranean area and c Europe to Iran. 🌿

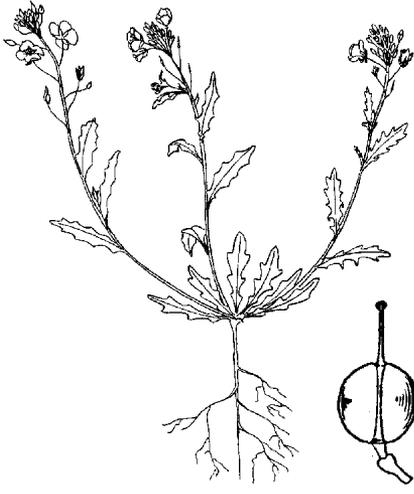


*Lesquerella densiflora* [HEA]

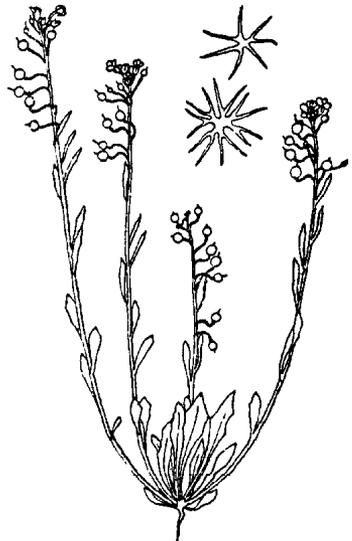
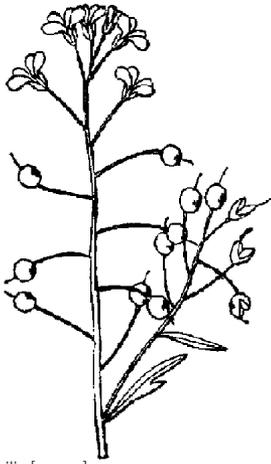
*Lesquerella engelmännii* [GR1]



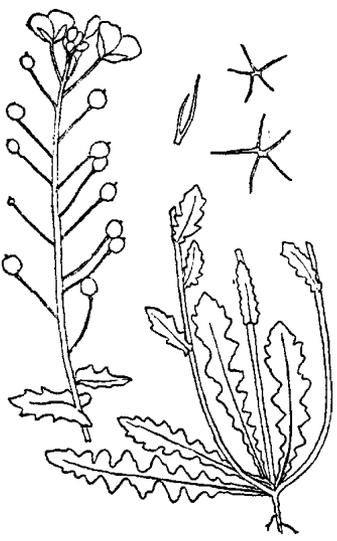
*Lesquerella fendleri* [HEA]



*Lesquerella gracilis* subsp. *gracilis* [BB2, SHI]



*Lesquerella gordonii* [AMB]



*Lesquerella grandiflora* [AMB]



*Lesquerella recurvata* [AMB]

**RAPHANUS RADISH**

☛ A genus of 3 species native to w and c Europe and the Mediterranean region to c Asia. (Greek: *raphanos*, quickly appearing, alluding to the rapid germination; classical Greek name for radish)

**Raphanus sativus** L., (cultivated), RADISH, RABANO. Sparsely hispid or nearly glabrous annual 25–125 cm tall, with swollen taproot; larger leaves pinnatifid, with large terminal lobe; petals white to rosy or lavender, 15–22 mm long; fruits 4–5 cm long, 6–10 mm in diam. Commonly cultivated throughout TX and sometimes a transitory escape; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990). Cultivated since time of Assyrians and probably of hybrid origin (Mabberley 1987). Exact place of origin unknown; European or Asiatic. ☛

**RAPISTRUM**

☛ An Old World genus of 2 species native of c Europe, the Mediterranean region, and w Asia. (Latin name of the wild rape)

REFERENCE: Lemke & Worthington 1991.

**Rapistrum rugosum** (L.) All., (rugose, wrinkled). Annual, resembling species of *Brassica*, glabrous or sparsely hispid; stems 0.3–0.8 m tall; lower leaves pinnatifid to coarsely dentate; stem leaves few, smaller, dentate; petals 5–10 mm long, yellow; pedicels 2–5 mm long; fruits 3–9 mm long including beak, of 2 segments; upper fruit segment nearly globose, ca. 3 mm in diam., one-seeded, larger than the lower segment, abruptly contracted to the beak; lower fruit segment one-seeded or seedless, cylindrical, appearing like a thickened extension of the pedicel; beak of fruit 1–3 mm long. Fields and roadsides; Grayson and Kaufman cos. s to Bell and Milam cos.; Blackland Prairie; also se and e TX and Edwards Plateau; apparently increasing. Apr–early May. Native of the Mediterranean region. ☛

**RORIPPA YELLOWCRESS**

Annuals or perennials; our species glabrous or nearly so; leaves simple or compound, toothed or pinnatifid; petals white or yellow, small or absent; seeds not winged.

☛ A nearly cosmopolitan genus of 80 species. (From the old Saxon word, *wrippen*, for plants of this genus)

REFERENCES: Green 1962; Stuckey 1972.

1. Petals white; leaves pinnately compound \_\_\_\_\_ **R. nasturtium-aquaticum**
1. Petals yellow OR absent; leaves simple (but may be deeply pinnatifid).
  2. Fruits (siliques) sessile or pedicels to 1.5 mm long; petals absent or rarely 1 present \_\_\_\_\_ **R. sessiliflora**
  2. Fruits pedicellate with pedicels 2 mm long or longer; petals present.
    3. Pedicels about equal to fruits in length; fruits usually 3–9 mm long; seeds 0.5–0.9 mm long; vesicular (= sac-like) hairs absent, the plants glabrous or with pointed hairs \_\_\_\_\_ **R. palustris**
    3. Pedicels much shorter than fruits; fruits usually 10–15 mm long; seeds 0.4–0.5 mm long; vesicular hairs present on lower part of stem or foliage \_\_\_\_\_ **R. teres**

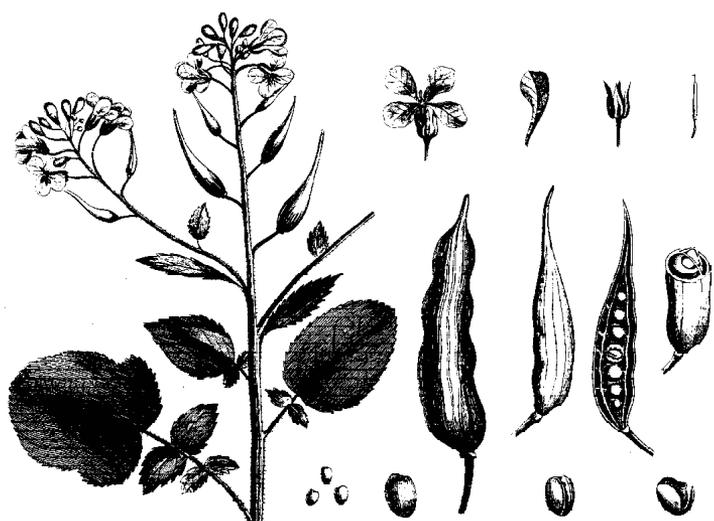
**Rorippa nasturtium-aquaticum** (L.) Hayek, (aquatic nasturtium, from Latin, *nasi tortium*, a twisted nose, from the plant's pungent qualities), WATERCRESS. Aquatic to semiaquatic perennial; stems floating, creeping, or ascending, rooting at the nodes; leaflets oblong- to rhombic-orbicular, entire or shallowly and bluntly toothed; petals 3–4 mm long. Shallow, fairly clear water, in streams or springs, sometimes stranded in wet mud; Bell, Burnet, Dallas, Grayson, and Tarrant cos., also Johnson Co. (R. O'Kennon, pers. obs.); widely scattered in TX. Apr–Jun. Native of Europe. [*Nasturtium officinale* W.T. Aiton, *Sisymbrium nasturtium-aquaticum* L.] ☛



*Matthiola longipetala* [HEA]



*Myagrum perfoliatum* [GLE, LAM]



*Raphanus sativus* [LAM]



*Rapistrum rugosum* [ALL]



*Rorippa nasturtium-aquaticum* [REE]



*Rorippa palustris* subsp. *fernalidiana* [GLE]

**Rorippa palustris** (L.) Besser subsp. **fernaldiana** (Butters & Abbe) Jonsell, (sp.: marsh-loving; subsp.: for Merritt Lyndon Fernald, 1893–1950, author of *Gray's Manual of Botany*, 8th ed.), BOG YELLOWCRESS, BOG MARSHCRESS. Annual to 80 cm tall, usually erect, branched above, essentially glabrous, without vesicular hairs; lower leaves lobed; upper leaves toothed; petals usually 1–2 mm long; fruits short-cylindrical to ellipsoid, usually 3–9 mm long, the replum becoming twisted when dry. Margins of lakes and streams; Cooke and Dallas cos.; mainly se and e TX w to Grand Prairie and Edwards Plateau. Apr–Sep. [*R. palustris* (L.) Besser var. *fernaldiana* (Butters & Abbe) Stuckey, *R. islandica* of TX auth., not (Oeder) Borbás]

**Rorippa sessiliflora** (Nutt.) Hitchc., (stalk-less-flowered), STALK-LESS YELLOWCRESS. Glabrous summer, fall, or winter annual; stems to 50 cm tall, erect, single to much-branched; leaves entire, repand or somewhat toothed; sepals greenish yellow; petals absent or rarely 1 present; fruits thick, can be over 2 mm wide, 6–10 mm long, sessile or on pedicels 0.5–1.5 mm long. Shores of streams and lakes; Bell, Cooke, Dallas, and Hopkins cos., also Brown (HPC) and Tarrant (R. O'Kennon, pers. obs.) cos.; se and e TX w to Grand Prairie and Edwards Plateau. Apr–May, less commonly Aug–Sep.

**Rorippa teres** (Michx.) Stuckey, (terete, circular in cross-section), TANSY-LEAF YELLOWCRESS. Annual with erect to decumbent, usually branched stems to 40 cm long; vesicular hairs obovate to clavate on lower part of stems and upper leaf surfaces of lower leaves; leaves deeply pinnatifid; petals 1(–2) mm long; pedicels 2–5 mm long; fruits (5–)10–15(–18) mm long. Wet thickets, stream banks, sandy soils; Dallas Co. (Cedar Hill–R. O'Kennon, pers. obs.), also cited for vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se and e TX w to Edwards Plateau and Trans-Pecos. Mar–Apr, sporadically later.

## SIBARA

☛ A genus of 10 species native to e and s North America. (An anagram of *Arabis*)  
REFERENCE: Rollins 1947.

**Sibara virginica** (L.) Rollins, (of Virginia), VIRGINIA SIBARA. Annual to 35 cm tall, similar in appearance to *Cardamine parviflora*; stems often numerous, sparsely pubescent toward base; basal rosette of leaves present; basal leaves pinnately dissected with 5–14 pairs of lateral divisions; stem leaves similar but reduced; racemes 10–20 cm long; petals white or with tinge of pink, 2.5–3 mm long; fruits 15–30 mm long, ca. 1.2–2 mm wide, flattened. Wet thickets, ditches, disturbed areas; se and e TX w to Edwards Plateau and Rolling Plains. Feb–Apr.

## SINAPIS MUSTARD

Our species introduced annuals; leaves not clasping, at least the lower pinnatifid; petals yellow, rather large and showy; beak of silique large, usually containing a seed.

☛ A genus of 7 species of Europe and the Mediterranean region; sometimes included in *Brassica*. As in the related genus *Brassica* (e.g., *Brassica nigra*), the seeds of *Sinapis alba* are a source of edible mustard. ☛ Some species can be poisonous to livestock due to the presence of mustard oil glycosides (Stephens 1980). (Latin: *sinapis*, mustard, from flavor of seeds)  
REFERENCES: Sun 1946; Lemke & Worthington 1991.

1. Leaves all pinnatifid; fruits bristly, 3–4 mm in diam., the beak 1–2 times longer than the fruit body; seeds 4–8 per fruit \_\_\_\_\_ **S. alba**
1. Middle and upper leaves merely toothed; fruits glabrous or sparsely bristly, 1.5–2.5 mm in diam., the beak shorter than or equal to fruit body in length; seeds 7–13 per fruit \_\_\_\_\_ **S. arvensis**

**Sinapis alba** L., (white), WHITE MUSTARD. Rough hairy annual to 70 cm tall; siliques 15–35 mm long, the beak 10–20(–rarely more) mm long, flat, often curved. Weedy areas; included based on

citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); scattered in TX. Probably native of Mediterranean region. [*Brassica hirta* Moench] Cultivated for its mustard-producing seeds and for greens. 🌱

**Sinapis arvensis** L., (pertaining to cultivated fields), FIELD MUSTARD, CHARLOCK. Annual to 80 cm tall; stems spreading pubescent; siliques 20–45 mm long, the beak quadrangular-flattened, 6–15 mm long. Fields, roadsides, and railroads, various soils; se and e TX w to West Cross Timbers and Edwards Plateau. Feb–May. Native of Europe. [*Brassica kaber* (DC.) L.C. Wheeler] Poisoning and death have been reported in cattle, chickens, horses, and pigs from eating large quantities of the plant or seeds (Mulligan & Munro 1990) 🌱 🌿

## SISYMBRIUM

Our species small to robust annuals, glabrous or sparsely pubescent with simple hairs; leaves unevenly pinnatifid, often with large apical section; petals light yellow.

☛ A genus of 90 species of Eurasia, the Mediterranean region, s Africa, North America, and the Andes. (Latinized from an ancient Greek name for some plant of this family)

REFERENCE: Payson 1922a.

1. Terminal lobe of upper leaves linear-oblong or linear; petals 5–10 mm long; pedicels spreading-ascending; mature fruits 3.5–10 cm long \_\_\_\_\_ **S. altissimum**
1. Terminal lobe of upper leaves triangular; petals 2.5–4 mm long; pedicels spreading-ascending OR closely appressed; mature fruits 1–5 cm long.
  2. Pedicels spreading-ascending in age, 4–10 mm long; stems glabrous; mature fruits 3–5 cm long \_\_\_\_\_ **S. irio**
  2. Pedicels closely appressed in age, 1–2 mm long; stems sparingly hispid-pubescent at least below; mature fruits 1–2 cm long \_\_\_\_\_ **S. officinale**

**Sisymbrium altissimum** L., (tallest), TUMBLE-MUSTARD. Plant to 1.5 m tall; lower leaves and stems sparsely pilose. Railroads and roadsides; Dallas Co.; scattered in TX. Native of Europe and w Asia. 🌱

**Sisymbrium irio** L., (Latin name for a siliquose plant), ROCKET-MUSTARD, LONDON-ROCKET. Plant to 0.6 m tall. Fields, roadsides, and waste ground, various soils; Dallas and Brown cos.; wide-spread in TX. Feb–May, Nov on further s. Native of Europe. 🌱

**Sisymbrium officinale** (L.) Scop., (medicinal), HEDGE-MUSTARD, TANSY-MUSTARD. Plant to 1.2 m tall. Fields, thickets, and waste ground, various soils; Cooke, Denton, and Grayson cos., also McLennan and Navarro cos. (Mahler 1988); widespread in TX. Apr–Jun. Native of Europe. [*S. officinale* var. *leiocarpum* DC.] 🌱

## STREPTANTHUS TWISTFLOWER

☛ A genus of 35 species of w and s North America. Calluses on the leaf margins of some species mimic pierid butterfly eggs, reducing egg deposition and thus herbivory by larvae (Buck et al. 1993). Some species are known to hyperaccumulate nickel (Kruckeberg & Reeves 1995). (Greek: *streptos*, twisted, and *anthos*, flower, from the wavy-margined petals)

**Streptanthus hyacinthoides** Hook., (resembling *Hyacinthus*–hyacinth), SMOOTH TWISTFLOWER. Erect, glabrous annual to 1 m tall; basal leaves absent; leaves linear-lanceolate; sepals deep purple; petals 12–20 mm long, lavender with dark veins to dark purple; mature fruits 6–10 cm long, to 2 mm wide. Open woods and roadsides, loose sand; w part of Blackland Prairie and West Cross Timbers (Comanche and Young cos.) (Mahler 1988); e TX w to nc TX, also Edwards Plateau. May–Jun, sporadically to Aug.

**THLASPI** PENNYCRESS, FRENCHWEED

☛ A genus of 60 species of n temperate areas and n hemisphere mountains; some European and Asian species accumulate metals (nickel and zinc). (Greek: *thlaein*, to crush, from the flattened silicle)

REFERENCE: Payson 1926.

**Thlaspi arvense** L., (pertaining to cultivated fields), FIELD PENNYCRESS, MITHRIDATE-MUSTARD, FRENCHWEED, FANWEED, PENNYCRESS. Glabrous annual to 50 cm tall; leaves (except lowest) sessile and clasping, oblong to triangular-lanceolate, entire or toothed; petals white, 2–5 mm long; fruits conspicuous, flat, orbicular, 8–15 mm wide, notched at apex. Railroads and roadsides, various soils; Denton, Grayson, Henderson, and Tarrant cos.; nc TX s to Edwards Plateau. Mar–early May. Native of Europe. Formerly used medicinally (Mabberley 1997); reported to have caused poisoning and death of cattle when fed in large amounts in hay; photosensitization has also been reported (Mulligan & Munro 1990). ☛ ☞

**BUDDLEJACEAE** BUDDLEJA FAMILY

☛ A small (120 species in 8 genera), tropical and warm area, especially e Asian family of trees, shrubs, or rarely herbs with most species in the ornamentally important genus *Buddleja*. Family name from *Buddleja*, BUTTERFLY-BUSH, a genus of ca. 100 species of warm areas, especially e Asia; some are used medicinally or as fish poisons. *Buddleja davidii* Franch., a Chinese species widely cultivated in Europe and milder climate regions of the United States, is extremely attractive to butterflies. (Named for Reverend Adam Buddle, 1660–1715, amateur botanist) (sub-class Asteridae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is a small bushy-branched herb with opposite linear leaves and small, 4-merous, white flowers.

REFERENCES: Moore 1947; Rogers 1986; Jensen 1992.

**POLYPREMUM** POLLYPRIM

☛ A monotypic genus of warm areas of the Americas; previously treated in the Loganiaceae. (Name altered from the Greek: *polypremnos* many-stemmed)

**Polypremum procumbens** L., (procumbent, prostrate), JUNIPER-LEAF, POLLYPRIM. Bushy-branched, reclining to erect herb to 30 cm high; perennial but flowering as an annual; leaves opposite, narrowly linear, to 3 cm long, rarely > 2 mm wide; flowers solitary or in a terminal leafy cyme, 4-merous; corollas white, almost rotate, 1.8–2.3 mm long, divided 1/3 their length; capsules ovoid, notched at apex, ca. 1.5–2.5 mm long. Sandy woods, old fields, and disturbed ground; se and e TX w to West Cross Timbers and Edwards Plateau, also Trans-Pecos. Jun–Oct.

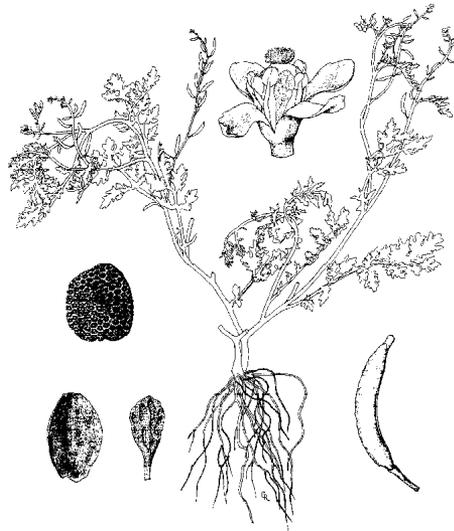
**CABOMBACEAE** WATER-SHIELD FAMILY

Aquatic, rhizomatous, perennial herbs rooting in mud; vegetative tissues with conspicuous air chambers; flowers axillary, solitary, on thick peduncles; sepals and petals each usually 3(–4); stamens 3–36; pistils (1–)2–18, simple; ovaries superior; fruits indehiscent.

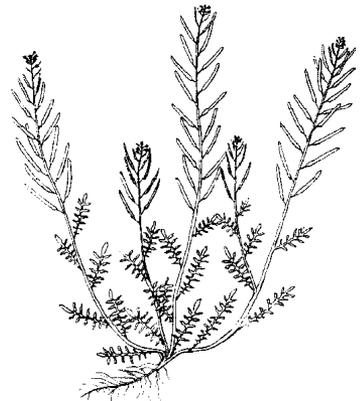
☛ A very small (6 species in 2 genera—Wiersema 1997c) pantropical and warm temperate family of aquatics. It has often been lumped with the Nymphaeaceae, but differs in having free carpels. *Cabomba* has flower parts in 3s like those of monocotyledons. Some taxonomists refer to the Cabombaceae as “paleoherbs” (a group including Aristolochiales, Piperales, and Nymphaeales) and believe them to be an early branch off the evolutionary line leading to monocots; this view is supported by characters such as the 3-merous flowers and molecular data which place the paleoherbs as the immediate sister group of the monocots (Chase et al.



*Rorippa sessiliflora* [GR1]



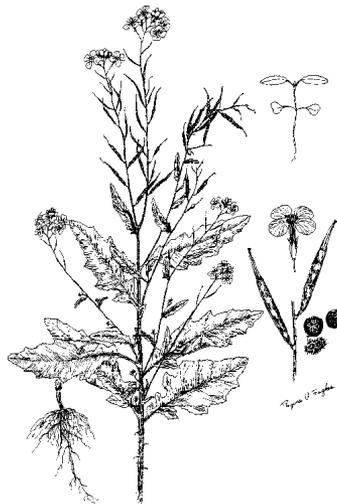
*Rorippa teres* [GWO]



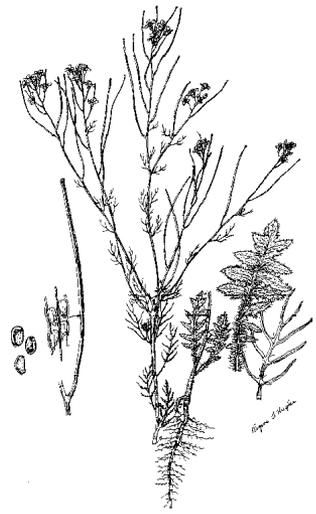
*Sibara virginica* [STE]



*Sinapis alba* [SMI]



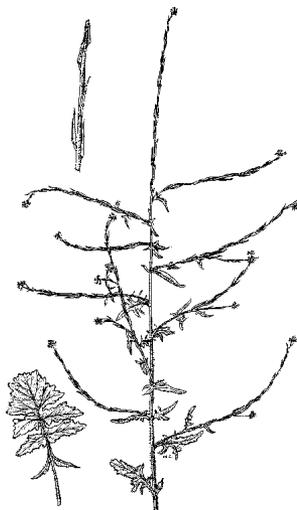
*Sinapis arvensis* [REE]



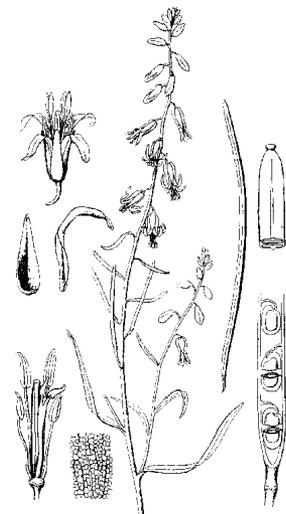
*Sisymbrium altissimum* [REE]



*Sisymbrium irio* [GLE]



*Sisymbrium officinale* [ROB]



*Streptanthus hyacinthoides* [GR1]

1993) (see Fig. 41 in Appendix 6). In the past *Brasenia* and *Cabomba* were often included in the Nymphaeaceae (e.g., Correll & Johnston 1970). (subclass Magnoliidae)

**FAMILY RECOGNITION IN THE FIELD:** aquatics with *peltate* floating leaves and either with conspicuous mucilage on underwater surfaces or with much dissected submerged leaves; perianth usually 3-merous; carpels free.

REFERENCES: Wood 1959, Williamson & Schneider 1993a; Wiersema 1997c.

1. Plants with only undivided, alternate, peltate, floating leaves, the blades 13.5–11(–13.5) cm long; lower surfaces of leaf blades and petioles coated with a heavy, very conspicuous layer of jelly-like mucilage; stamens 18–38(–51); perianth purplish, 10–20 mm long \_\_\_\_\_ **Brasenia**
1. Plants with much dissected, opposite (rarely whorled), submerged leaves and also usually small (blades ca. 1–3 cm long), alternate, peltate, floating leaves; lower surfaces of leaf blades and petioles without conspicuous mucilage layer, the tissues only barely mucilaginous; stamens 3–6; perianth usually whitish (rarely purplish or yellowish), 4–12 mm long \_\_\_\_\_ **Cabomba**

### BRASENIA PURPLE WEN-DOCK, WATER-SHIELD

☛ A monotypic genus of America, Africa, India, temperate e Asia, and Australia. Submerged parts are conspicuously covered with mucilaginous jelly. (Named for Christopher Brasen, 1734–1774, Moravian missionary and plant collector in Greenland and Labrador—Wiersema 1997c)  
REFERENCE: Osborn & Schneider 1988.

**Brasenia schreberi** J.F. Gmel., (for Johann Christian Daniel von Schreber, 1739–1810, German botanist), PURPLE WEN-DOCK, WATER-SHIELD, SCHREBER'S WATERSHED. Rooted aquatic; jelly-like mucilage layer thick and obvious; leaves long-petiolate; leaf blades elliptic to broadly oval, 3.5–11(–13.5) cm long, 2–6.5 cm wide, centrally peltate, entire or slightly crenate; flowers on peduncles to 15 cm long, emergent when open; perianth 12–20 mm long, the petals slightly longer and narrower than the sepals; petals without proximal auricles; pistils 2–18; fruits 5–10 mm long, with 1–2 seeds. Ponds, lakes, slow streams; Lamar Co. in Red River drainage (Carr 1994); mainly e TX. May–Jul. [*B. peltata* Pursh] Cultivated as an ornamental and the young leaves are eaten in Japan (Mabberley 1987). Reported to be wind-pollinated (Wiersema 1997c). Williamson and Schneider (1993b) gave an uncited reference indicating that *Brasenia* has phytotoxic properties which contribute to its dominance in some situations; it is possibly useful as an allelopathic way of controlling aquatic weeds.

### CABOMBA FANWORT

☛ A genus of 5 species (Wiersema 1997c) of mostly tropical to warm areas of the Americas. (Probably an aboriginal name, possibly from Guiana)

REFERENCES: Fassett 1953; Ørgaard 1991.

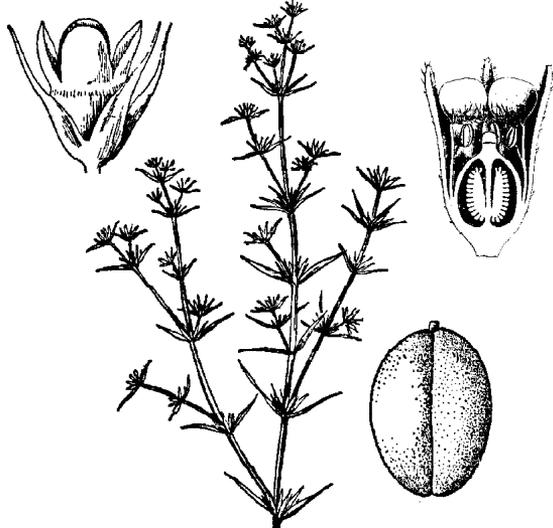
**Cabomba caroliniana** A. Gray, (of Carolina), CAROLINA FANWORT, FANWORT. Rooted aquatic; stems to 2 m or more long; submersed leaves opposite or rarely whorled, the blades palmately 2–3 times dissected into linear-filiform segments; floating leaves alternate, few, the blades peltate, entire, linear-elliptic, 1–3 cm long; flowers solitary on axillary peduncles; perianth 4–12 mm long; sepals 3; petals 3; sepals and petals similarly colored; petals proximally with yellow, nectar-bearing auricles; pistils (1–)2–4; fruits 1–3-seeded, 4–7 mm long. Ponds, lakes, quiet streams; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se and e TX, also Edwards Plateau. Apr–Jul. *Cabomba* is sometimes used in aquaria (Mabberley 1987).

## CACTACEAE CACTUS FAMILY

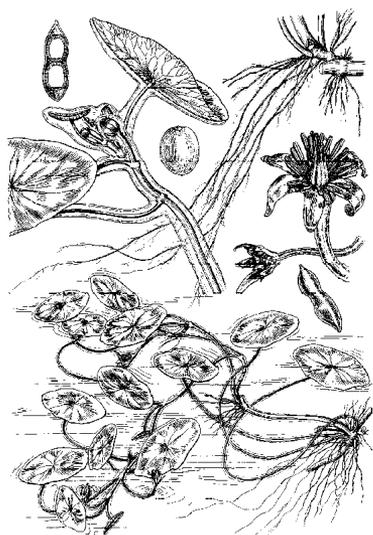
Fleshy or soft-woody, succulent, green-stemmed, usually armed shrubs to small trees; leaves in ours absent, or present as fleshy points on new growth; specialized, axillary, cushion-like bud



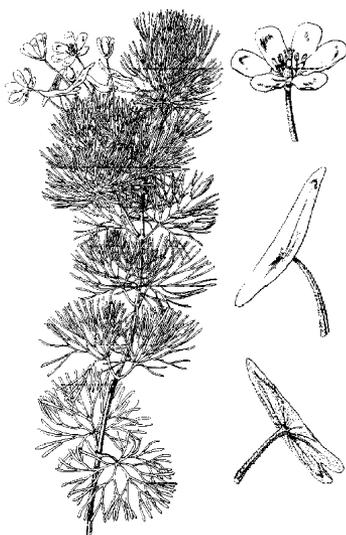
*Thlaspi arvense* [REE]



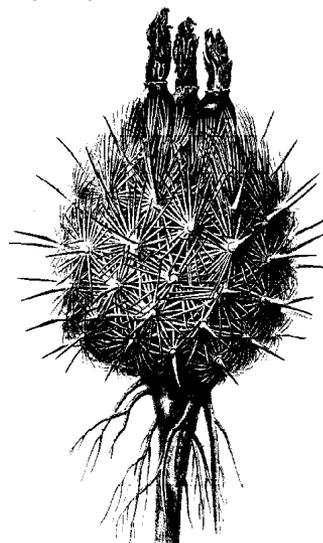
*Polypremum procumbens* [EN2, GLE]



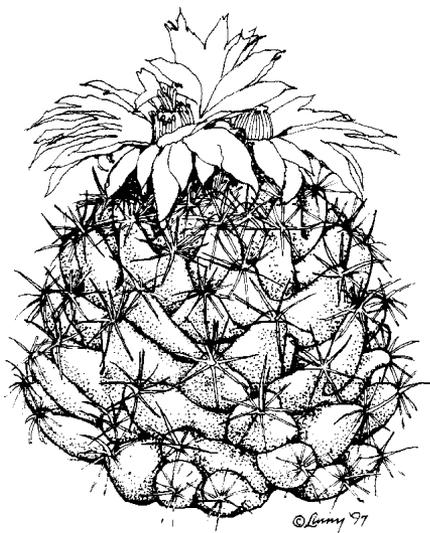
*Brasenia schreberi* [CO1]



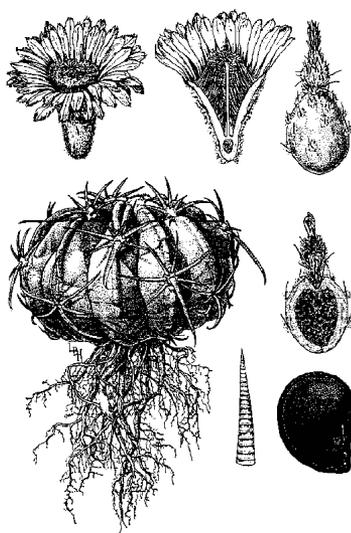
*Cabomba caroliniana* [PL]



*Coryphantha echinus* [EMO]



*Coryphantha sulcata* [HEA]



*Echinocactus texensis* [LUN]

areas (= areoles) usually bearing spines and sometimes barbed hairs or bristles (= glochids); flowers solitary or crowded, sessile, closed at night, often showy; sepal-like perianth parts 5 or more, grading into the many, thin-textured petal-like structures, all joined at base to form a cup or tube (= hypanthium) on summit of the thick, pedicel-like, inferior ovary; stamens many; fruit a dry or fleshy berry.

☛ A medium-large (1,400 species in 97 genera) family of stem-succulent xerophytes native almost exclusively to the New World, but now widely naturalized; some have become problematic invaders (e.g., *Opuntia* in Australia); the family includes a number of epiphytes. Xerophytic adaptations include a thick cuticle, large volume to surface ratio, widespread shallow root system (to take in any available rain), crassulacean acid metabolism (CAM photosynthesis—allows night absorption and storage of CO<sub>2</sub> thereby reducing water loss through transpiration during the day—Crosswhite 1984), and spines (condense dew and protect from herbivores). Numerous species are utilized as ornamentals and some are endangered due to overcollecting (e.g., “cactus rustling”); cacti are protected by the Convention of International Trade in Endangered Species (CITES) (Barthlott & Hunt 1993). Many species have alkaloids (e.g., *Lophophora williamsii* (Lem. ex Salm-Dyck) J.M. Coult.—PEYOTE, which contains the hallucinogen, mescaline, and is used in religious ceremonies by Native Americans).

Because of their extreme morphological specializations, the taxonomic placement of the Cactaceae has been problematic; however, biochemical and molecular markers indicate a relationship with the Caryophyllidae (e.g., Cactaceae are characterized by betalain pigments like most other members of this subclass—Cronquist and Thorne 1994). A study by Downie and Palmer (1994) suggested the family may be derived from Portulacaceae. On the basis of molecular data, Hershkovitz and Zimmer (1997) also indicated that the family is derived from within the Portulacaceae and that the molecular divergence “between pereskioid cacti and the genus *Talinum* (Portulacaceae) is less than that between many Portulacaceae genera.” The ancestral condition within the family is clearly observable in the small subfamily Pereskioideae composed of leafy shrubs and trees with only slightly succulent stems. Family name conserved from *Cactus*, a generic name rejected in favor of *Mammillaria* (Farr et al. 1979). (Greek: *cactus*, a spiny or prickly plant) (subclass Caryophyllidae)

FAMILY RECOGNITION IN THE FIELD: leafless stem *succulents* with watery sap, areoles (= pad-like axillary buds unique to the family) typically bearing *spines*, and flowers showy, with numerous perianth parts and numerous stamens.

REFERENCES: Britton & Rose 1919–1923, 1937, 1963; Schulz & Runyon 1930; Marshall & Bock 1941; Benson 1969, 1982; Weniger 1970, 1984; Grant & Grant 1979a; Barthlott & Hunt 1993; Behkne & Mabry 1994; Hershkovitz & Zimmer 1997.

1. Stems jointed, cylindrical OR flattened; glochids (= small barbed hairs) present at areoles \_\_\_\_\_ **Opuntia**
1. Stems not jointed, variously shaped but never flattened; glochids absent.
  2. Stems vertically ribbed.
    3. Central spine (of an areole) strongly hooked at end, 12–38 mm long; flowers yellow with red basally \_\_\_\_\_ **Thelocactus**
    3. Central spine absent OR present, if present curved downward, not hooked; flowers variously red, red and yellow, pink to light purple, OR reddish basally and then orange and pink to white apically.
      4. Spines, if present, not cross-ribbed; ovaries with slender spines; filaments white, green, yellow, or pink; stems usually multiple, cylindrical, 10 cm or less in diam. \_\_\_\_\_ **Echinocereus**
      4. Spines stout, cross-ribbed (= annulate); ovaries spineless; filaments red; stems usually single, hemispheric, to 30 cm in diam. \_\_\_\_\_ **Echinocactus**
  2. Stems tuberculate (= with nipple-like protrusions), not ribbed.
    5. Flowers variously colored, located on new growth near the stem apex at the base of the

upper side of a tubercle; above ground portion of plant not flat, the small stems hemispheroidal to globose, ovoid, obovoid, or cylindroid; stems sometimes solitary but often forming clumps; tubercles usually with a longitudinal groove on the upper side.

6. Fruits green at maturity; seeds brown; central spines present and differentiated from radials; flowers yellow to yellow with pink basally to dark purplish pink.
7. Flowers dark purplish pink; sepal-like structures fringed with long hairs (= fimbriate); seeds reticulate; radial spines 12–40; central spines 3–10 per areole, the lower central spine shorter than the upward-directed other central spines or absent \_\_\_\_\_ **Escobaria**
7. Flowers yellow or yellow with pink basally; sepal-like structures not fimbriate; seeds smooth and shining, sometimes minutely punctate; radial spines 6–26; central spines 1–4 per areole, the lower central spine longer than the upward-directed other central spines \_\_\_\_\_ **Coryphantha**
6. Fruits red at maturity; seeds black; central spines usually none (sometimes 1(–2), if present not differentiated from radials); flowers greenish to yellowish (rarely bronzy) \_\_\_\_\_ **Escobaria**
5. Flowers pink, white, cream, or some mixture, located on old growth of preceding seasons below the stem apex, between the tubercles and not obviously connected with them; above ground portion of plant ± flat or slightly convex; stems usually solitary, sometimes clustered; tubercles without a longitudinal groove on the upper side \_\_\_\_\_ **Mammillaria**

## CORYPHANTHA

Stems solitary or branching basally and forming mounds; ribs none; with spirally arranged tubercles; areoles apical on the tubercles; flowers and fruits produced at base of upper side of tubercles, connected to the areole by a groove on the tubercle; flowers ca. 50–62 mm in diam.; fruits fleshy, green at maturity, smooth, ellipsoid; seeds 1–2 mm in greatest diam., brown, smooth and shiny, sometimes minutely punctate.

☛ A genus of 45 species of sw North America; some are cultivated as ornamentals. While some authors (e.g., Benson 1982; Jones et al. 1997) include the morphologically similar genus *Escobaria* in *Coryphantha*, we are following Hunt (1978), Kartesz (1994), and J. Kartesz (pers. comm. 1997) in recognizing *Escobaria* as a distinct genus (see *Escobaria* for additional information). Castetter et al. (1975) gave characters separating the genera. (Greek: *corypha*, top, and *anthus*, flower, from the position of the flowers at the apex of the stem)

REFERENCES: Craig 1945; Castetter et al. 1975.

1. Petal-like structures yellow; radial spines 16–26; seeds minutely punctate \_\_\_\_\_ **C. echinus**
1. Petal-like structures yellow, pink basally; radial spines 6–8; seeds not punctate \_\_\_\_\_ **C. sulcata**

**Coryphantha echinus** (Engelm.) Britton & Rose, (prickly), RHINOCEROS CACTUS. Spines brown, usually down-curved; central spines 3 or 4, ca. 12–17 mm long; radial spines 16–26, to 28 mm long on upper side of areole, 12 mm long on lower; flowers yellow; fruits green, ca. 2.5 cm long. Limestone soils; Cooke Co., (Benson 1982); mainly Trans-Pecos. Jun–Jul. [*C. cornifera* (DC.) Lem. var. *echinus* (Engelm.) L.D. Benson, *Mammillaria echinus* Engelm.] We are following Jones et al. (1997) and J. Kartesz (pers. comm. 1997) for nomenclature of this species.

**Coryphantha sulcata** (Engelm.) Britton & Rose, (sulcate, furrowed), PINEAPPLE CACTUS, FINGER CACTUS. Spines at first yellow and pink or pink, later overlain by gray or white; central spines 1–3 per areole, spreading, curving, the longer 9–12 mm long; radial spines 6–8 per areole; petal-like structures yellow apically, pink basally; fruits green, to 3 cm long, fleshy at maturity; seeds brown, smooth and shining. Prairies, sandy or gravelly soils; Denton and Tarrant cos., also Brown, Comanche (HPC), Mills, and Lampasas (Benson 1982) cos.; nc TX s to sc TX. May–Jun. [*Mammillaria sulcata* Engelm.] ☒/85

**ECHINOCACTUS** BARREL CACTUS

☛ A genus of 6 species of ribbed cacti often with long spines native to sw North America; some are cultivated as ornamentals. While now treated as a small genus, *Echinocactus* formerly included most cacti with ribbed stems (Barthlott & Hunt 1993). (Greek: *echinos*, hedgehog, and *cactus*, name for another spiny plant)

REFERENCE: Maddox 1986.

***Echinocactus texensis*** Hopffer, (of Texas), HORSECRIPPLER, DEVIL'S-HEAD CACTUS, DEVIL'S-PINCUSHION, MANCA CABALLO. Stems solitary, green, hemispheroidal, 12.5–20 cm long, up to 30 cm in diam.; ribs 13–17; spines stout, cross-ribbed; central spine 1 per areole, curved downward; radial spines 5–7 per areole; petal-like structures basally reddish, then orange and pink to white apically, with midribs purplish to violet; filaments red; anthers yellow; fruits red, fleshy becoming dry, splitting irregularly with deciduous scales. Sandy or limestone soils; Coryell, Tarrant, Williamson, and Young cos. (Benson 1982); nc TX s and w to s TX and Trans-Pecos. Apr–May [*Homalocephala texensis* (Hopffer) Britton & Rose] Grazing animals can be badly injured by the strong spines and older plants are reported capable of puncturing pickup tires; as a result this species has been eliminated from many areas (Wills & Irwin 1961; Kirkpatrick 1992). ☒/88

**ECHINOCEREUS** HEDGEHOG CACTUS

Stems branching near ground level, cylindroid, with 5–18 ribs; spines smooth (not cross-ribbed); fruits on old growth of preceding year above areoles; fruits fleshy at maturity, bearing slender spines.

☛ A genus of 47 species of sw North America; all are cultivated. (Greek: *echinos*, hedgehog, and genus *Cereus* from Latin: *cereus*, a wax taper or candle)

REFERENCES: Taylor 1985; Miller 1988; Ferguson 1989.

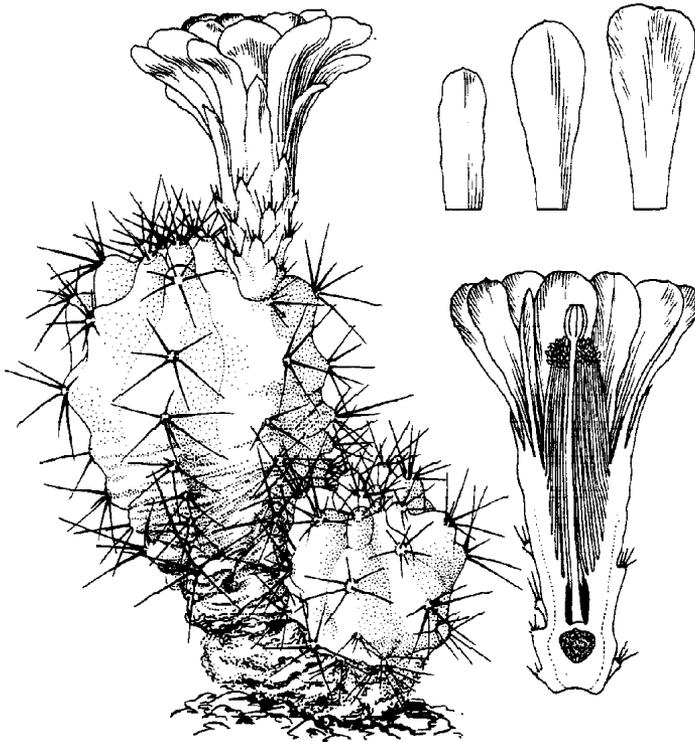
1. Flowers red or red and yellow (no blue mixture); stems usually 6.2–10 cm in diam.; ribs 5–7(–12); radial spines 4–6 \_\_\_\_\_ ***E. coccineus***
1. Flowers pink to light purple; stems 2.5–5 cm in diam.; ribs 12–18; radial spines 22–32 \_\_\_\_\_ ***E. reichenbachii***

***Echinocereus coccineus*** Engelm. var. ***paucispinus*** (Engelm.) D.J. Ferguson, (sp.: scarlet; var.: few spined), CLARET-CUP CACTUS, RED-FLOWER HEDGEHOG. Stems few, 15–20 cm long; central spines absent; radial spines nearly straight, gray, 3–3.8 cm long; flowers 25–38 mm long; fruits red. Rocky limestone soils; Lampasas (Benson 1982), Burnet, and Williamson (Ferguson 1989) cos.; sw part of nc TX w and sw to Trans-Pecos. Mid-Mar–Jul. [*E. triglochidiatus* Engelm. var. *paucispinus* (Engelm.) W.T. Marsh.] ☒/88

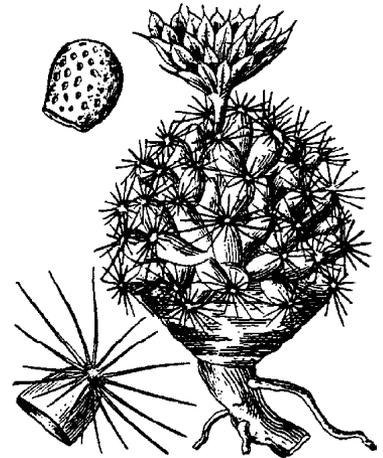
***Echinocereus reichenbachii*** (Terscheck ex Walp.) F. Haage, (for Heinrich Gottlieb Ludwig Reichenbach, 1793–1979, German naturalist), LACE CACTUS, WHITE LACE CACTUS, BROWN LACE CACTUS, HEDGEHOG CACTUS. Stems solitary or branching, 7.5–15(–22.5) cm long; areoles narrow, 3 mm long; spines obscuring the stem, central spines usually absent (rarely 1–3), if present, much smaller than the radials; radial spines arched, 4.5–6 mm long, straw-colored to pale gray, distally pink to reddish; flowers 20–60 cm long; fruits green with conspicuous, deciduous, woolly hairs from the areoles. Gravelly, rocky, or sandy soils, especially limestone; Hood, Johnson, Palo Pinto, and Williamson cos., also Brown (HPC), Burnet, Jack, McLennan, Parker, Young (Benson 1982), and Tarrant (R. O'Kennon, pers. obs.) cos.; nc TX s to Edwards Plateau and w to Panhandle. May–Jun. ☒/88

**ESCOBARIA** NIPPLE CACTUS

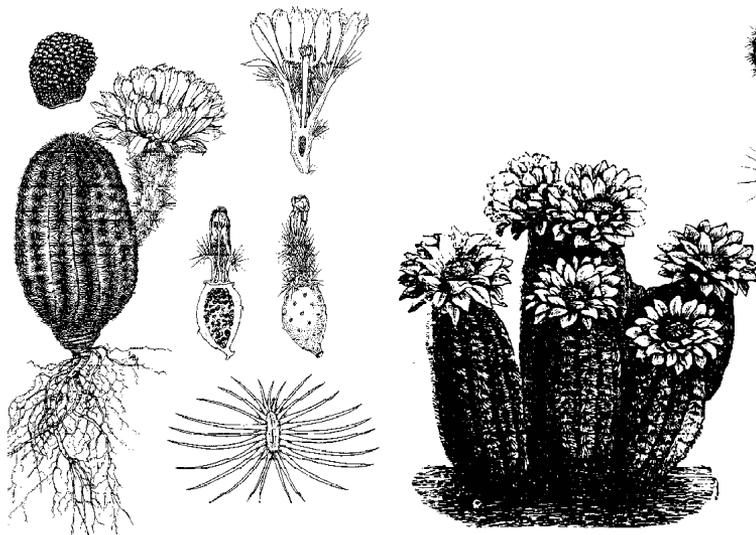
Stems solitary or branching basally and forming mounds; ribs none; with spirally arranged tubercles; areoles apical on the tubercles; flowers and fruits produced at base of upper side of tu-



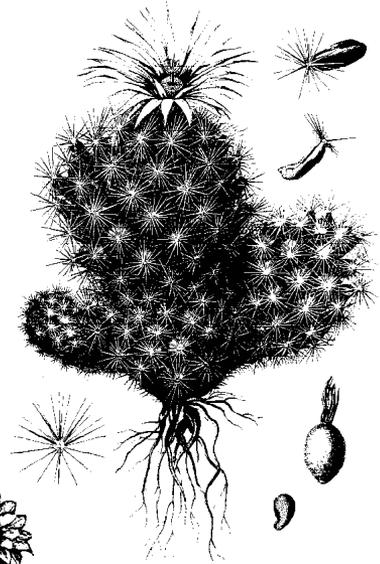
*Echinocereus coccineus* var. *paucispinus* [TAN]



*Escobaria missouriensis* var. *similis* [BB2]



*Echinocereus reichenbachii* [BEL, GAR]



*Escobaria vivipara* var. *radiosa* [EMO]

bercles, connected to the areole by a groove on the tubercle; flowers 25-56 mm in diam.; fruits fleshy, red or green at maturity, smooth, globose to ellipsoid; seeds 1-2 mm in greatest diam., brown or black, punctate or reticulate.

☛ A genus of 15 species of sw North America to s Canada and Cuba. This genus is morphologically similar to *Coryphantha* and has often been lumped with it (e.g., Benson 1982; Jones et al. 1997). Hunt (1978), however, believed "... that *Escobaria* (with *Neobesseya*) represent an evolutionary lineage independent of *Coryphantha*, that is to say that they are distinct phyletic groups at an approximately analogous stage." We are with some hesitation following Hunt (1978), Kartesz (1994), and J. Kartesz (pers. comm. 1997) in recognizing *Escobaria*. The following dichotomy separating the two genera by Barthlott & Hunt (1993) raises questions about their distinctiveness:

1. Seedcoat cells tabular; outer tepals entire, or areoles with glands \_\_\_\_\_ *Coryphantha*
1. Seedcoat cells tabular-concave or par-concave (pitted); outer tepals fringed; areolar glands absent \_\_\_\_\_ *Escobaria*

Because of the difficulty of separating the two using the above dichotomy, other characters are used in our key to genera with *Escobaria* coming out in two places. Castetter et al. (1975) discussed characters separating the genera. (Named for the Escobar brothers, Romulo and Numa, Mexicans of the early 20th century)

REFERENCES: Britton & Rose 1919-1923, 1937, 1963; Craig 1945; Castetter et al. 1975; Hunt 1978; Taylor 1978; Fischer 1980.

1. Flowers greenish to yellowish (rarely bronzy); fruits red at maturity; seeds black; central spines usually none (sometimes 1(-2), if present not differentiated from radials); \_\_\_\_\_ **E. missouriensis**
1. Flowers dark purplish pink; fruits green at maturity; seeds brown; central spines 3-4 per areole, differentiated from radials \_\_\_\_\_ **E. vivipara**

**Escobaria missouriensis** (Sweet) D.R. Hunt, (of Missouri), PLAINS NIPPLE CACTUS. Spines yellowish becoming dark gray, pubescent; central spines usually none, if present, undifferentiated from radial spines; radial spines 12-15 per areole, 10-20 mm long; fruits red, 10-20 mm long; seeds black, punctate. Spring-?

1. Flowers ca. 4.4-5 cm in diam. and length; sepal-like structures not fimbriate; fruits ca. 1 cm in diam., globose; petal-like structures abruptly long acuminate \_\_\_\_\_ var. **robustior**
1. Flowers ca. 5-6.2 cm in diam. and length; outer sepal-like structures fimbriate; fruits 1.5-2 cm long, globular to ellipsoid; petal-like structures acuminate-attenuate \_\_\_\_\_ var. **similis**

var. **robustior** (Engelm.) D.R. Hunt, (robust, stout). Fruits globose, ca. 1 cm in diam. Grasslands; Denton, Williamson, and Young cos. (Benson 1982); also Hale Co. in Panhandle and Bexar Co. in c TX (Benson 1982). [*Coryphantha missouriensis* (Sweet) Britt. & Rose var. *robustior* (Engelm.) L.D. Benson] While some authors have put *Escobaria missouriensis* var. *robustior* into synonymy under *Coryphantha sulcata* (e.g., Kartesz 1994; Jones et al. 1997), the individuals in nc TX traditionally placed in var. *robustior* (e.g., Benson 1982; Mahler 1988) seem much closer to *Escobaria missouriensis* var. *similis* than to *C. sulcata*. J. Kartesz (pers. comm. 1997) agrees that var. *robustior* should be treated as a var. of *Escobaria missouriensis*.

var. **similis** (Engelm.) N.P. Taylor, (similar). Fruits globose to ellipsoid, 1.5-2 cm long. Grasslands; Grayson Co., also Dallas, Kaufman, Lampasas, and Tarrant cos. (Benson 1982); nc TX to c TX (Bexar Co.) and w to Wichita Co. in Rolling Plains. [*Coryphantha missouriensis* (Sweet) Britton & Rose var. *caespitosa* (Engelm.) L.D. Benson, *Escobaria missouriensis* var. *caespitosa* (Engelm.) D.R. Hunt, *Mammillaria similis* Engelm.] ☒/89

**Escobaria vivipara** (Nutt.) Buxb. var. **radiosa** (Engelm.) D.R. Hunt, (sp.: producing live young, freely producing asexual propagating parts; var.: with many rays), SPINY-STAR, PINCUSHION

CACTUS, BEEHIVE NIPPLE CACTUS. Spines relatively dense, obscuring stems to varying degrees; central spines usually white basally but tipped with pink, red, or black, 3–4 per areole, 1.5–2.2 cm long, straight; radial spines white to pink, 20–40 per areole, 1.2–1.9 cm long; fruits green, 1.9–2.5 cm long; seeds brown, reticulate. Grasslands and woodlands, limestone soils; Hood and Wise cos., also Brown, Hamilton (HPC), Montague (S. Lusk, pers. comm.), and Young (Benson 1982) cos.; mainly w 1/2 of TX. May–Jun. [*Coryphantha vivipara* (Nutt.) Britton & Rose. var. *radiosa* (Engelm.) Backeberg, *Mammillaria vivipara* (Nutt.) Haw. var. *radiosa* Engelm.] ☒/90

### MAMMILLARIA FISHHOOK CACTUS, PINCUSHION CACTUS, NIPPLE CACTUS

☛ A genus of ca. 150 species ranging from the sw U.S. to Colombia and Venezuela, but especially in Mexico; they are low, often tuft-forming and a number are cultivated as ornamentals. (Latin: *mamilla*, nipple, in reference to the shape of the tubercles)

REFERENCES: Craig 1945; Hunt 1971.

**Mammillaria heyderi** Muehlenpf., (for Herr Heyder, 1808–1884, a noted cultivator of cacti in Berlin), FLATTENED MAMMILLARIA, NIPPLE CACTUS, LITTLE-CHILIS, BIZNAGA DE CHILITOS. Plant low-growing spiny pincushion; sap milky; stems typically solitary to rarely clustered, turbinate to subglobose, but the above ground portion ± flat to shallowly convex, 7.5–10(–15) cm in diam.; tubercles prominent, ± conical from a subpyramidal base, 9–12 mm long; areoles apical on the tubercles; spines dense but not obscuring the stem; central spines 0–2(–4) per areole, the longer ones 3–9 mm long, straight; radial spines 6–22 per areole, the longer ones 6–16 mm long; flowers pink, white, cream, or some mixture, not connected by a groove to the areoles; fruits red, 12–40 mm long, 6–9 mm broad. Limestone soils in grasslands or dry areas, typically in partial shade; Brown Co. (Stanford 1971); also San Saba Co. just sw of nc TX; w margin of nc TX s to s TX and w to Trans-Pecos. May–Jun. [*M. gummifera* Engelm. var. *applanata* (Engelm.) L.D. Benson, *M. heyderi* var. *applanata* Engelm.] The fruits are reported to be edible (Kirkpatrick 1992). ☒/97

### OPUNTIA PRICKLY-PEAR, CHOLLA

Mat- or clump-forming perennials to shrubs or small trees; stems jointed, either cylindrical or flattened; areoles usually with spines and small, brown, retrorsely barbed hairs (= glochids); young stems with a small, single, fleshy, vestigial, early deciduous leaf below each areole; fruits dry or fleshy, sometimes sweet and edible.

☛ A genus of ca. 200 species native from Massachusetts and British Columbia s to Straits of Magellan and the Galápagos Islands; stems are either flattened or cylindrical (the latter known as CHOLLAS); some are tree-like; a number have edible fruits (PRICKLY-PEARS); the flattened stems of others are eaten as a vegetable; some serve as hosts for the cochineal insect (*Dactylopius coccus*), the source of a red dye; alkaloids, including mescaline, can be present. In some parts of TX during periods of drought, flame-throwers are used to burn the spines off *Opuntia* species so they can be used as an emergency food for livestock. Some species of *Opuntia* have been introduced into the Old World and have become problematic invaders in certain areas (e.g., Australia). A number of other *Opuntia* species including *O. stricta* (Haw.) Haw. var. *stricta* (SPINELESS PRICKLY-PEAR), a spineless ornamental 0.6–2 m tall, and *Opuntia imbricata* (TREE CHOLLA), a large (1–3 m tall) cylindrical species, are cultivated in nc TX and long persist. ☒ In addition to the obvious spines, glochids (= minute barbed hairs or bristles) are also present and can cause dermatitis; they can be extremely irritating; gloves should be worn when handling the plants (Spoerke & Smolinske 1990). The PRICKLEY-PEAR was designated the **state plant of Texas** by the 74th state legislature; all members of subgenus *Opuntia* (with flat stems) are considered the state plant, while those of subgenus *Cylindroopuntia* (with cylindrical stems) are not (Jones et al. 1997). (Greek name for a spiny plant (not Cactaceae) that grew near Greek town of Opus (Opuntis)

REFERENCES: Grant & Grant 1979b, 1979c, 1982a, 1982b; Grant & Hurd 1979; Grant et al. 1979; Leuenberger 1991, 1993.

1. Joints (= stem segments or sections) cylindrical (CHOLLAS) (Subgenus *Cylindroopuntia*).
  2. Plants to only 10 cm tall, mat-like or clump-like; spines with epidermis separating into a sheath only at apex (sheath short), 6–12(–15) per areole; flowers yellow; joints narrowed gradually toward their base, noticeably broader apically \_\_\_\_\_ **O. schottii**
  2. Plants to several meters tall, usually shrubby; spines with entire epidermis separating into a thin paper-like sheath (sheath as long as spine), 1–10 per areole; flower color various including yellow; joints ± equal in diam. throughout their length except where attached.
  3. Plants golden-tan from sheath color; spines 6–10 per areole, reddish brown; flowers usually green (centers yellowish and the apices and exteriors often tinged with red or brown); terminal joints 9–12 mm in diam. \_\_\_\_\_ **O. tunicata**
  3. Plants not golden-tan; spines 1–4 per areole, gray or grayish pink; flowers yellow, green, bronze, lavender, purple, or reddish; terminal joints 3–10 mm in diam.
  4. Flowers green, yellow, or bronze; terminal joints 3–4.5 mm in diam.; fruits not tuberculate \_\_\_\_\_ **O. leptocaulis**
  4. Flowers lavender, purple, or reddish; terminal joints 5–10 mm in diam.; fruits strongly tuberculate (= with conspicuous raised areas) \_\_\_\_\_ **O. kleiniae**
1. Joints flattened (PRICKLY-PEARS) (Subgenus *Opuntia*).
  5. Plants trees 3–5(–7) m tall with a main trunk 0.6–1.2 m tall (but plants can be very dense and ± as wide as tall); larger terminal joints (22.5–)30–60 cm long; fruits 5–10 cm long; escaped cultivar in sw part of nc TX \_\_\_\_\_ **O. ficus-indica**
  5. Plants prostrate to sprawling or suberect shrubs 7.5 cm to 3(–3.5) m tall, a main trunk if present very short; larger terminal joints 3.8–34(–40) cm long (except 45–90(–120) cm long in the locally rare cultivar, *O. engelmannii* var. *linguiformis*); fruits 2.1–7 cm long; native nc TX taxa (except var. *linguiformis*) widespread in the area.
  6. Spines usually needle-like, not flattened, elliptic to circular in cross-section; plants prostrate, most or all of the flattened joints on the ground; spines usually present only on the uppermost part of the joints or absent.
    7. Spines 0–1 per areole, 1.9–3 cm long, 0.5–0.7 mm in diam.; spines gray or brownish; all roots fibrous; joints green; seed margins smooth and regular, ca. 0.5 mm broad \_\_\_\_\_ **O. humifusa**
    7. Spines 1–6 per areole, usually 3.8–5.6 cm long, 0.25–0.5 mm in diam.; spines white or pale gray; main roots tuberous; joints glaucous; seed margins irregular, ca. 1 mm broad \_\_\_\_\_ **O. macrorrhiza**
  6. Spines, at least some larger ones, flattened basally, narrowly elliptic in cross-section; plants suberect to sprawling shrubs to nearly prostrate, many of the joints often separated by 1 or more others from the ground; spines often present on at least the upper half of the joints.
    8. Spines cream to yellow; joints green; petal-like structures yellow \_\_\_\_\_ **O. engelmannii**
    8. Spines not all cream to yellow, usually dark brown; joints bluish green; petal-like structures yellow or yellow with red bases \_\_\_\_\_ **O. phaeacantha**

**Opuntia engelmannii** Salm-Dyck, (for George Engelmann, 1809–1884, German-born botanist and physician of St. Louis). Large, suberect to sprawling shrub 1–3(–3.5) m high; joints green; spines cream to yellow, (1–)3–6 per areole, usually on all but lower areoles, 1.2–4(–5) cm long, erect; flowers yellow; fruits purple, 2.1–7 cm long. May–Jun.

1. Larger terminal joints usually obovate to orbicular, 15–25(–30) cm long \_\_\_\_\_ var. **lindheimeri**
1. Larger terminal joints elongate, lanceolate to linear-lanceolate, 45–90(–120) cm long \_\_\_\_\_ var. **linguiformis**

var. **lindheimeri** (Engelm.) B.D. Parfitt & Pinkava, (for Ferdinand Jacob Lindheimer, 1801–1879, German-born TX collector), TEXAS PRICKLY-PEAR, NOPAL PRICKLY-PEAR. Sandy, gravelly, or alluvial

soils; grasslands; Mills Co., also Bell, Coryell, Ellis, Lampasas, and Navarro cos. (Benson 1982); c Blackland Prairie s to s TX and w to Trans-Pecos (also Arbuckle Mountains in OK). [*Opuntia lindheimeri* Engelm.] According to Crosswhite (1980), during pioneer days the fruits were eaten fresh, made into preserves or syrup, or boiled and fermented into “colonche”; the young pads were also eaten; however, eating excessive amounts of older pads can cause oxalic acid poisoning. ☠ ☒/101

var. **linguiformis** (Griffiths) B.D. Parfitt & Pinkava, (tongue-shaped), COW’S-TONGUE, COW-TONGUE PRICKLY-PEAR, LENGUA DE VACA. Cultivated as an ornamental because of the tongue-like joints, escapes; Brown (Stanford 1971) and Comanche (HPC) cos.; also e Edwards Plateau and s TX. [*O. lindheimeri* var. *linguiformis* (Griffiths) L.D. Benson] According to Benson (1982), “... this cultivated and escaped variety is known only from plants descended from those collected near San Antonio, Texas, by Griffiths in 1906.”

var. *engelmannii*, ENGELMANN’S PRICKLY-PEAR, native to the s and w of nc TX, is distinguished by the often chalky white or pale straw-colored spines. It is used in Mexico as a source of nopalitos—the tender young green pads, which have not yet formed spines, are cut into strips; they are boiled several times and used as a food (Kirkpatrick 1992); nopalitos can sometimes be found fresh or canned in TX supermarkets. The ripe fruits are known as tunas; in order to preserve them, Native Americans squeezed the juice out and dried them in the sun (Kirkpatrick 1992); a candy-like jelly known as queso de tuna is made from the fruits in Mexico. [*O. phaeacantha* Engelm. var. *discata* (Griffiths) L.D. Benson & Walk.]

**Opuntia ficus-indica** (L.) Mill., (Indian fig), INDIAN-FIG. Tree 3–5(–7) m tall with a main trunk 0.6–1.2 m tall; larger terminal joints green, broadly to narrowly obovate or oblong; spines none to abundant, 1–6 per node, flattened basally, the longer ones 1.2–2.5(–4) cm long; flowers yellow or orange-yellow, externally pink-tinged; fruits yellow, orange, red, or purplish, edible at maturity. Cultivated and escapes; Lampasas Co. (Benson 1982), also Brown Co. (Stanford 1971); scattered in s and w TX. Probably native of Mexico. Spineless forms have been valued for their fruits since prehistoric times and were probably spread by trading; this species has become naturalized in many parts of the world and is a pest in some areas (Benson 1982). ☠ ☒

**Opuntia humifusa** (Raf.) Raf., (spreading on the ground), EASTERN PRICKLY-PEAR. Low clump- or mat-forming perennial 7.5–10 cm high; joints green or reddish purple in winter, 3.8–10 cm long, elliptic, orbicular, or obovate, often noticeably wrinkled; spineless or spines 1 per areole in the upper areoles; spines 25–38 mm long; flowers yellow; fruits purple or red, 2.5–3.8 cm long; seeds 4.5 mm in diam., 1.5 mm thick. Open dry areas; Denton, Grayson, Henderson, Kaufman, and Limestone cos., also Brown (HPC), Dallas, and Tarrant (Benson 1982) cos.; se and e TX w to nc TX and e Edwards Plateau. Apr–Jun. [*O. compressa* (Salisb.) J.F. Macbr.]

**Opuntia kleiniae** DC., (resembling *Kleinia* in the Asteraceae), KLEIN’S CHOLLA, CANDLE CHOLLA, TASAJILLO. Bush or shrub to 2 m tall; larger terminal joints 10–30 cm long, 0.5–1 cm in diam.; tubercles prominent; spines 1–4 per areole; flowers lavender to purple or reddish; fruits red to green and red, to 2 cm long. Rocky soils of hillsides, deserts, and grasslands; Eastland and Lampasas cos. (Benson 1982); sw edge of nc TX s and w to Trans-Pecos. May.

**Opuntia leptocaulis** DC., (thin-scaled), DESERT CHRISTMAS CACTUS, PENCIL CACTUS, PENCIL CHOLLA, CHRISTMAS CHOLLA, TASAJILLO, TESAJO, RAT-TAIL CACTUS, SLENDER-STEM CACTUS. Bush or erect shrub 50–70 cm tall; joints 30–40 cm long; terminal joints usually 2.5–7.5 cm long, 3–4.5 mm in diam.; tubercles almost absent; spines 1 per areole, 2.5–5 cm long; flowers green, yellow, or bronze; fruits bright red, ca. 12 mm long. Clay or alluvial soils; Archer, Bell, Brown, Coleman, Milam, Palo Pinto, and Parker cos., also Clay, Hood, Johnson, and McLennan cos. (Benson 1982); Blackland Prairie w through w 2/3 of TX. Apr–May.

**Opuntia macrorhiza** Engelm., (large-rooted), PLAINS PRICKLY-PEAR, GRASSLAND PRICKLY-PEAR, CHAIN PRICKLY-PEAR, TUBEROUS-ROOT PRICKLY-PEAR. Low, clump-forming perennial 7.5–12.5 cm high; joints glaucous, bluish green, 5–10 cm long, orbicular to obovate; spines 1–6 per areole, mostly in upper areoles, the longer spines 3.8–5.6 cm long, slender; flowers yellow, usually with base red-tinged; fruits reddish purple, 25–38 mm long; seeds 4.5 mm in diam., 1.25–2.25 mm thick. Sandy or rocky soils; nearly throughout TX, less so in Edwards Plateau and e Texas. May–Jun.

**Opuntia phaeacantha** Engelm., (dark-thorned), PRICKLY-PEAR, ENGLEMAN'S PRICKLY-PEAR, PURPLE-FRUIT PRICKLY-PEAR. Large, prostrate or sprawling to suberect perennial 30–90+ cm high; larger terminal joints bluish green, with some purplish pigmentation in cold weather, 10–34(–40) cm long; spines usually dark brown, deflexed, 4–7 cm long, long and arching, some definitely flattened; flowers yellow or the bases reddish; fruits purplish, 31–62 mm long. May–Jun.

1. Spines over most of joint; spines 5–8 per areole above, 1–4 below; plants low-growing, semi-prostrate, spreading, forming clumps or rosettes of joints \_\_\_\_\_ var. **camanricha**
1. Spines usually on upper one-half, one-third, or less of joint; spines 1–3 per areole; plants ascending and spreading, relatively larger, to 90+ cm tall \_\_\_\_\_ var. **major**

var. **camanricha** (Engelm. & J.M. Bigelow) L.D. Benson, (of Camanche, CA). Sandy soils; Lampasas Co. (Benson 1982); mainly Panhandle.

var. **major** Engelm., (greater), BROWN-SPINE PRICKLY-PEAR. Rocky, gravelly, or sandy soils of hill-sides; c part of nc TX (Denton and Ellis cos.) w through w 2/3 of state.

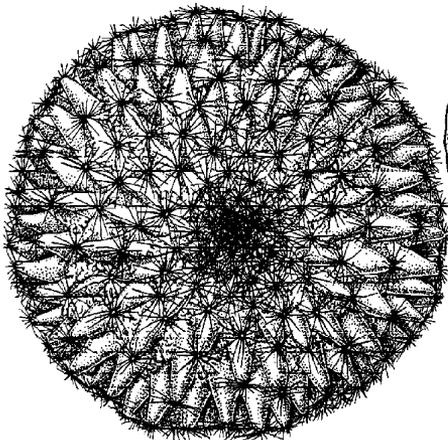
**Opuntia schottii** Engelm., (for Richard van der Schott, d. 1819, head gardener at Austrian palace at Schönbrunn), CLAVELLINA, DEVIL CHOLLA, SCHOTT'S CHOLLA, DOG CHOLLA. Clump- or mat-forming cholla to 10 cm tall, the clumps or mats 1–3 m in diam.; terminal joints 4–6 cm long, 1.5–2.5 cm in diam.; areoles (at least the uppermost) spiny; spines 6–12(–15) per areole; flowers yellow; fruits yellow, 38–56 mm long. Rocky soils; Brown Co. (Benson 1982), known from only one large population w of Brownwood (J. Stanford, pers. comm.); mainly extreme w and s TX. Spring.

**Opuntia tunicata** (Lehm.) Link & Otto var. **davisii** (Engelm. & J.M. Bigelow) L.D. Benson, (sp.: coated; var.: for Jefferson Davis who was Secretary of War when the Whipple expedition explored w TX), GREEN-FLOWER CHOLLA, JEFF DAVIS' CHOLLA, JUMPING CHOLLA, JUMPING CACTUS. Golden tan (from the color of spine sheaths) shrub 30–40(–100) cm tall, bushy or clump-forming; joints strongly woody; terminal joints 5–15 cm long, 0.9–1.2 cm in diam.; spines 6–10 per areole, ca. 3.8 cm long, barbed, the sheaths 1.5–2 mm in diam., loose; fruits red, ca. 30 mm long. Sandy soils; Brown (HPC) and Coryell (Benson 1982) cos.; scattered in w 2/3 of TX. Jun. The sheaths conspicuously glisten in the sun giving the plants a “blond” appearance; the common names JUMPING CHOLLA and JUMPING CACTUS were earned by the ease with which the joints break off; they are easily attached to animals and thus dispersed (Kirkpatrick 1992); this results in vegetative reproduction. 📷/101

*Opuntia edwardsii* Grant & Grant, a small subshrub 20–45 cm tall, native from the Edwards Plateau to the Panhandle, occurs in Travis Co. just to the s of nc TX. It is in the *O. phaeacantha* group and can be distinguished from *O. phaeacantha* and *O. lindheimeri* using the following characters: joints 11–18 cm long, blue-green; spines white or ashy gray, deflexed, distributed over the entire joint, 1.1–4.0 cm long (Grant & Grant 1979b). It would not be unexpected to find this species in the Lampasas Cut Plain.

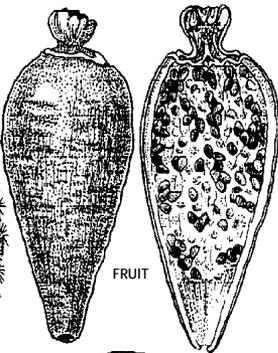
## THELOCACTUS

☞ A genus of 11 species of Mexico and the sw U.S.; small cacti with large flowers; some are cultivated as ornamentals. (Greek: *thele*, a nipple, and *cactus*, name for another spiny plant; the ribs of some species have a nipple-like appearance)



PLANT FROM ABOVE

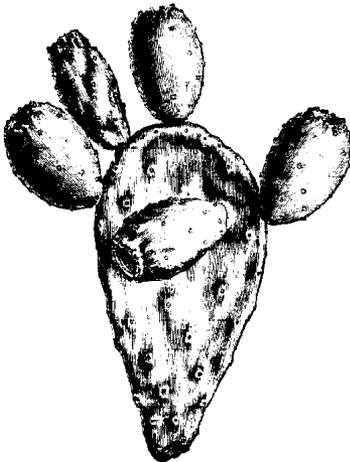
*Mammillaria heyderi* [BEL]



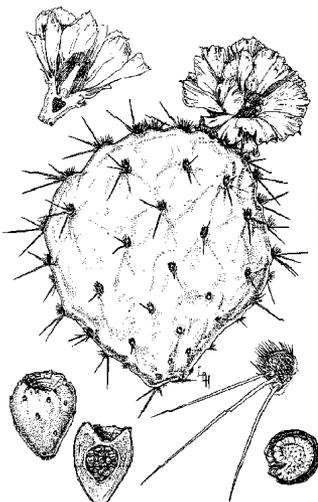
FRUIT



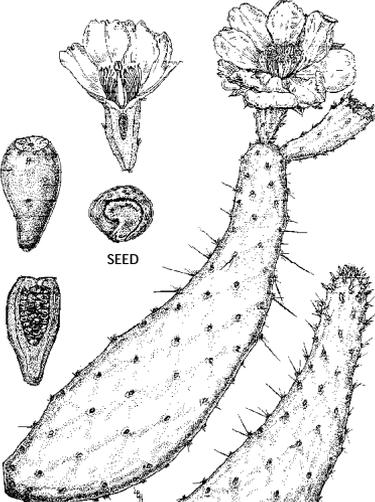
SEED



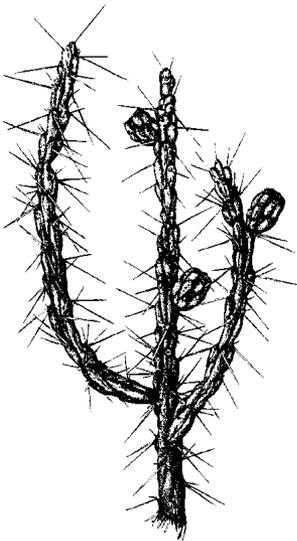
*Opuntia ficus-indica* [NIC]



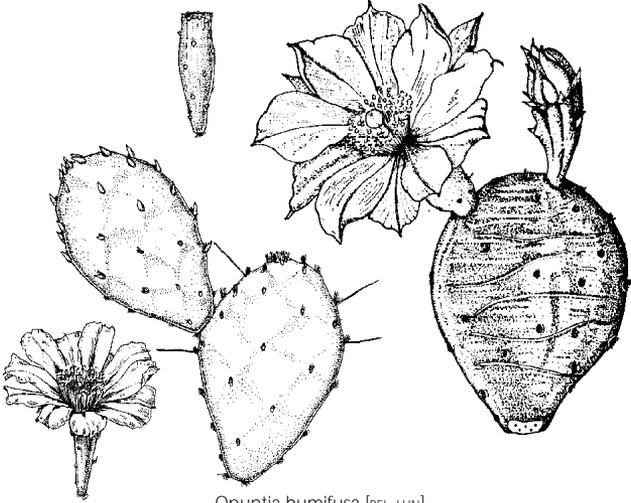
*Opuntia engelmannii* var. *lindheimeri* [LUN]



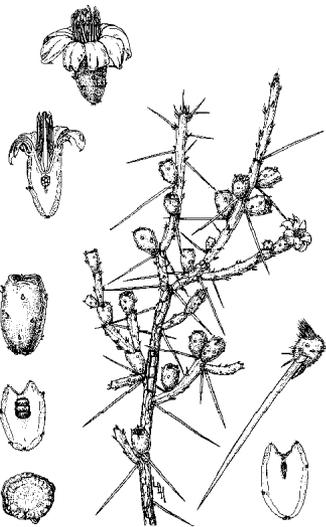
*Opuntia engelmannii* var. *linguiformis* [BEL]



*Opuntia kleiniae* [VIN]



*Opuntia humifusa* [BEL, LUN]



*Opuntia leptocaulis* [BEL]

**Thelocactus setispinus** (Engelm.) E.F. Anderson, (bristly spines), HEDGEHOG CACTUS. Miniature barrel cactus with stems solitary to sometimes several to numerous, ovoid or cylindroid, 3.8–10(–20) cm long, 3.8–5 cm in diam., vertically ribbed; ribs ca. 13; spines smooth, not cross-ribbed, dense but not obscuring stem; main central spine strongly hooked, 12–38 mm long; 1–3 smaller, straight, central spines also present; radial spines 12–15 per areole, ± straight; petal-like structures clear yellow, red basally, the largest 20–25 mm long; fruits red, globular, ca. 9–12 mm in diam. Black or clay soils, grasslands, mesquite thickets; Brown Co. (Stanford 1971) near w margin of nc TX; also San Saba and Travis cos. just sw and s of nc TX; mainly e Edwards Plateau s to se and s TX. [*Echinocactus setispinus* Engelm., *Ferocactus setispinus* (Engelm.) L.D. Benson] Benson (1982) treated this species in the genus *Ferocactus*. Early spring–late fall.

## CALLITRICHACEAE WATER STARWORT FAMILY

☛ A very small (17 species), nearly cosmopolitan family with a single genus. Based on molecular data, Reeves and Olmstead (1993) indicated that the Callitrichaceae should be considered part of the Scrophulariaceae. (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: very small wet area annuals with tiny, entire, opposite or apparently whorled leaves often forming rosettes at the stem tips, minute, solitary, axillary flowers without a perianth, and often flattened, slightly heart-shaped fruits.

REFERENCE: Reeves & Olmstead 1993.

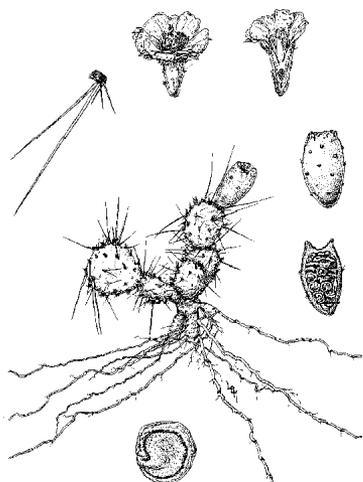
### CALLITRICHE WATERWORT, WATER STARWORT, WATER-CHICKWEED

Diminutive, glabrous annuals of shallow water or damp ground; leaves opposite or seemingly whorled, linear to oblanceolate, entire; flowers minute, axillary, usually sessile or short-pedicelled, unisexual; perianth absent; flowers consisting of a single stamen or a single pistil; pistil of 2 carpels; fruits somewhat flattened laterally, often slightly heart-shaped and appearing to have 2 lobes, eventually splitting into 4 achene-like mericarps.

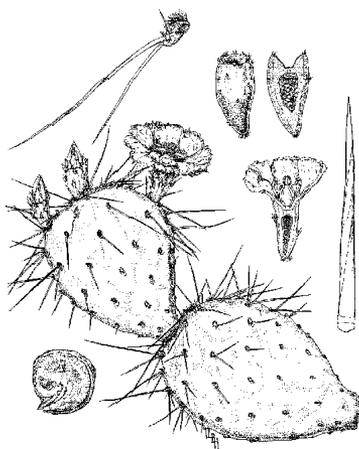
☛ Some species are grown as aquarium plants, while others are sensitive to pollution and can be used as ecological indicators—that is, their performance can be used to predict the presence of pollutants. Both aerial and underwater (= hydrophily or more specifically, hypohydrophily) pollination systems are known to occur in *Callitriche*; it is the only genus in which both of these systems have been confirmed (Philbrick 1993; Philbrick & Osborn 1994). *Callitriche* is also one of only two dicot genera for which hydrophily has been documented; the other is *Ceratophyllum* in the Ceratophyllaceae (Philbrick 1991, 1993). Microscopic examination of the small fruits is necessary for definitive identification to species. The only 2 species to occur with frequency in nc TX are *C. heterophylla* and *C. nuttallii*; additional distinguishing characters between these 2 are given in the descriptions. The key to species is adapted from Fassett (1951). (Greek: *callos*, beautiful, and *thrix*, hair, from the slender stems)

REFERENCES: Fassett 1951; Philbrick & Jansen 1991; Philbrick & Anderson 1992; Philbrick 1993; Philbrick & Osborn 1994.

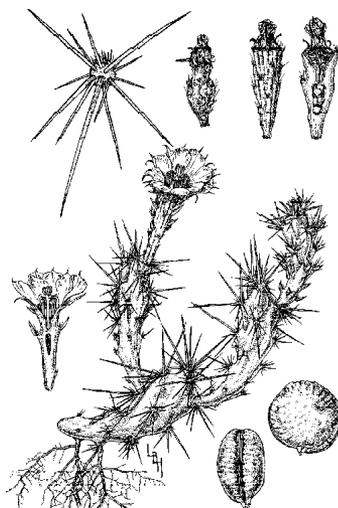
1. Plants either mostly terrestrial or on mud; fruits wider than high; stigmas 0.3–1 mm long; anthers 0.1–0.2 mm wide; flowers without bracts; leaves ± uniform in shape.
2. Fruit base greatly thickened or gibbose due to the 2 segments pushing against each other at base; fruits 0.3–0.8 mm wide. \_\_\_\_\_ **C. peploides**
2. Fruit base not thickened or gibbose; fruits 0.5–1.2 mm wide.
3. Fruits pedicelled; stigma ca. 0.8 mm long; wing of thin margin of carpels turned outward at right angles or revolute and appearing like a thickened margin (under magnification) \_\_\_\_\_ **C. nuttallii**
3. Fruits usually nearly sessile; stigma 0.2–0.4 mm long; carpels scarcely winged, under high magnification a very narrow wing seen \_\_\_\_\_ **C. terrestris**



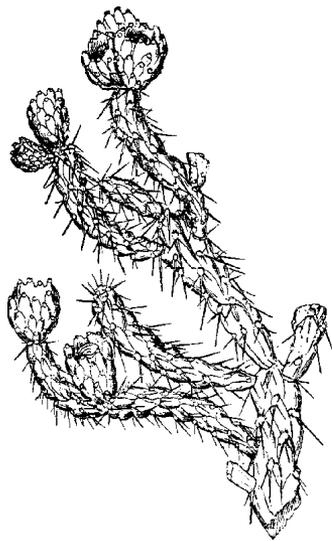
*Opuntia macrorhiza* [BEL]



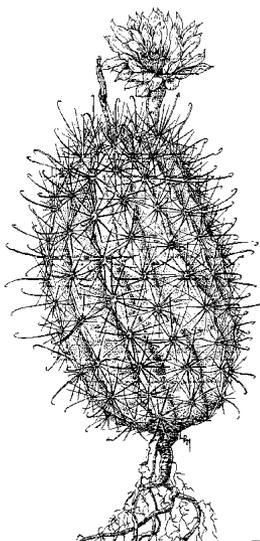
*Opuntia phaeacantha* var. *major* [BEL]



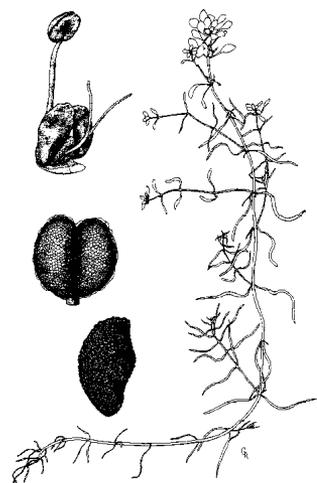
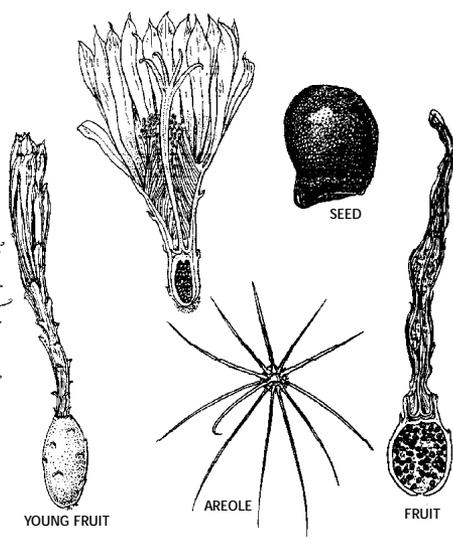
*Opuntia schottii* [BEL]



*Opuntia tunicata* var. *davisii* [BR3]



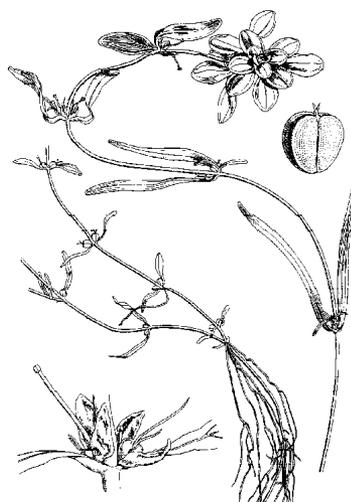
*Thelocactus setispinus* [BEL]



*Callitriche heterophylla* [gwo]



*Callitriche nuttallii* [co1]



*Callitriche palustris* [MAS]

1. Plants completely submersed OR with terminal rosette of leaves floating OR stranded on mud; fruits as high as wide or slightly higher; stigmas 0.7–6 mm long; anthers 0.3–1.5 mm wide; flowers with 2 whitish inflated bracts at base; leaves often of various shapes.

4. Fruits thickest at base; margins of carpels with a definite scarious wing; rare in nc TX (reported but no specimens seen) \_\_\_\_\_ **C. palustris**

4. Fruits thickest just below middle; margins of carpels usually wingless; commonly found in nc TX \_\_\_\_\_ **C. heterophylla**

**Callitriche heterophylla** Pursh, (various-leaved), LARGER WATERWORT. Flowers subtended by 2 small bracts (resembling stipules); fruits sessile or nearly so, very slightly 2-lobed. In quiet, clear water; Burnet, Dallas, Grayson, Henderson, and Lamar cos.; nearly throughout TX. Late Mar–Apr.

**Callitriche nuttallii** Torr., (for its discoverer, Sir Thomas Nuttall, 1786–1859, English-American botanist), NUTTALL'S WATERWORT. Moss-like; flowers without bracts; fruits in age with well-developed pedicels, deeply lobed. In damp silty or sandy places; se and e TX w to Navarro and Lamar cos. on the e margin of nc TX; also Edwards Plateau. Late Mar–Apr.

**Callitriche palustris** L., (marsh-loving), COMMON WATERWORT. Fruits sessile, very slightly 2-lobed. In quiet water; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); mainly c and e TX. Mar–Jun. [*C. verna* L.]

**Callitriche peploides** Nutt., (resembling *Peplis*, now included in *Lythrum*—loosestrife), MAT WATERWORT. Fruits sessile, moderately 2-lobed. Growing on mud, wet sand, and moist lawns; Tarrant Co.; mainly se, e, and c TX. Feb–May.

**Callitriche terrestris** Raf., (of or growing in ground), ANNUAL WATERWORT. Fruits sessile or nearly so, moderately 2-lobed. Damp to wet open areas of lawns, fallow fields, paths, or similar areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); mainly se, e, and c TX. Mar–Jun.

## CAMPANULACEAE BLUEBELL, BELLFLOWER OR HAREBELL FAMILY

Ours annual, biennial, or perennial herbs; leaves alternate, simple, entire or toothed, sessile or the lower petioled; stipules absent; flowers axillary or terminal, solitary or in racemes or spike-like inflorescences; calyces with 5 acute or acuminate lobes; corollas sympetalous at least at base, radially symmetrical and 5-lobed OR bilaterally symmetrical and 2-lipped OR (in cleistogamous forms of *Triodanis*) vestigial or absent; stamens 5; pistil 1; style 1; stigma 1; ovary inferior, with placentation axile; fruit a capsule; seeds numerous.

☛ A medium-large (2,000 species in 82 genera) cosmopolitan family of herbs or rarely shrubs; it includes a number of ornamentals in genera such as *Campanula*, *Downingia*, and *Lobelia*; ☛ a number of species contain toxic alkaloids. The family is split by some authorities, with the subfamily Lobelioideae sometimes recognized as a distinct family, the Lobeliaceae (e.g., Lammers 1992); Cronquist (1988), however, included the Lobelioideae and treated the family in the broad sense. Recent molecular analyses (e.g., Michaels et al. 1993; Olmstead et al. 1993) indicate that Campanulaceae are phylogenetically reasonably closely related to Asteraceae. *Sphenoclea zeylanica* Gaertn. (PIEFRUIT, CHICKENSPIKE), here treated in the Sphenocleaceae, was previously placed in the Campanulaceae; according to N. Morin (pers. comm.), it is not closely related to Campanulaceae. Family name from *Campanula*, BELLFLOWER, an ornamentally important genus of 300 species of herbs or rarely shrubs native to the n temperate zone, especially the Mediterranean, and tropical mountains. *Campanula reverchonii* A. Gray, (for Julien

Reverchon, 1837–1905, a French-American immigrant to Dallas and important botanical collector of early TX), BASIN BELLFLOWER, is endemic to granite areas of the Central Mineral Region just s of nc TX. It is a small (to 30 cm tall) annual with radially symmetrical, light blue corollas 9–13 mm long; it can be distinguished from *Triodanis* species by its long-peduncled flowers (at least those of the main axes), narrowly funnellform corollas (tube portion 4–7 mm long), and cleistogamous flowers absent. 🌱 (Diminutive of Latin: *campana*, bell, in reference to the shape of the flowers) (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: herbs with alternate simple leaves and sometimes milky sap, inferior ovaries maturing into capsules with many seeds, showy, bilaterally (2-lipped) or radially symmetrical corollas, and sometimes fused anthers.

REFERENCES: McVaugh 1943, 1961; Diggs 1982; Rosatti 1986; Shetler & Morin 1986; Lammers 1992.

1. Corollas bilaterally symmetrical and 2-lipped (the dorsal lip with 2 lobes separated by a deep cleft, the ventral lip with 3 lobes); stamens united into a tube; flowers in terminal racemes or spike-like inflorescences; capsules opening by apical valves (Subfamily Lobelioideae) \_\_\_\_\_ **Lobelia**
1. Corollas radially symmetrical or vestigial or absent; stamens separate; flowers axillary, sessile, 1–3 per axil; capsules opening by 1–3 lateral pores (these positioned from near middle of the capsule to near its apex) (Subfamily Campanuloideae) \_\_\_\_\_ **Triodanis**

## LOBELIA

Perennial, biennial, or annual herbs often with milky juice; inflorescences often 1-sided; calyces 5-cleft, radially symmetrical; corollas bilaterally symmetrical, split nearly to base between 2 lobes of the dorsal lip, the tube fenestrate (= with lateral openings) or not so; stamens 5; filaments united above into a tube; anthers united into a tube; ovary 2-carpellate.

☞ A genus of ca. 300 species of tropical and warm areas, especially the Americas; also a few in temperate regions; ☠ many have toxic alkaloids including lobelamine and lobeline (Krochmal et al. 1972; Hardin & Arena 1974) and are strongly poisonous; according to some sources (e.g., Hewyood 1993), even smelling *Lobelia tupa* L. of Chile may cause sickness; some have been used medicinally; lobeline has an effect on the central nervous system similar to nicotine (Blackwell 1990); a number are cultivated as ornamentals. Some *Lobelia* species can be hybridized (e.g., *L. cardinalis* × *L. siphilitica* = *L. ×speciosa* Sweet) (e.g., Bowden 1964a, 1982); these are rarely found in nature (McVaugh 1943) and are unknown from nc TX. (Named for Matthias de l'Obel, 1538–1616, Flemish herbalist/botanist and physician to James I of England)

REFERENCES: McVaugh 1936, 1940; Bowden 1959a, 1960a, 1960b, 1961, 1964a, 1982; Krochmal et al. 1972; McGregor 1985d; Lammers 1993; Thompson & Lammers 1997.

1. Corollas bright red; flowers (including calyx) 30–50 mm long; filaments including tube portion (but not anther tube) (15–)19–33 mm long \_\_\_\_\_ **L. cardinalis**
1. Corollas blue or violet; flowers 10–33 mm long; filaments including tube portion 2–15 mm long.
  2. Flowers 15–33 mm long; stems glabrous OR short hirsute or puberulent; filaments including tube portion 6–15 mm long; corolla tube fenestrate (= with 2 lateral slit-like openings as well as the dorsal split).
  3. Stems nearly glabrous to sparsely pubescent; flowers 23–33 mm long; corollas white-striped in throat; corolla tube often 5–10 mm wide; filaments including tube portion 10–15 mm long \_\_\_\_\_ **L. siphilitica**
  3. Stems densely short hirsute or puberulent throughout; flowers 15–24 mm long; corollas not white-striped in throat; corolla tube 3–4 mm wide; filaments including tube portion 6–7 mm long \_\_\_\_\_ **L. puberula**

2. Flowers 10–15 mm long; stems glabrous or nearly so; filaments including tube portion 2–4 mm long; corolla tube not fenestrate.

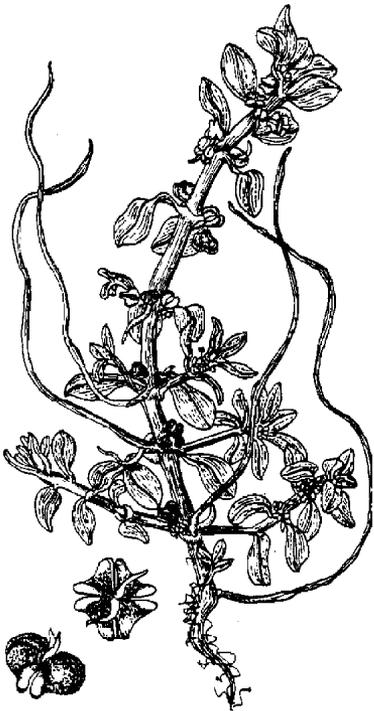
**L. appendiculata**

**Lobelia appendiculata** A. DC., (with an appendage), EARFLOWER. Slender annual or biennial 0.15–0.9(–1.1) m tall; stems glabrous or with a few basal hairs; leaves oblong-lanceolate, obtuse, subentire or toothed; middle stem leaves usually clasping or subsessile with broad base, ± glabrous; flowers in loose spikes to 32 cm long; calyx lobes linear-lanceolate, usually densely bristly-ciliate, sometimes only near tips, with conspicuous basal auricles that are flat, ciliate, lanceolate, 1–3 mm long; inflorescences ± secund (= 1-sided); corollas light violet or light lavender-blue to white; anther tube 2–2.5 mm long, bluish gray. Sandy open woods, fields, and roadsides; Fannin, Henderson, and Lamar cos.; se and e TX w to e margin of nc TX. May–Jun.

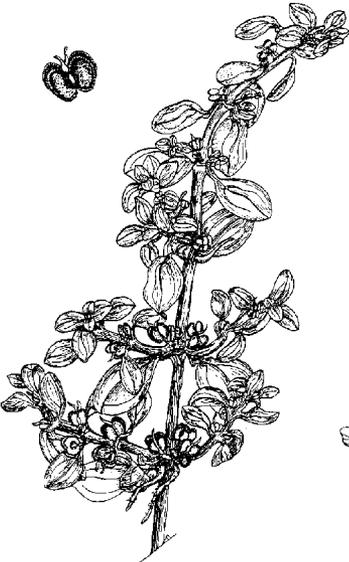
**Lobelia cardinalis** L., (cardinal, in reference to the flower color), CARDINAL-FLOWER. Perennial to 1.3(–2) m tall, with basal offshoots; raceme terminal, to 50 cm long; calyx lobes foliaceous, to 14 mm long and 6 mm wide; corollas bright crimson red (rarely white or pink); corolla tube fenestrate; anther tube 4–5.5 mm long, bluish gray; capsules 8–10 mm long. Low moist areas, stream banks; throughout TX. Mainly Sep–Oct. [*L. cardinalis* subsp. *graminea* (Lam.) McVaugh var. *phyllostachya* (Engelm.) McVaugh] A BRIT/SMU sheet annotated by McVaugh as *L. cardinalis* var. *phyllostachys* known from Dallas. Bowden (1960b) indicated that plants from TX are difficult to classify and apparently represent hybrid swarms between *L. cardinalis* subsp. *cardinalis* and *L. cardinalis* subsp. *graminea* var. *phyllostachya*. As can be seen from these examples, infraspecific taxa are often recognized in this species (e.g., Kartesz 1994; Jones et al. 1997). However, because of apparently unstable character combinations, we are following Brooks (1986b) and Thompson and Lammers (1997) in not recognizing infraspecific taxa. Thompson and Lammers (1997) concluded that all populations of the *L. cardinalis* complex (sometimes divided into four species) occurring from s Canada to n Colombia should be recognized as a single species without infraspecific taxa; they further concluded that *L. cardinalis* is most closely related to *L. siphilitica*, with which it is known to hybridize. The flowers of this species are visited by and presumably pollinated by ruby-throated hummingbirds (*Archilochus colubris*) (James 1948). The entire plant is poisonous to humans and livestock, sometimes fatally so, due to a mixture of pyridine alkaloids including lobeline; the sap can also irritate the skin; it was at one time used to treat conditions including syphilis and worm infestations but because of severe illness or even death resulting from overdoses, its use has long been discontinued (Krochmal et al. 1972; Turner & Szczawinski 1991). ☞ ☒/96

**Lobelia puberula** Michx., (somewhat pubescent), DOWNY LOBELIA, PURPLE-DEWDROP. Perennial; stems to 1.6(–2.7) m tall; racemes to 50 cm long; calyx lobes with small basal auricles; corollas blue to purple (rarely white); anther tube 3–3.5 mm long, bluish gray; capsules 4–7 mm long. Wooded areas to prairies or fields, usually in wet places; Henderson and Milam cos., also Lamar Co. (Carr 1994); se and e TX w to e margin of nc TX. Aug–Dec. [*L. puberula* var. *mineolana* Wimmer; *L. puberula* var. *simulans* Fernald] While varieties are sometimes recognized (e.g., Kartesz 1994; Jones et al. 1997), we are not distinguishing infraspecific taxa in this variable species. Lobeline and three other alkaloids are present in quantities similar to those in *L. cardinalis* (Krochmal et al. 1972). ☞

**Lobelia siphilitica** L. var. **ludoviciana** A. DC., (sp.: syphilitic, from supposed medicinal value; var.: of Louisiana), BIG BLUE LOBELIA, BLUE CARDINAL-FLOWER, GREAT LOBELIA, LOUISIANA LOBELIA. Nearly glabrous perennial with basal offshoots; stems to 1.3 m tall; racemes to 50 cm long; calyx lobes foliaceous, to 14 mm long, with broad basal auricles 2–5 mm long; corollas blue, white striped in throat; filament tube 12–15 mm long; anther tube 4–5 mm long, bluish gray; capsules 8–10 mm long. Low moist areas, prairies, woodlands; collected by Reverchon in Dallas Co. (Mahler 1988), also a Grayson Co. population (no longer extant) was observed for a number of years by



Callitriche peploides [c01]



Callitriche terrestris [c01]



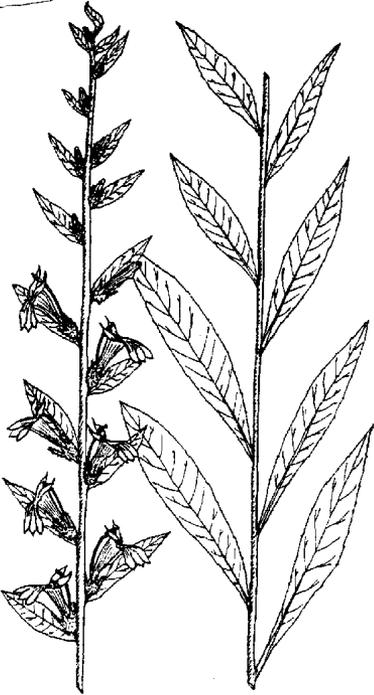
Lobelia appendiculata [HEA]



Lobelia cardinalis [GLE]



Lobelia puberula [c01]



Lobelia siphilitica var. ludoviciana [STE]

Sally Crosthwaite (pers. comm.); e TX w to nc TX. Aug–Sep. This species was used by Native Americans and early settlers as a treatment for syphilis (Larsen 1940); according to Steyermark (1963), it was also formerly used medicinally as an emetic and to relieve spasms of the air passages in cases of laryngitis and asthma. However, it is poisonous when taken in overdoses (Steyermark 1963); lobeline and two other alkaloids are present (Krochmal et al. 1972). ☠ ☒/96

*Lobelia spicata* Lam., (spicate, with spikes), PALE-SPIKE LOBELIA, HIGHBELIA, is known just to the e and n of nc TX in e TX and OK. It can be distinguished from *L. appendiculata* (the most similar nc TX species) using the following characters: stems densely short pubescent at base; middle stem leaves not clasping, narrowed to base, with pubescence on both surfaces; inflorescences usually not secund; calyx lobes glabrous or ciliate near their tips, with basal auricles that are usually deflexed, glabrous, and filiform or shortly triangular. Reported to be poisonous (Burlage 1968). ☠

### TRIODANIS VENUS'-LOOKING-GLASS

Annuals with 1 or several, usually unbranched, densely leafy stems to ca. 1 m tall (usually shorter); leaves mostly sessile, often clasping, usually < 3(–7) cm long, the upper gradually smaller; flowers sessile; early flowers (cleistogamous, self-pollinated, in lower leaf axils) often without corolla or corolla vestigial, maturing fruit very early; chasmogamous flowers with corollas radially symmetrical, rotate, rather deeply 5-lobed, blue-purple to purple or rarely white; capsules subcylindrical, opening by lateral pores (like window shades), the pores positioned from near the middle of the capsule to its apex; seeds lenticular (quadrangular in 1 species) in cross-section.

☞ A genus of 7 species, 6 in North America (1 extending to South America) and 1 in the Mediterranean region; previously lumped into the European and Mediterranean genus *Legousia* (= *Specularia*). All species, except the single one from the Old World (*T. falcata* (Ten.) McVaugh), occur in nc TX. (Greek: *tri*, three, and *odonto* a tooth, possibly in reference to the three calyx lobes of some flowers)

REFERENCES: McVaugh 1945, 1948; Fernald 1946b; Bradley 1975.

1. Leaves (not bracts subtending flowers) with pubescence on the upper surface; calyx lobes 5, all in a given flower ± alike, usually 8–15 mm long; capsules of both cleistogamous and chasmogamous flowers usually with 3 locules and thus 3 pores; pores of capsule opening first at apex with covering of pore curling toward capsule base; in nc TX known only Bell and Williamson cos. near s margin of area \_\_\_\_\_ **T. coloradoensis**
1. Leaves glabrous on upper surface (or with a few bristles near tips); calyx lobes 3–5, often 3 in cleistogamous flowers or sometimes 1 or 2 much smaller than others, usually < 10 mm long (often much less); capsules of cleistogamous flowers usually with 1 or 2 locules and thus usually 1 or 2 pores (chasmogamous flowers have 3 locules and 3 pores); pores of capsule opening first at base with covering of pore curling toward capsule apex; widespread in nc TX.
2. Floral leaves (= bracts subtending flowers) narrow, oblong-lanceolate or lanceolate to nearly linear, 3.5–10 times as long as wide, not clasping; capsules of cleistogamous flowers often curved, subulate, usually 8–12(–20) mm long, dehiscent by fractures near apex or by a single pore near apex; capsules of chasmogamous flowers 15–20(–25) mm long \_\_\_\_\_ **T. leptocarpa**
2. Floral leaves broader, rhombic-lanceolate to semi-orbicular to reniform, 0.5–3 times as long as wide, not clasping to strongly clasping; capsules of cleistogamous flowers straight, not subulate, usually < 8(–12) mm long, dehiscent by 2(–3) pores near capsule apex or middle; capsules of chasmogamous flowers usually 12 mm or less long.
3. Pores of capsules near apex.

4. Floral leaves longer than wide, mostly < 1 cm wide; seeds 0.4–0.65 mm long; widespread in nc TX \_\_\_\_\_ **T. perfoliata** var. **biflora**
4. Floral leaves wider than long to about as long as wide, mostly > 1 cm wide; seeds 0.7–1 mm long; rare, in nc TX known from only from n edge of area \_\_\_\_\_ **T. lamprosperma**
3. Pores of capsules near middle.
5. Pores linear or very narrowly oblong, 0.2–0.5 mm wide, the cartilage (which rolls out resulting in pore) before dehiscence with only very narrow scarious margins \_\_\_\_\_ **T. holzingeri**
5. Pores oblong-ovate or broader, 0.5–1.5 mm wide, the cartilage with broad scarious margins (relative to cartilage width).
6. Stems and underside of leaves glabrous, scabrous, or main veins pilose; seeds smooth or roughened by minute points \_\_\_\_\_ **T. perfoliata** var. **perfoliata**
6. Stems and underside of leaves densely hirsute or pilose; seeds reticulate (= with network of ridges) \_\_\_\_\_ **T. texana**

**Triodanis coloradoensis** (Buckley) McVaugh, (of the Colorado River area), COLORADO VENUS'-LOOKING-GLASS, TEXAS VENUS'-LOOKING-GLASS, LINDHEIMER'S VENUS'-LOOKING-GLASS. Upper and middle leaves oblanceolate to elliptic, to 7 cm long and 15 mm wide, sessile; lower leaves broader, short petiolate; floral bracts lanceolate, attenuate; corollas of chasmogamous flowers 9–18 mm long; capsules from cleistogamous flowers 11–18 mm long, those from chasmogamous flowers to 23 mm long; pores of capsules 1.5–2.5 mm below attachment of calyx lobes, 2–4 mm long, 0.8–1.7 mm wide; seeds 0.8–1 mm long. Dry hillsides, bluffs, rocky ledges, woods, gravel bars, floodplains; Bell and Williamson cos. (McVaugh 1945, 1961) on s margin of nc TX, also Fort Hood (Bell or Coryell cos.—Sanchez 1997); Edwards Plateau and adjacent areas; endemic to TX. Apr–early Jun. [*Campanula coloradoense* Buckley, *Legousia coloradoensis* Briq., *Specularia coloradoensis* Buckley ex Small, *S. lindheimeri* Vatke] This species is most similar to the Mediterranean *T. falcata* (Ten.) McVaugh. 📍

**Triodanis holzingeri** McVaugh, (for John Mitchell Holzinger, 1853–1929, German-born bryologist, who first noted its distinctions). Leaves ovate to elliptic or obovate, marginally crenate; floral bracts broader than leaves, ovate; corollas of chasmogamous flowers 7–9(–11) mm long; pores of capsules the narrowest of any nc TX species; seeds 0.3–0.7 mm long. Sandy open woods and open ground; throughout much of TX. May–Jun. [*Specularia holzingeri* (McVaugh) Fernald]

**Triodanis lamprosperma** McVaugh, (with shining seeds). Leaves broadly elliptic to obovate or ovate, sometimes broadly so, apically acute, marginally crenate to nearly entire; floral bracts often wider than long, to 25 mm wide; corollas of chasmogamous flowers 9–12 mm long; pores of capsules broadly elliptic, 0.7–1.5 mm wide; seeds 0.7–1 mm long. Stream bottom woods; Fannin and Grayson cos.; rare; ne TX w in Red River drainage to nc TX. May–Jun. [*Specularia lamprosperma* (McVaugh) Fernald]

**Triodanis leptocarpa** (Nutt.) Nieuwl., (slender-fruited), SLIMPOD VENUS'-LOOKING-GLASS, SLENDER VENUS'-LOOKING-GLASS. Leaves narrowly elliptic to lanceolate or oblanceolate, apically acute to obtuse, marginally crenate; floral bracts narrower than leaves, apically acute to acuminate (vs. acute to obtuse in other nc TX species except *T. coloradoensis*); corollas of chasmogamous flowers mostly 7–10 mm long; capsules dimorphic: capsules of chasmogamous flowers ± straight, linear (usually longer and relatively narrower than in other nc TX species), with 1 apical pore (vs. 2 or 3 in other nc TX species); capsules of cleistogamous flowers curved, subulate; seeds 0.7–1 mm long. Rocky limestone outcrops or less often sandy soils; nc TX and Edwards Plateau. May–Jun. [*Specularia leptocarpa* (Nutt.) A. Gray]

**Triodanis perfoliata** (L.) Nieuwl., (with leaf surrounding the stem), HEN-AND-CHICKENS. Corollas of chasmogamous flowers 5.5–12 mm long; seeds 0.5–0.6 mm long. Eroding or disturbed areas.

Bradley (1975) indicated that the following 2 taxa hybridize, that a gradient exists between them, and that extensive cleistogamy in var. *biflora* results in a partial isolating mechanism that allows individuals of that variety to be identified; he concluded that recognition at the varietal level is most appropriate. See key to species to separate the 2 varieties.

var. **biflora** (Ruiz & Pav.) T.R. Bradley, (two-flowered), SMALL VENUS'-LOOKING-GLASS. Leaves not clasping, longer than wide, apically acute to rarely obtuse, marginally crenate; floral bracts longer than wide, mostly < 1 cm wide; cleistogamous flowers at nearly all nodes, each stem usually with 1 open terminal flower; pores of capsules oval to nearly round, ca. 1 mm in diam. Brown, Denton, and Grayson cos., McVaugh (1961) cited numerous nc TX cos.; nearly throughout TX. Apr–Jun. [*T. biflora* (Ruiz & Pav.) Greene, *Specularia biflora* (Ruiz & Pav.) Fisch. & C.A. Mey.]

var. **perfoliata**, CLASPING VENUS'-LOOKING-GLASS. Leaves and floral bracts usually clasping, about as wide or wider than long, apically broadly acute to rounded, marginally crenate to serrate; each stem typically with more than 1 open flower; pores of capsules elliptic, 0.5–1.5 mm wide. Collin and Grayson cos., McVaugh (1961) cited numerous nc TX cos.; nearly throughout TX. Apr–May. [*Specularia perfoliata* (L.) A. DC.]

**Triodanis texana** McVaugh, (of Texas). Leaves ovate to elliptic or obovate, apically rounded to obtuse (rarely acute), marginally crenate; corollas of chasmogamous flowers 7–14 mm long; pores of capsules oval; seeds 0.4–0.6 mm long. Sandy open woods and open ground; Denton Co., also Dallas, Erath, and Milam cos. (McVaugh 1945, 1961); e TX w to nc TX, also Edwards Plateau; endemic to TX. Apr–May. According to Shetler and Morin (1986), this species has seed morphology unique within the genus (quadrangular in cross-section, different surface texture). [*Specularia texana* (McVaugh) Fernald] ↴

Individuals intermediate between a number of the taxa above are known. These include those that combine the characters of *T. perfoliata* var. *perfoliata* and *T. perfoliata* var. *biflora*; *T. perfoliata* and *T. texana*; and *T. perfoliata* and *T. holzingeri* (McVaugh 1945). McVaugh (1945) listed two nc TX collections (Bell Co., Erath Co.) for the last pair mentioned.

## CANNABACEAE HEMP FAMILY

☛ The Cannabaceae is a very small family (3–5 species in 2 genera—Kubitzki 1993) of the n temperate zone to se Asia; the species are erect or twining, wind-pollinated herbs with pyridine alkaloids; the family is closely related to the Moraceae and Urticaceae. From a cladistic standpoint these families should be lumped to form a more inclusive monophyletic family, which based on nomenclatural rules should be called Urticaceae (Judd et al. 1994). The beer flavoring HOPS comes from *Humulus*. The family is sometimes referred to as the Cannabidaceae; however, the name Cannabaceae is conserved. (subclass Hamamelidae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is an introduced annual herb with palmately compound leaves with 3–9(–11) coarsely toothed leaflets and small flowers.

REFERENCES: Miller 1970; Kubitzki 1993b; Judd et al. 1994; Small 1997.

### CANNABIS HEMP

☛ A monotypic genus of c Asia; long in cultivation. (From the Greek name, *kannabis*, thought by some to come from the Persian name, *kanab*, or the Arabic, *kinnab*)

REFERENCES: Emboden 1974; Small & Cronquist 1976; Small et al. 1976.

**Cannabis sativa** L., (cultivated), HEMP, MARIJUANA. Erect annual herb to 4 m tall; stems angled, minutely pubescent; leaves palmately compound, the lower opposite, the upper alternate; leaf-



*Triodanis coloradoensis* [HEA]

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*Triodanis holzingeri* [HEA]



*Triodanis lamprosperma* [HEA]

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*Triodanis leptocarpa* [BB2]

lets 3–9(–11), narrowly lanceolate, coarsely and sharply toothed, scabrous above, pubescent beneath; stipules lance-linear; inflorescence a narrow, terminal panicle with leafy bracts, or the flowers in mostly axillary, small, spike-like clusters; flowers unisexual, the sexes on separate plants; staminate flowers on pedicels 0.5–3 mm long, the perianth greenish, 5-parted; pistillate flowers sessile, enclosed by sepal-like bracts; achenes 2–5 mm long. Found in the city of Dallas in Jun 1876 by Reverchon (Mahler 1988); scattered localities in TX. Jul–Oct. Native of c Asia. [*C. sativa* subsp. *indica* (Lam.) E. Small & Cronquist] While infraspecific taxa are sometimes recognized (e.g., Jones et al. 1997), according to Small (1997), “the chemical and morphologic distinctions by which *Cannabis* has been split into taxa are often not readily discernible, appear to be environmentally modifiable, and vary in a continuous fashion.” For these reasons we are not recognizing taxa below the specific level. Cultivated for use as a psychoactive drug and as a source of the fiber known as hemp which has numerous uses including rope, paper, cloth, and nets; due to demand for rope, *Cannabis* was a major economic crop in the American colonies; during World War II, because fiber supplies were low, the U.S. government encouraged and subsidized the cultivation of *Cannabis* for hemp. It is one of the world’s oldest cultivated plants having been domesticated for ca. 8500 years; the active ingredients are tetrahydrocannabinol (THC) and related phenolic resins; it is controlled in the U.S. by the Comprehensive Drug Abuse Act of 1970 and is used illegally as a recreational drug; medicinally, *Cannabis* is used in the treatment of glaucoma and in combating the nausea experienced during cancer chemotherapy; there are adverse effects from concentrated doses or heavy usage and the pollen can be a cause of hay fever; a single inflorescence has been estimated capable of producing more than 500 million pollen grains (Tippo & Stern 1977; Stephens 1980; Fuller & McClintock 1986; Mabberley 1987; Blackwell 1990; Turner & Szczawinski 1991; Kubitzki 1993b; Small 1997). ☛ ☞

## CAPPARACEAE CAPER OR SPIDER-FLOWER FAMILY

Ours annuals with alternate, palmately compound leaves; leaflets entire or nearly so; flowers in terminal, bracted racemes; sepals 4; petals 4, ± unequal, clawed; stamens 6 to many; pistil 1; ovary superior; fruit a capsule.

☛ A medium-sized (650 species in 39 genera) mainly tropical and subtropical family with a few in arid temperate regions; many species are woody and most produce mustard-oil glucosides and in some cases alkaloids; capparids are similar in many respects to members of the Brassicaceae. The Capparaceae are closely related to the Brassicaceae and are probably paraphyletic when treated separately. From a cladistic standpoint the two should be lumped to form a more inclusive monophyletic family, which based on nomenclatural rules, should be called Brassicaceae (Judd et al. 1994). Family name from *Capparis* (CAPER), a genus of 250 species of shrubs, scramblers, or trees of warm areas of the world. The spice capers are the flower buds of *Capparis* species. The family is sometimes referred to as the Capparidaceae; however, the name Capparaceae is conserved. (Greek: *kapparis*, capers) (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: annuals (many woody in other parts of the world) with palmately compound leaves (3–7 leaflets); similar to Brassicaceae (e.g., flowers in racemes, 4 sepals, 4 petals) but with somewhat bilaterally symmetrical flowers (not cross-like as in Brassicaceae), stamens never 4+2 (the condition in the Brassicaceae), inflorescence bracts often present (these absent in Brassicaceae), and fruits lacking a transverse partition (this present in Brassicaceae).

REFERENCES: Iltis 1957, 1958 [1959]; Ernst 1963a; Judd et al. 1994.

1. Stems glandular-pubescent, at least in upper part (use lens); petals white or yellowish, sometimes pinkish or purple-tinged or pink to purple; mature capsules 40–100 mm long, very much longer than wide; stamens sometimes much exceeding the petals.
2. Leaflets 3; plants unarmed; stamens 6–20, of unequal lengths, exposed in bud; petals white to



*Triodanis perfoliata* var. *biflora* [GLE]



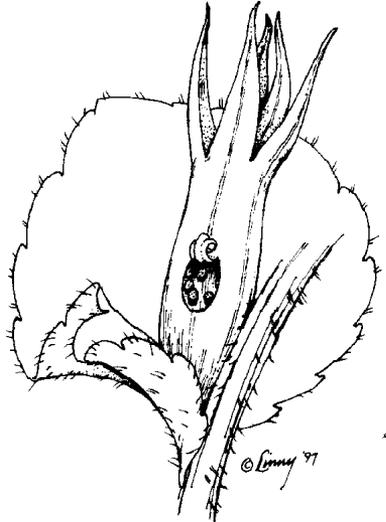
*Triodanis perfoliata* var. *perfoliata* [STE]



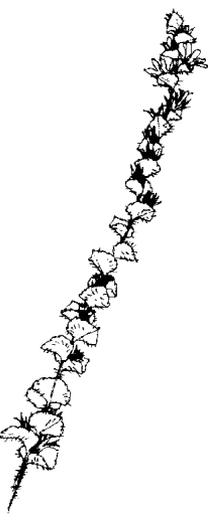
*Cannabis sativa* [REE]



*Cleome hassleriana* [BL2]



*Triodanis texana* [HEA]



*Cleomella angustifolia* [PL]

yellowish, sometimes pinkish-tinged or purplish-tinged, 5–16 mm long; fruits without a stipe or on a short stipe (to ca. 14 mm long) beyond the 10–40 mm long pedicel. \_\_\_\_\_

**Polanisia**

2. Leaflets 5 or 7; plants armed with prickles; stamens 6, of equal length, covered in bud by the overlapping petals; petals pink to purple (rarely white), 20–40 mm long; fruits on an elongate slender stipe 30–80 mm long (beyond the 20–40 mm long pedicel). \_\_\_\_\_

**Cleome**

1. Stems glabrous; petals deep yellow; mature capsules 5–10 mm long, ca. as wide as long; stamens equaling or barely exceeding the petals. \_\_\_\_\_

**Cleomella**

### CLEOME SPIDER-FLOWER, BEEPLANT

☛ A genus of 150 species of tropical and warm areas of the world; a number are cultivated as ornamentals, for medicinal uses, or for edible seeds. (Name of unknown origin; applied early to some mustard-like plant)

REFERENCE: Iltis 1959.

**Cleome hassleriana** Chodat, (for Emile Hassler, 1861–1937, Swiss botanical collector and physician who settled in Paraguay), SPIDERPLANT, SPIDER-FLOWER, SPINY SPIDER-FLOWER, PINK-QUEEN. Plant robust, 1–2 m tall, armed, strongly scented; leaflets oblanceolate-elliptic to nearly elliptic, to 12 cm long; racemes dense, to 1 m long; petals showy; anthers ca. 1 cm long; capsules linear-cylindric, to 4 mm thick, divergent to deflexed. Cultivated and apparently escapes; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990), also s TX. Apr–Oct. Native of South America. 🌿

### CLEOMELLA RHOMBOPOD

☛ A genus of 10 species of sw North America. (Diminutive of *Cleome*)

REFERENCE: Payson 1922b.

**Cleomella angustifolia** Torr., (narrow-leaved), NARROW-LEAF RHOMBOPOD. Plant glabrous, erect, ca. 0.2–2(–2.6) m tall; leaves 3-foliolate; leaflets linear-elliptic, 2–8 mm wide; petals 4–6 mm long; capsules 5–9 mm wide, rhomboid-obdeltoid (like a distorted triangle); seeds 3–6 per capsule. Draws, ditch bottoms, and roadsides, sandy soils; Clay, Jack, and Montague cos.; West Cross Timbers w to Rolling Plains and s to Edwards Plateau. Jul–Oct.

### POLANISIA CLAMMYWEED

Herbaceous glandular-pubescent annuals with strong odor; leaves 3-foliolate, petiolate; petals (in ours) with a long claw prominent nectary gland present in flowers; capsules elongate, erect, dehiscing apically by valves; seeds numerous.

☛ A North American genus of 6 species; thought to be related to xerophytic African *Cleome* species and often lumped into that genus. (Greek: *polys* many, and *anisos*, unequal, in reference to the characters by which the stamens differ from those of *Cleome*)

REFERENCES: Iltis 1958, 1966.

1. Leaflets lanceolate or elliptic to rhombic-orbicular or ovate, 10–30 mm wide; petals slightly unequal, entire or notched; stamens 9–30 mm long; capsules 5–10 mm wide. \_\_\_\_\_

**P. dodecandra**

1. Leaflets linear, 1–5 mm wide; petals very unequal (upper 2 much larger than lower), with deeply ragged margin; stamens 6–12 mm long; capsules 1.5–3.5(–5) mm wide. \_\_\_\_\_

**P. erosa**

**Polanisia dodecandra** (L.) DC. subsp. **trachysperma** (Torr. & A. Gray) H.H. Iltis, (sp. twelve-stamened; subsp.: rough-seeded), CLAMMYWEED. Plant 20–100 cm tall; leaflets oblanceolate, 20–40 mm long; petals 5–16 mm long, white or sometimes with purplish tinge; stamens 6–20, pink to purple; nectary gland solid, truncate to shallowly concave, 1–2 mm long, yellowish, the apex

orange to orange-red; capsules 20–70 mm long; seeds many. Sandy stream banks, roadsides, and disturbed sites; widespread in TX, apparently native from West Cross Timbers westward (Mahler 1988), local e to Bell, Dallas, Denton, Falls, Grayson, and McLennan cos. May–Oct. [*Polanisia trachysperma* Torr. & A. Gray] Touching the foliage transfers a strong-smelling substance that makes the hands sticky or clammy. 📷/103

***Polanisia crosa*** (Nutt.) H.H. Iltis, (jagged as if gnawed, in reference to petal margin), LARGE CLAMMYWEED, LARGE CRESTPETAL. Plant 20–60 cm tall; leaflets linear to oblanceolate, 10–40 mm long; upper (larger) petals 6–11 mm long, white to pale-yellow, sometimes with pink tinge, the claw purplish pink; stamens 6–15, pink; nectary gland tubular, truncate, 3.5–5.5 mm long, 0.9 mm in diam., yellow, drying pink-purple, persistent in fruit at base of gynophore; capsules 20–60 mm long, with 6–36 seeds; stipe (= gynophore) (4–)7–14 mm long. Loose sand; Dallas, Limestone, Parker, and Tarrant cos.; se and e TX w to West Cross Timbers. Late May–Oct. Sometimes segregated into the genus *Cristaltella* [as *C. crosa* Nutt.].

## CAPRIFOLIACEAE HONEYSUCKLE FAMILY

Herbs, shrubs, trees, or woody vines; leaves opposite, sessile or petioled, simple or pinnately compound, entire, toothed, or lobed; flowers axillary or terminal, solitary, in pairs, or in spikes, whorls, umbels, or cymes; calyx lobes minute to large, 3–5; corollas 2-lipped or radially symmetrical and 4–5-lobed, funnellform or tubular to rotate; stamens 4 or 5; pistil 1; style and stigma 1; ovary half to wholly inferior; fruit in ours a drupe or berry.

☛ A small (420 species in 15 genera), nearly cosmopolitan family of shrubs or small trees or less frequently lianas or herbs; it includes a number of ornamentals such as *Abelia*, *Weigela*, *Lonicera*, and *Symphoricarpos*. Based on a cladistic analysis, Judd et al. (1994) suggested segregating *Sambucus*, *Viburnum*, and relatives into the family Adoxaceae. They further suggested including the Valerianaceae and Dipsacaceae with the remaining Caprifoliaceae to form a more inclusive monophyletic Caprifoliaceae. Family name from *Caprifolium*, a genus now treated as *Lonicera*. (Latin: *capra*, goat, and *folius*, leaved, from the foliage being used as goat fodder) (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: shrubs or vines (1 herb) with similarities to the Rubiaceae (e.g., opposite leaves, ± inferior ovaries) but Caprifoliaceae usually lack stipules and typically have larger showier flowers with the flower parts mostly in 5s (Rubiaceae have stipules and flower parts often in 4s).

REFERENCES: Ferguson 1966a; Brooks 1986c; Donoghue et al. 1992; Judd et al. 1994.

1. Leaves pinnately compound; fruits 4–6 mm in diam., purple-black, numerous. \_\_\_\_\_ **Sambucus**
1. Leaves simple; fruits not as above.
  2. Plants erect herbs to 80 cm tall; flowers usually solitary in the leaf axils. \_\_\_\_\_ **Triosteum**
  2. Plants woody, either vines, shrubs, or small trees; flowers either not axillary, or if axillary then not solitary.
    3. Leaves usually with distinct teeth; corollas rotate or shallowly funnellform, radially symmetrical; flowers small and many, in terminal cymes; fruits 10–15 mm long, dark blue. \_\_\_\_\_ **Viburnum**
    3. Leaves usually without teeth (however, the morphologically different juvenile leaves (= those on new growth) can have teeth, lobing, or wavy edges); corollas funnellform to long-tubular, nearly radially symmetrical to 2-lipped; flowers few or many, axillary or terminal, in pairs or spikes or whorls; fruits differing from above in either size or color or both.
      4. Corollas 10–50 mm long, often bilaterally symmetrical; leaves often > 4 cm long; plants shrubs or twining or trailing vines; fruits with several seeds. \_\_\_\_\_ **Lonicera**
      4. Corollas 2.5–5 mm long, nearly radially symmetrical; leaves usually < 4 cm long; plants small shrubs to only 2 m tall; fruits with 2 seeds. \_\_\_\_\_ **Symphoricarpos**

**LONICERA** HONEYSUCKLE

Vines or shrubs; leaves short-petioled or sessile, entire; flowers axillary or terminal, rather large and showy; fruit a several-seeded berry.

☛ A genus of 180 species of the n hemisphere s to Mexico and the Philippines; many are cultivated as ornamentals and a number have become serious invasive weeds; some have very fragrant flowers. (Named for Adam Lonitzer, 1528–86, German naturalist and herbalist)

REFERENCES: Rehder 1903; Luken & Thieret 1995, 1996.

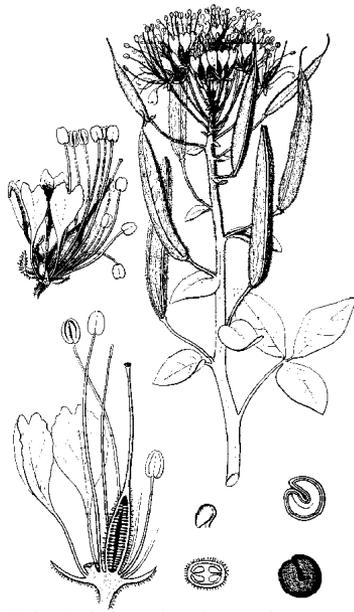
1. Uppermost leaves united around stem; flowers terminal, in heads or in whorls forming spikes; twining, trailing or climbing vines.
  2. Corollas 25–50 mm long, partly or wholly red, purple, or pink \_\_\_\_\_ **L. sempervirens**
  2. Corollas 12–18 mm long, creamy white \_\_\_\_\_ **L. albiflora**
1. Uppermost leaves separate, short-petioled; flowers axillary or both axillary and terminal, mostly in 2s; vines or shrubs.
  3. Twining, trailing or climbing vines; corolla tube > 15 mm long \_\_\_\_\_ **L. japonica**
  3. Shrubs; corolla tube < 15 mm long.
    4. Leaves acuminate apically; branches hollow, with brown pith \_\_\_\_\_ **L. maackii**
    4. Leaves rounded or acute apically (but short apiculate); branches with solid white pith \_\_\_\_\_ **L. fragrantissima**

**Lonicera albiflora** Torr. & A. Gray, (white-flowered), WHITE HONEYSUCKLE, BUSHY HONEYSUCKLE. Evergreen, low, shrubby vine with arched to twining branches; young stems usually glabrous (rarely with sparse pubescence); leaves sessile or subsessile; leaf blades variable in shape, elliptic to ovate, suborbicular, rhombic, or obovate, (1.5-)2-4(-6.5) cm long, ± coriaceous, apically usually rounded (rarely broadly acute); upper surface of leaf blades gray-green or yellow-green, the lower surface variously glaucous; typically only the terminal pair of leaves perfoliate; fruits reddish orange, 5–15 mm in diam. Limestone outcrops; Blackland Prairie (Austin Chalk) s and w to w TX. Apr–May. [*L. albiflora* var. *dumosa* (A. Gray) Rehder] The fruits are reported to contain a substance that induces vomiting (Powell 1988). ☛

**Lonicera fragrantissima** Lindl. & Paxton, (very fragrant), SWEET-BREATH-OF-SPRING. Semi-evergreen shrub to ca. 3 m tall; leaves short petioled; leaf blades broadly oval, to ca. 8 cm long, strongly apiculate; flowers fragrant, several pairs in leaf axils; corollas ca. 16 mm long, creamy white, sometimes tinged with pink, the tube ca. 5–6 mm long; fruits orange to red, 8–10 mm long. Widely cultivated and escapes, forest margins; Collin Co. (Heard Museum property), also Tarrant Co. (R. O’Kennon, pers. obs.); we do not know of other TX reports. Jan–Apr. Native of China. ☛

**Lonicera japonica** Thunb., (of Japan), JAPANESE HONEYSUCKLE. Trailing or twining vine, evergreen; young stems usually densely pubescent to almost glabrous; leaves short-petioled; leaf blades oblong-ovate or oblong-lanceolate, those on new spring or summer growth (= juvenile leaves) often pinnatifid; flowers very fragrant; corollas 25–40 mm long, creamy white or white tinged with purple, becoming yellow with age, eventually changing to brownish, the tube pubescent outside, the upper lip with at least 2 of its lobes united more than half way; fruits black, 5–8 mm in diam. Cultivated, escaped, and locally established in disturbed areas, woods, and thickets; se and e TX w to Rolling Plains and Edwards Plateau. Can be an invasive pest overtaking the habitat of native species. Mar–Jul. Native of Asia. ☛

**Lonicera maackii** (Rupr.) Maxim., (for Richard Maach, 1825–1886, Russian naturalist), AMUR HONEYSUCKLE, BUSH HONEYSUCKLE, TREE HONEYSUCKLE, MAACK’S HONEYSUCKLE. Shrub to ca. 6 m tall, deciduous but leafing out very early and holding leaves late; leaves short-petioled; leaf blades to ca. 8 cm long, acuminate; flowers fragrant, in axillary pairs; corollas white becoming



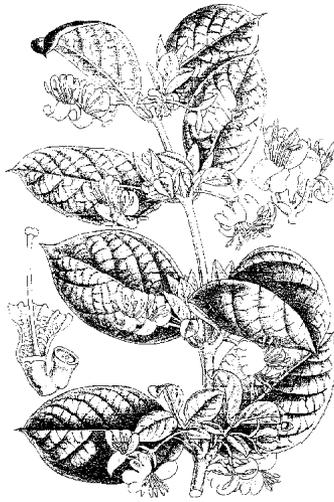
*Polansia dodecandra* subsp. *trachysperma* [GR1]



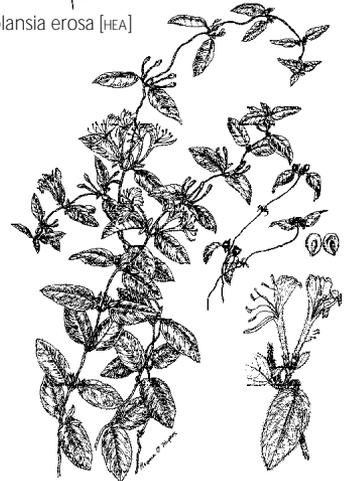
*Polansia erosa* [HEA]



*Lonicera albiflora* [VIN]



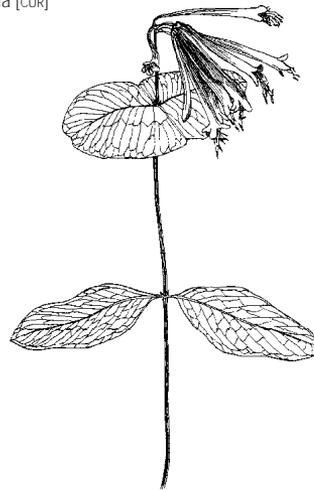
*Lonicera fragrantissima* [CUR]



*Lonicera japonica* [REE]



*Lonicera maackii* [SID]



*Lonicera sempervirens* [BT3]

yellow, ca. 20 mm long; fruits dark red, 2–4 mm in diam. Widely cultivated and escapes, calcareous slopes and forest margins; Dallas Co., also Tarrant Co. (R. O'Kennon, pers. obs.); first referred to as a weed in the U.S. in Chicago in 1924 and now considered problematic in some areas of the e U.S. (Luken et al. 1995). Mar. Native of c and ne China, the Amur River and Ussuri River valleys, Korea, and Japan (Luken & Thieret 1996). ☞

**Lonicera sempervirens** L., (evergreen), CORAL HONEYSUCKLE, TRUMPET HONEYSUCKLE, EVERGREEN HONEYSUCKLE. Glabrous, evergreen, twining vine; young stems glabrous or nearly so; leaves sessile or subsessile; leaf blades ovate to elliptic or obovate, 3–6(–7) cm long, 2–4 cm wide, subcoriaceous, apically obtuse to acute; upper surface of leaf blades olive-green or dark green, the lower surface lighter than the upper, often glaucous; terminal 1–2(–several) pairs of leaves perfoliate; corollas tubular, usually red outside, orange inside, shallowly lobed, lobes nearly equal; fruits red or reddish orange, 6–10 mm in diam. Stream banks or hillside woods, also cultivated; se and e TX w to West Cross Timbers. Mar–Apr. The flowers of this species are visited by and presumably pollinated by ruby-throated hummingbirds (*Archilochus colubris*) (James 1948). ☞/96

### SAMBUCUS ELDERBERRY

☞ A temperate and subtropical genus of 9 species of shrubs and small trees often with alkaloids and extrafloral nectaries; some are cultivated as ornamentals or used for their edible fruit; ☞ however, some species have toxic fruit. While we are treating *Sambucus* in the Caprifoliaceae, Bolli (1994) indicated that even though many authors regard *Sambucus* as most closely related to *Viburnum*, the genus is isolated and he recommended that it be treated in the unigeneric family Sambucaceae. (The Latin name, perhaps from the Greek: *sambuce*, an ancient musical instrument; because of the readily removed tubes of bark, these were used for flutes and whistles)

REFERENCE: Bolli 1994.

**Sambucus nigra** L. var. **canadensis** (L.) Bolli, (sp.: black; var.: of Canada), COMMON ELDERBERRY, AMERICAN ELDERBERRY. Coarse perennial, developing pithy-woody stems, becoming shrubby, 1–4 m tall; leaflets 5–7(–11), broadly lanceolate, abruptly acuminate, finely and sharply toothed, glabrous to densely soft-pubescent beneath; flowers small, in broad, flat-topped corymbs; corollas creamy white, ca. 5 mm wide; fruit a 3-stoned, purple-black, berry-like drupe 4–6 mm in diam. Stream bottoms and ditch banks, in shade or sun; mainly e 1/2 of TX, scattered further w. May–Jun, sporadically to Sep. [*S. canadensis* L., *S. canadensis* L. var. *submollis* Rehder] While this species has long been recognized as *S. canadensis* (e.g., Correll & Johnston 1970; Kartesz 1994; Jones et al. 1997), we are following Bolli's (1994) revision of the genus for nomenclature of this species; he recognized it as being composed of 6 subspecies indicating "... it is important to emphasize the close relationship and morphological similarity of all subspecies of *S. nigra*." Even though the ripe fruits are edible when cooked (Lampe & McCann 1985) and used in making wines and jellies, the roots, stems, leaves, flowers, and unripe fruits contain a poisonous alkaloid and cyanogenic glycoside (Hardin & Arena 1974); during frontier days the leaves were dried and used as an insecticide (Crosswhite 1980). ☞

### SYMPHORICARPOS CORAL-BERRY, SNOWBERRY

☞ A genus of 17 species of deciduous shrubs of North America and China; some are cultivated as ornamentals. ☞ The fruits of some species are reportedly toxic if ingested in quantity (Lampe & McCann 1985). (Greek: *symphorein*, to bear together, and *carpos*, fruit; from the clustered fruits)

REFERENCE: Jones 1940.

**Symphoricarpos orbiculatus** Moench, (orbicular, round), INDIAN-CURRENT, CORAL-BERRY,

BUCKBRUSH. Short, rhizomatous, inconspicuously pubescent, erect to ascending shrub to ca. 2 m tall; leaves very short-petioled; leaf blades elliptic-orbicular, entire or with a few blunt teeth, usually < 4 cm long, rarely to 6 cm; flowers in small dense axillary spikes, rather inconspicuous; corollas funnellform, 3–5 mm long, greenish white, sometimes partly brown-red; drupes usually with 2 stones, coral-red to pink or purple-tinged, 5–7 mm long, long persisting. Woods and thickets; se and e TX w to West Cross Timbers, also Edwards Plateau; increasing under disturbance. Jun–Aug. Reported to be poisonous (Burlage 1968). ☠

### TRIOSTEUM FEVERWORT, HORSE-GENTIAN

☞ A genus of 5–6 species of perennial herbs of e Asia and e North America; this disjunct distribution pattern is discussed under the genera *Campsis* (Bignoniaceae) and *Carya* (Juglandaceae). (Greek: *tri*, three, and *osteon* bone, alluding to 3 bony nutlets)

REFERENCE: Lewis & Frantz 1973.

**Triosteum angustifolium** L., (narrow-leaved), YELLOW-FLOWERED HORSE-GENTIAN. Perennial herb to ca. 80 cm tall; stems long-hirsute, the hairs 1–4 mm long; leaves narrowly obovate to lanceolate, to ca. 15 cm long, apically acuminate; flowers usually solitary in the leaf axils, subtended by a pair of bracts; calyx lobes 7–13 cm long; corollas tubular, greenish or yellowish white or yellowish, 12–15 mm long; fruit a pale orange drupe 5–7 mm in diam., usually with 3 nutlets. Wooded areas, thickets; Grayson Co. in Red River drainage, also Lamar Co. (Carr 1994); mainly e TX. Mar–May.

### VIBURNUM ARROW-WOOD

☞ A genus of 150 species of small trees and shrubs of temperate and warm areas, especially Asia and North America; a number of species are important ornamental shrubs with conspicuous flowers and ornamental fruits; some species have the marginal flowers of the inflorescence sterile and enlarged; ☠ fruits of different species are variously edible or poisonous. (The classical Latin name for *V. lantana* L.)

REFERENCES: Egolf 1962; Donoghue 1983.

**Viburnum rufidulum** Raf., (somewhat rufid, reddish), SOUTHERN BLACKHAW, DOWNY VIBURNUM, NANNY-BERRY, RUSTY BLACKHAW. Shrub or small tree to 10 m tall, deciduous; leaves reddish-pubescent on petiole and along midrib beneath; leaf blades finely toothed, unlobed, elliptic-lanceolate to orbicular; flowers numerous, in terminal, compound, dense umbels; corollas rotate or shallowly funnellform, white; drupes blue-black, glaucous, 10–15 mm long, 1-seeded. Rocky or sandy woods; widespread in TX, particularly the e 1/2. Apr. Correll and Johnston (1970) and Cox and Leslie (1991) indicated that the fruit pulp is sweet and edible with a raisin-like taste.

## CARYOPHYLLACEAE PINK OR CARNATION FAMILY

Ours annual, biennial, or perennial herbs; stems often with swollen nodes; leaves opposite, simple, entire; stipules scarious or absent; flowers solitary or inflorescences cymose, panicle-like, or capitate; sepals or tepals (4–)5; petals 0–5 (or more in cultivated forms), often notched (“pinked”) at apex, frequently differentiated into claw and blade, sometimes with a crown of appendages (projections or scales) at junction of claw and blade; stamens (1–)5–10; pistil 1; ovary superior; placentation usually free-central or basal; fruit a capsule dehiscent apically by valves or teeth or an utricle.

☞ A large (ca. 2,200 species in ca. 86 genera—Bittrich 1993), cosmopolitan, but especially temperate and warm n hemisphere family of mostly herbs or rarely shrubs or small trees. It includes ornamentals such as *Dianthus* (CARNATION, SWEET-WILLIAM) and *Gypsophila* (BABY’S-

BREATH). The family is unusual in its subclass in having anthocyanin rather than betalain pigments (Cronquist & Thorne 1994); however, molecular analyses link it with other members of the Caryophyllales (Giannasi et al. 1992; Downie & Palmer 1994). The common name PINK is an old name probably referring to the notched or “pinked” petals (as in pinking shears). Family name conserved from *Caryophyllus* Mill., a genus now treated as *Dianthus* (the name *Dianthus* was published earlier and thus has priority in terms of nomenclature). In pre-Linnaean times, some authorities (e.g., Tournefort) referred to all PINKS as belonging to the genus *Caryophyllus*; Linnaeus, however, used the name for *Syzygium aromaticum* (L.) Merr. & L.M. Perry, CLOVES or CLOVE TREE, of the Myrtaceae; *Caryophyllus* L. has been rejected in favor of *Syzygium* (Farr et al. 1979). Linnaeus did use “caryophyllus” as an epithet for one of the familiar carnations also known as the CLOVE PINK (Bailey 1938). (Greek: *caryon*, nut, and *phylon*, leaf, possibly in reference to the capsular or utricular fruit being subtended by bracts—R. Rabeler, pers. comm.) (sub-class Caryophyllidae)

**FAMILY RECOGNITION IN THE FIELD:** herbs with opposite, simple, entire leaves, *swollen nodes* and separate, often *notched petals* frequently with claw and blade; fruit often a toothed or valved capsule.

**REFERENCES:** Larsen 1986; Rabeler & Thieret 1988; Giannasi et al. 1992; Bittrich 1993; Behnke & Mabry 1994; Downie & Palmer 1994.

1. Flowers or several-flowered head-like clusters subtended by 2–3 pairs of conspicuous, broadly ovate-oblong or obovate, scarious (= dry, not green) bracts; rare introduced species. \_\_\_\_\_ **Petrorhagia**
1. Flowers or inflorescences without bracts OR bracts very different from those above (e.g., in *Dianthus* bracts linear or lance-linear, not scarious); widespread native and introduced species.
  2. Stipules present.
    3. Leaves elliptic, ovate, or obovate AND plants prostrate or decumbent; lower leaves usually in whorls of 4 or apparently so; introduced species rare in nc TX, known only from s part of Lampasas Cut Plain. \_\_\_\_\_ **Polycarpon**
    3. Leaves linear to filiform, needle-like, elliptic, or oblanceolate, if elliptic or oblanceolate, then plants neither prostrate nor decumbent; lower leaves not in whorls of 4, instead either opposite OR needle-like and crowded; including species widespread in nc TX.
    4. Petals absent or minute; sepals green to yellow or brown, sometimes white apically; stipules ovate-lanceolate to linear, 2–6 times as long as wide; widespread in nc TX.
    5. Sepals acute to acuminate or with minute awn-point at apex, entire; fruit a single-seeded utricle. \_\_\_\_\_ **Paronychia**
    5. Sepals rather abruptly narrowed to an awn-like tip about half their total length, the outer 3 with a distinct bristle-tooth on each side from about the middle; fruit a several-seeded capsule. \_\_\_\_\_ **Loeflingia**
    4. Petals present, white or pink; stipules triangular, not over twice as long as wide; rare in nc TX. \_\_\_\_\_ **Spergularia**
  2. Stipules absent.
    6. Sepals separate or united only at base; petals not differentiated into claw and blade.
    7. Petals split more than half way to base (corollas apparently of 10 petals). \_\_\_\_\_ **Stellaria**
    7. Petals entire OR divided less than half way to base OR absent.
    8. Petals absent.
      9. Leaf blades very narrow, < 1 mm wide, glabrous; capsules opening apically by 4–5 valves; calyces without a red band at base; styles equal in number to capsule valves. \_\_\_\_\_ **Sagina**
      9. Leaf blades usually > 1 mm wide, glabrous or pubescent; capsules opening apically by 6 valves or 10 teeth; calyces with a red band at base OR not so; styles half as many as capsule valves or teeth.
      10. Capsules opening apically by 6 valves (opening to ca. middle of capsule); styles

- usually 3; plants ± glabrous or with inconspicuous pubescence, the pubescence if present not glandular. \_\_\_\_\_ **Stellaria**
10. Capsules opening apically by 10 teeth (opening only at very apex); styles usually 5; plants with obvious pubescence, the pubescence usually glandular, at least in the inflorescences. \_\_\_\_\_ **Cerastium**
8. Petals present.
11. Styles 3; petals 2–15 mm long; capsules opening apically by 3 or 6 valves.
12. Petals 2–4 mm long, shorter than the sepals, acute, entire at apex; sepals 2–4 mm long; capsules opening apically by 6 valves. \_\_\_\_\_ **Arenaria**
12. Petals 5–15 mm long, longer than the sepals, toothed or shallowly notched at apex; sepals 2.5–8 mm long; capsules opening apically by 3 valves. \_\_\_\_\_ **Minuartia**
11. Styles 5 (occasionally 4); petals ca. 1–7 mm long; capsules opening apically by 10 teeth or 4–5 valves.
13. Petals toothed or notched at apex; leaves ± pubescent, oblong or lanceolate to elliptic or obovate; capsules opening apically by 10 teeth. \_\_\_\_\_ **Cerastium**
13. Petals entire; leaves glabrous, narrowly linear; capsules opening apically by 4–5 valves. \_\_\_\_\_ **Sagina**
6. Sepals united 1/3 or more (may have separate bracts outside), often forming a campanulate, funnellform, cylindric or inflated calyx tube; petals often, but not always, clawed.
14. Flowers in dense head-like cymes; calyces each with 2–several bracts at base; petals white to variously colored, often minutely dotted with white. \_\_\_\_\_ **Dianthus**
14. Flowers in very open to congested cymes; calyces without bracts at base; petals white to variously colored but if colored not minutely dotted with white.
15. Calyx lobes 15–45 mm long, longer than calyx tube; styles (4–)5; petals usually purplish red, 24–36 mm long including claw, without a crown of projections or scales on upper (inner) side at junction of blade and claw. \_\_\_\_\_ **Agrostemma**
15. Calyx lobes 0.5–5 mm long, shorter than calyx tube; styles 2–3(–4); petals white to pinkish or purplish, 5–38 mm long including claw, without OR with a crown.
16. Leaves not clasping; calyces 10–20-nerved, not angled, cylindric to campanulate to funnellform in fruit; petals white to pinkish or purplish, with a crown of projections or scales on upper (inner) side at junction of blade and claw OR without a crown.
17. Styles 3(–4); inflorescences open; calyx tube 5–10 mm long; petals with crown absent or minute; capsules opening apically by 6 teeth. \_\_\_\_\_ **Silene**
17. Styles usually 2; inflorescences congested; calyx tube 12–20 mm long; petals crowned with an appendage at top of the claw; capsules opening apically by 4 teeth. \_\_\_\_\_ **Saponaria**
16. Leaves clasping; calyces strongly 5-angled or winged, inflated in fruit, ovoid; petals lavender-pink, without a crown. \_\_\_\_\_ **Vaccaria**

### AGROSTEMMA CORN-COCKLE

☛ A temperate Eurasian genus of 2 species. (Greek: *agnos*, field, and *stemma* a crown or garland, Linnaeus apparently believing it was suitable for such a use)

**Agrostemma githago** L., (an old generic name for *Agrostemma*), COMMON CORN-COCKLE. Erect taprooted annual or biennial 0.3–1 m tall; stems simple or few-branched, densely pubescent with appressed hairs; leaves linear to lanceolate, 4–12 cm long, 1–10 mm wide, sessile, entire; stipules absent; flowers 1 per node, on elongate peduncles to 20 cm long; calyx tube 10-ribbed, 10–18 mm long; calyx lobes 15–45 mm long, longer than the tube, linear or lance-linear; petals 24–36 mm long including claw, usually purplish red, with small black dots along veins near

base; capsules 18–22 mm long, opening by (4–)5 teeth, many-seeded. Disturbed areas; a 1998 Parker Co. collection is the first documented for nc TX. Mar–Jul. Native of Europe. The seeds are possibly poisonous due to saponins (Mabberley 1997). ☠

### ARENARIA SANDWORT, CHICKWEED

Our species small annuals; flowers terminal, solitary or cymose; petals white, entire, shorter than the sepals; fruit a capsule opening by 6 valves.

☞ A n temperate genus of ca. 150 species (Bittrich 1993) including some cultivated ornamentals. Some species previously included in *Arenaria* are now treated in *Minuartia*. (Latin: from *arena*, sand, in which many of the species grow)

REFERENCES: Maguire 1947, 1951; Shinnars 1962c; McNeill 1980; Wofford 1981.

1. Sepals glabrous; pedicels 2–15 mm long in flower, up to 35 mm in fruit; on limestone. \_\_\_\_\_ **A. benthamii**
1. Sepals minutely scabrous-pubescent; pedicels 1–3 mm long in flower, up to 10 mm in fruit; in sand \_\_\_\_\_ **A. serpyllifolia**

**Arenaria benthamii** Fenzl ex Torr. & A. Gray, (for George Bentham, 1800–1884, English taxonomist and president of Linnaean Society), HILLY SANDWORT. Plant to 50 cm tall; leaves oblong-lanceolate or oblanceolate to elliptic-lanceolate, to 2 cm long, usually smaller. Limestone outcrops, usually in shade of shrubs or small trees; Coryell, Hood, Lampasas, and Johnson cos.; widespread in TX. Late Mar–May.

**Arenaria serpyllifolia** L., (with leaves like *Thymus serpyllum*—thyme), THYME-LEAF SANDWORT. Plant to 20 cm tall; leaves elliptic or ovate, to 7 mm long, sessile. Sandy roadsides, waste areas, or stream bottoms; Grayson, Henderson, and Kaufman cos., also Tarrant Co. (Mahler 1988); local, apparently spreading; naturalized in parts of e 1/2 of TX. Late Mar–May. Native of Europe. 🇪🇺

### CERASTIUM CHICKWEED

Small annuals or perennials; petals white, shallowly notched, or petals sometimes absent; capsules cylindrical, exceeding the calyces in age, scarious, with 10 prominent teeth when opened, the whole suggesting a corolla.

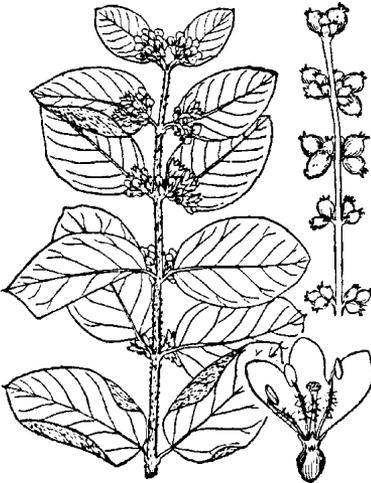
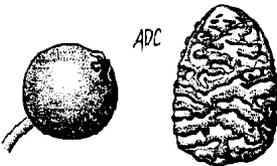
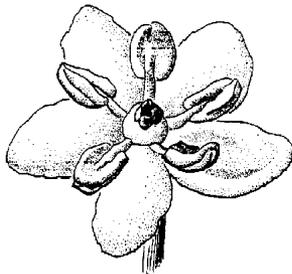
☞ An almost cosmopolitan genus of ca. 100 species (Bittrich 1993) including some cultivated annuals and many weeds. (Greek: *cerastes*, horned, alluding to the shape of the slender and often curved fruit)

REFERENCES: Good 1984; Turner 1995d [1996]; Rabeler & Reznicek 1997.

1. Capsule 1–2 times as long as the sepals; petals if present about equaling the sepals (sometimes withering very early); sepal pubescence of dense, glandular or non-glandular hairs, these long (some ca. 1/3 or more as long as sepal width).
2. Sepals with long, spreading hairs up to and projecting beyond the apex; upper bracts of inflorescence entirely herbaceous, without scarious margins; inflorescence or its main divisions remaining compact OR open and diffuse.
3. Inflorescence or its main divisions remaining compact, the pedicels mostly shorter than the sepals, 0.5–3(–5) mm long. \_\_\_\_\_ **C. glomeratum**
3. Inflorescence or its main divisions open and diffuse, the pedicels once to twice as long as the sepals, 5–12 mm long. \_\_\_\_\_ **C. brachypetalum**
2. Sepals with subappressed to spreading hairs becoming shorter and stopping just below apex; upper bracts of inflorescence with scarious margins; inflorescence open and diffuse in age.
4. Flowers 8–10 mm wide; petals deeply notched (to 1/2 way to base); sepals pilose, seldom glandular-hairy; stamens 10; capsules mostly over 8 mm long; sepals 5–6 mm long in flower;



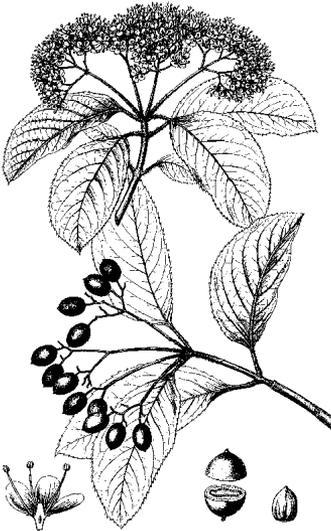
*Sambucus nigra* var. *canadensis* [BA1, JAA]



*Symphoricarpos orbiculatus* [BB2]



*Triosteum angustifolium* [STE]



*Viburnum rufidulum* [SA3]



*Agrostemma githago* [GLE]



*Arenaria benthamii* [HEA]



*Arenaria serpyllifolia* [MUE]

plants perennial, often with non-flowering basal shoots. \_\_\_\_\_ **C. fontanum**

4. Flowers 5–6 mm wide; petals shallowly notched (to 1/4 way to base); sepals glandular-hairy; stamens 5 (rarely 10); capsules < 8 mm long; sepals 4–5 mm long in flower; plants annual \_\_\_\_\_ **C. pumilum**

1. Capsule 2–3 times as long as the sepals; petals often 1.5–2 times as long as the sepals; sepal pubescence of sparse, glandular hairs, these short (much < 1/3 as long as sepal width).

5. Leaves usually 30 mm or less long; pedicels straight or only slightly curved at maturity, usually equaling or shorter than the capsules in fruit, 0.5–1.25 times the length of the flowering calyces, to 3 times the calyx length at maturity (ca. 2–13 mm long); widespread in nc TX \_\_\_\_\_ **C. brachypodium**

5. Leaves often > 30 mm long; pedicels sharply curved or hooked just below the calyx at maturity, usually much longer than the capsules in fruit, 1–3 times the length of the flowering calyces, to 5 times or more the calyx length at maturity (longer pedicels 10–55 mm long); rare if present in nc TX \_\_\_\_\_ **C. nutans**

**Cerastium brachypetalum** Pers., (short-petaled), GRAY CHICKWEED. Annual; stems erect, covered with long, shiny, mostly non-glandular hairs; leaves spatulate, elliptic, or ovate; tip of pedicel often bent in fruit. Roadside ditches; a Red River Co. collection (*Rabeler 1333*) made in April of 1998 is the first report for TX; the species should be expected elsewhere in nc TX. Apr. Native of Europe. ☞

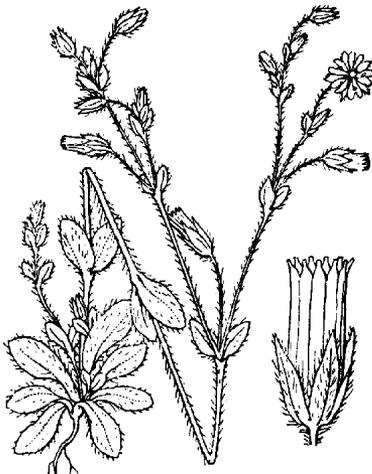
**Cerastium brachypodium** (Engelm. ex A. Gray) B.L. Rob., (short-stalked), SHORT-STALK CHICKWEED. Annual; stems erect, glandular-pubescent with hairs spreading at right angles; leaves glabrous to rather densely viscid-pubescent; pedicels usually 10 mm or less long, reflexed before and after flowering, erect or ascending in flower and again in mature fruit, not sharply curved or hooked just below calyx; sepals 3–4.5 mm long; capsule 6–12 mm long. Prairies, disturbed sites; widespread in e 1/2 of TX. Mar–early Apr.

**Cerastium fontanum** Baumg. subsp. **vulgare** (Hartm.) Greuter & Burdet, (sp.: pertaining to springs or fountains; subsp.: common), COMMON MOUSE-EAR. Apparently annual in nc TX, though perennial farther n (Larsen 1986; R. Rabeler, pers. comm.); leaves oblong-elliptic to lanceolate or oblanceolate. Sandy roadsides, disturbed sites; Denton, Grayson, and Henderson cos., also Tarrant Co. (R. O'Kennon, pers. obs.); scattered in TX. Apr–May. Native of Europe. [*C. holosteoides* of authors, not Fr., *C. triviale* Link, *C. vulgatum* L.] ☞

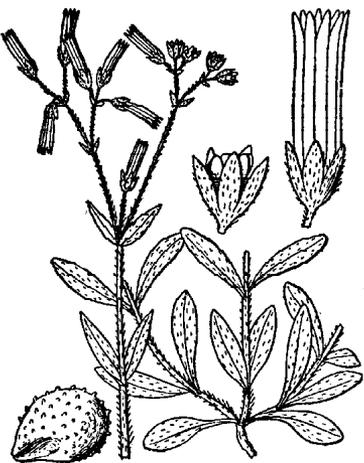
**Cerastium glomeratum** Thuill., (glomerate, clustered). Glandular-pilose annual, erect or with decumbent stems; leaves orbicular ovate to obovate. Roadsides, disturbed sites; widespread in e 1/2 of TX. Mar–early Apr. Native of Europe. [*C. viscosum* of authors, not L.] ☞

**Cerastium nutans** Raf., (nodding), POWDERHORN CHICKWEED, NODDING CHICKWEED. Erect or decumbent annual; stems finely glandular-pubescent; pedicels 10–55 mm long, sharply curved or hooked just below calyx. Moist or rich woods, open areas; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); supposedly scattered mostly in e 1/2 of TX; Turner (1995d [1996]) indicated that he had seen no collections from the state. Apr–Jun.

**Cerastium pumilum** Curtis, (dwarf), DWARF MOUSE-EAR CHICKWEED, CURTIS' MOUSE-EAR CHICKWEED. Annual resembling a small plant of *C. fontanum*. Roadside ditches and open disturbed areas; a Kaufman Co. collection (*Reznicek 10336*, BRCH, MICH) was the first report for TX (Rabeler & Reznicek 1997); in April of 1998 the species was found in Cooke, Denton, Fannin, Grayson, Lamar, and Red River cos. (e.g., *Rabeler & Diggs 132D*); this is an easily overlooked species; it is to be expected in other parts of nc TX and possibly elsewhere in the state. Apr–May. Native of Europe and sw Asia. ☞



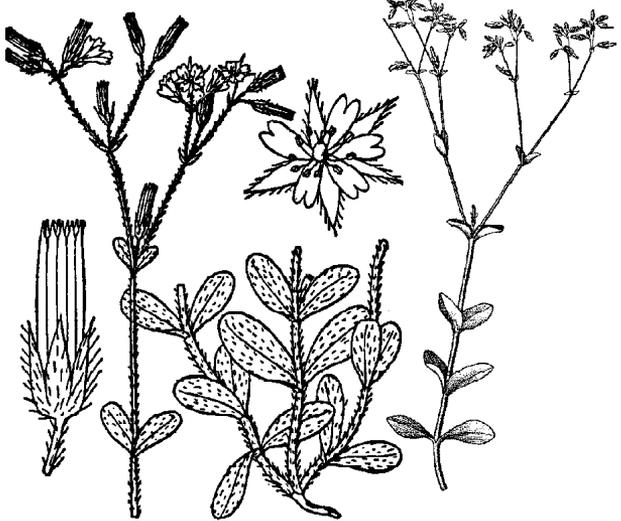
Cerastium brachypetalum [cos]



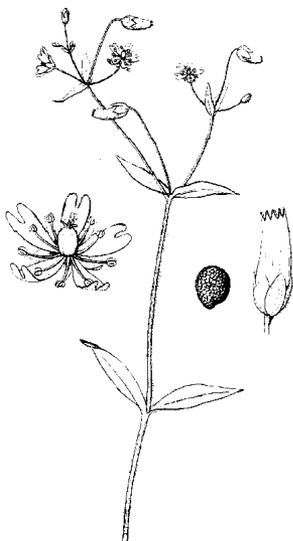
Cerastium brachypodium [BB2]



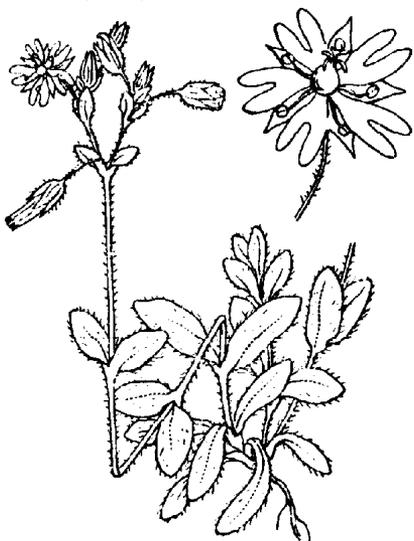
Cerastium fontanum subsp. vulgare [REE]



Cerastium glomeratum [BB2, GLE]



Cerastium nutans [GR1]



Cerastium pumilum [cos]



Dianthus armeria [GLE]

**DIANTHUS** PINK, CARNATION

Annual to perennial herbs; flowers in ours in dense terminal cymes; calyces with cylindrical tube, subtended by 2–several, linear or lance-linear bracts; petals 5, long clawed, without a crown; fruit a capsule.

☛ A Eurasian to s African genus of ca. 300 species (Bittrich 1993) with many cultivated ornamentals including CARNATIONS (*D. caryophyllus* L., *D. ×allwoodii* Hort. Allwood); CARNATION has religious significance extending back beyond the Dark Ages (Baumgardt 1982). The common name PINK is an old name probably referring to the notched or “pinked” petals (as in pinking shears). (Greek: *dios*, Jove, Jupiter, or Zeus, chief of the Greek gods, and *anthos*, flower; Jove’s flower or divine flower, from beauty or fragrance of flowers)

1. Leaves 2–8 mm wide, linear; stems usually pubescent to glabrate; plants annual or biennial; cymes dense, but not head-like \_\_\_\_\_ **D. armeria**
1. Leaves 10–18 mm wide, lanceolate to oblanceolate; stems glabrous; plants perennial; cymes usually head-like \_\_\_\_\_ **D. barbatus**

**Dianthus armeria** L., (the Latin name for a kind of *Dianthus*), DEPTFORD PINK. Plant 20–80 cm tall, dichotomously branched above; leaves grass-like, olive-green; calyx tube 10–15 mm long, closely subtended by elongate bracts ca. equaling the tube; petals pink to rosy or purplish, dotted with white, drying purplish, long clawed, the blades 4–5 mm long; capsules dehiscent by 4 valves. Disturbed areas; Grayson and Tarrant cos; in TX apparently only in nc and ne parts of state; first reported for TX by Lipscomb (1984). May–Aug. Native of Eurasia. 🌿

**Dianthus barbatus** L., (barbed, bearded), SWEET-WILLIAM. Plant 20–60 cm tall, glabrous; calyx tube 10–12 mm long; petals whitish to pink, dark red, or spotted. Cultivated and possibly escapes; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990) probably based on a Hunt Co. collection at TAES which is questionably identified as *D. barbatus* (R. Rabeler, pers. comm.); in TX apparently only in nc part of state. Jun–Aug. Native of Eurasia. 🌿

**LOEFLINGIA**

☛ A North American and Mediterranean genus of 7 species (Bittrich 1993). (Named for P. Loeffling, 1729–1756, Swedish botanist and explorer)

REFERENCE: Barneby & Twisselmann 1970.

**Loeflingia squarrosa** Nutt., (with recurved tips), SPREADING LOEFLINGIA. Small, minutely viscid-pubescent, erect annual to ca. 15 cm tall; stems much branched, the plants often globose in shape, about as broad as tall; leaves crowded, almost needle-like, 4–6 mm long; flowers inconspicuous, axillary, sessile, usually solitary or few together in fascicles; sepals 5, resembling the leaves; petals absent or minute; capsules slender, 3-valved. Loose, dry sand; Bell, Dallas, Hood, Parker, and Tarrant (Fort Worth Nature Center) cos.; nearly throughout TX. Late Apr–May. [*L. squarrosa* subsp. *texana* (Hook.) Barneby & Twisselm., *L. texana* Hook.] Inconspicuous and more rarely collected than its widespread occurrence would suggest.

**MINUARTIA** SANDWORT

Annuals or perennials; inflorescences loosely cymose or racemose; petals white, notched at apex; fruit a capsule opening by 3 valves.

☛ A genus of ca. 120 species (Bittrich 1993) ranging from the Arctic to Mexico, Ethiopia and the Himalaya Mts., also 1 species in Chile. Some are cultivated as ornamentals. Previously included in *Arenaria*. (Named for Juan Minuart, 1693–1768, Spanish botanist and pharmacist)

REFERENCES: Shinners 1949d; Maguire 1951; Wofford 1981; Rabeler 1992.

1. Perennials with stiff, almost needle-like leaves, with axillary tufts of smaller leaves; inflorescences glabrous. \_\_\_\_\_ **M. michauxii**
1. Annuals with flat, soft leaves, without axillary tufts of smaller leaves; inflorescences usually glandular-pubescent (use lens).
  2. Sepals usually elliptic-lanceolate, acute, strongly 3–5 ribbed.
    3. Sepals 5-ribbed; corollas scarcely exceeding the calyces; leaves 1.5 mm or less wide; plants usually < 15 cm tall; seeds dull reddish brown. \_\_\_\_\_ **M. patula**
    3. Sepals 3-ribbed; corollas conspicuously exceeding the calyces, showy; leaves often 1.5–3 mm wide; plants often larger (to 30 cm tall); seeds black, shiny. \_\_\_\_\_ **M. muscorum**
  2. Sepals usually ovate, obtuse, not prominently ribbed. \_\_\_\_\_ **M. drummondii**

**Minuartia drummondii** (Shinners) McNeill, (for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), DRUMMOND'S SANDWORT. Simple or sparingly branched annual to ca. 20 cm tall; stems and inflorescences mostly glandular-pubescent; leaves to 35 mm long, 2–7 mm wide; pedicels 10–25 mm long; flowers in dichotomous racemes, showy; petals to 15 mm long. Sandy or sandy clay soils, roadsides, fencerows, or waste areas; Kaufman, Navarro, and Tarrant cos.; mainly se and e TX, also Edwards Plateau. Mar–May. [*Arenaria drummondii* Shinners]

**Minuartia michauxii** (Fenzl) Farw. var. **texana** (B.L. Rob.) Mattf., (sp. for André Michaux, 1746–1803, French botanist and explorer of North America), ROCK SANDWORT. Densely tufted perennial, glabrous; stem leaves rather crowded in basal 1/3–2/3 of plant, to 15 mm long, ca. 0.5 mm wide; inflorescences loosely cymose, to ca. 30-flowered; pedicels 5–15(–25) mm long; petals 5–8 mm long. Limestone outcrops, rocky areas; Coryell, Hood, Johnson, Lampasas, Parker, and Wise cos., mainly Grand Prairie, also Grayson Co., also Dallas Co. (*Reverchon* in 1872), but not found there recently; nc TX and Edwards Plateau w to Panhandle. Apr–Jun. [*Arenaria stricta* Michx. var. *texana* B.L. Rob., *Arenaria texana* (B.L. Rob.) Britton]

**Minuartia muscorum** (Fassett) Rabeler, (mossy). Branched annual similar to but often larger than *M. patula*; seeds black, microscopically foveolate (Wofford 1981). Roadsides, stream bottoms, often in sandy soils; Delta, Fannin, Hopkins, Hunt, and Kaufman cos.; e TX w to Blackland Prairie. Apr–May. We are following Rabeler (1992) in recognizing this species; he indicated there has long been confusion between this species, *A. muriculata*, and *A. patula* var. *robusta*, all three of which represent the same entity. [*Arenaria patula* var. *robusta* (Steyerm.) Maguire, *M. patula* var. *robusta* (Steyerm.) McNeill, *Arenaria muriculata* McNeill, *Minuartia muriculata* (Maguire) McNeill, *Stellaria muscorum* Fassett]

**Minuartia patula** (Michx.) Mattf., (spreading), PITCHER SANDWORT. Branched annual; leaves to 40 mm long; inflorescences open cymose, sparingly and minutely glandular-pubescent; pedicels to 50 mm long; seeds reddish brown, not microscopically foveolate. Damp sandy ground; Limestone Co.; e TX w to e Blackland Prairie. Mar. [*Arenaria patula* Michx.]

### PARONYCHIA NAILWORT, WHITLOW-WORT

Annuals or perennials; scarious stipules usually conspicuous; flowers few or many, in terminal cymes; sepals 5, cupped or folded at apex; petals absent or essentially so; fruit a 1-seeded utricle.

☛ A cosmopolitan genus of ca. 110 species (Bittrich 1993) including some cultivated ornamentals. This is the largest genus of Caryophyllaceae in TX (13 species—fide Turner 1983). The scaly appearance of *Paronychia* species (due to the stipules) caused the plant to be used historically in the treatment of whitlow, a condition which caused the fingernails to look scaly—this is an example of the Doctrine of Signatures, an ancient belief that a plant that resembled a portion of the human body (a sign or signature) gave clues to its use; i.e., was useful in treating an illness of

the body structure it resembled (Ajilvsgi 1984). (Greek: *para*, close to, and *onyx*, nail, alluding to the original use of the plant to treat whitlow, an inflammation of the finger, especially beneath the nail)

REFERENCES: Core 1941; Turner 1983, 1995b.

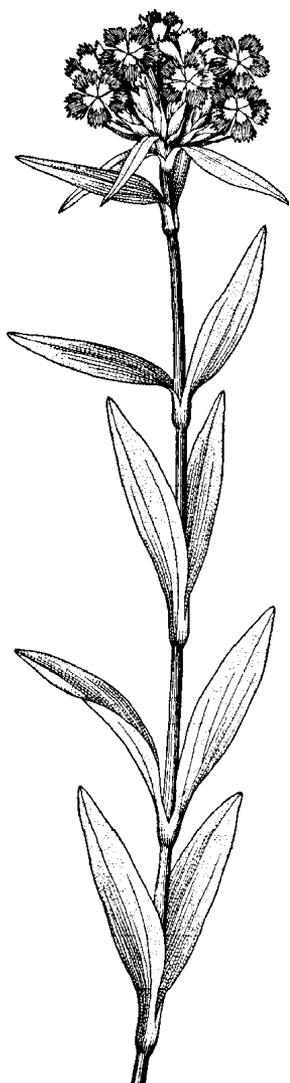
1. Plants annual, arising from a single, usually unbranched taproot; leaves needle-like to oblanceolate or narrowly elliptic, sometimes flat, from < 1 to 5 mm wide, acuminate, acute, or obtuse (if 1 mm or less wide then known only from extreme s part of nc TX).
  2. Leaves elliptic to oblanceolate, 2–5 mm wide; e part of nc TX w to Dallas Co.
    3. Calyces (below point where sepals separate) pubescent with hooked hairs; sepals ca. 1.5 mm long, with prominent, white, scarious margins, dilated into a white hood with a tiny awn/horn from back \_\_\_\_\_ **P. drummondii**
    3. Calyces glabrous or nearly so; sepals 0.8–1.2 mm long, with very narrow or obscure margins, not hooded \_\_\_\_\_ **P. fastigiata**
  2. Leaves narrowly linear, 1 mm or less wide; extreme s part of nc TX \_\_\_\_\_ **P. lindheimeri**
1. Plants perennial, arising from a thickened, often woody base or branched, persistent root-stock; leaves needle-like, 1 mm or less wide, acuminate.
  4. Plants with stems minutely pubescent; sepals 2–3 mm long, usually obscurely nerved; calyces with pubescence, the hairs longer near base (below point where sepals separate): West Cross Timbers w to w TX \_\_\_\_\_ **P. jamesii**
  4. Plants glabrous or nearly so; sepals ca. 3 mm long, prominently 3-nerved; calyces glabrous to short pubescent but without longer hairs near base; mainly Grand Prairie and Blackland Prairie \_\_\_\_\_ **P. virginica**

**Paronychia drummondii** Torr. & A. Gray, (for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), DRUMMOND'S NAILWORT. Annual to 25 cm tall, branching above into wide-spreading branches, often wider than tall; leaves to 25 mm long and 2–5 mm wide; sepals red-brown with white margins and apex. The white, apical hoods on the sepals distinguish this from all other *Paronychia* species in nc TX. Loose sand; collected at Dallas by Reverchon, not found there recently (Mahler 1988), also Henderson and Milam cos. near e margin of nc TX; mainly se and e TX endemic to TX and LA. May–Sep. [*P. drummondii* subsp. *parviflora* Chaudhri]

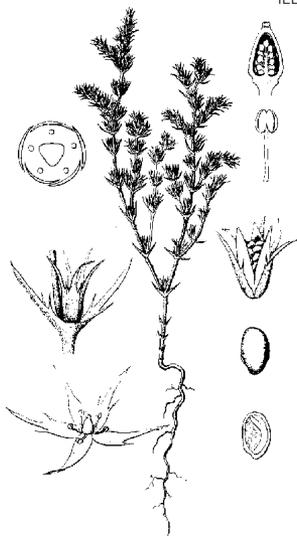
**Paronychia fastigiata** (Raf.) Fernald, (with crowded erect branches), CLUSTER-STEM NAILWORT, FORKED CHICKWEED. Annual to 30 cm tall, branched well above base, low and spreading; leaves flat, oblanceolate to linear-elliptic, to 15 mm long and 3 mm wide; sepals slightly mucronate. Dry woods or sandy openings; Dallas Co. (Turner 1983); mainly scattered localities in e TX. Jun–Aug.

**Paronychia jamesii** Torr. & A. Gray, (for Dr. Edwin James, 1797–1861, American botanical explorer of the Rocky Mt. area), JAMES' NAILWORT. Perennial branching from woody base, to ca. 30 cm tall; stems minutely pubescent; leaves gray-green; sepals light yellow, 2–3 mm long including the terminal awn-like cusp. Rocky, sandy, open ground; Archer, Clay, and Coleman cos.; according to Turner (1983) this species occurs in the w 1/2 of TX w of a line through Clay, Jack, Palo Pinto, Erath, Comanche, and Brown cos. Jun–Sep. [*P. jamesii* Torr. & A. Gray var. *praelongifolia* Correll]

**Paronychia lindheimeri** Engelm. ex A. Gray, (for Ferdinand Jacob Lindheimer, 1801–1879, German-born TX collector), LINDHEIMER'S NAILWORT. Annual to 30 cm tall, much branched from near base; leaves to 15 mm long; calyces short pubescent at base, the sepals 1.7–2 mm long, terminating in an awn-like cusp. Rocky, sandy, or gravelly areas; Burnet and Williamson cos. (Turner 1983); mainly e Edwards Plateau with isolated stations in e TX and the Trans-Pecos. Jul–Nov. [*P. chorizanthoides* Small] Stanford (1976) recognized *P. chorizanthoides* (endemic to c TX) based on the following distinctions:



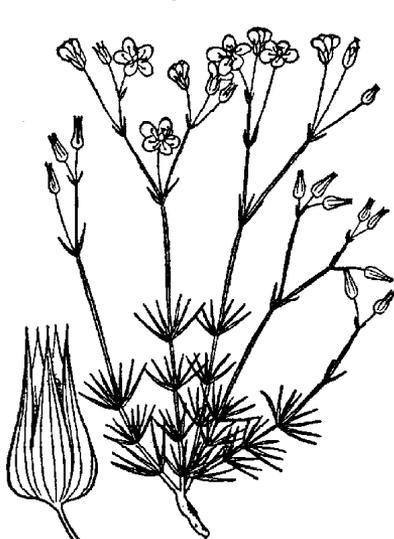
*Dianthus barbatus* [GLE]



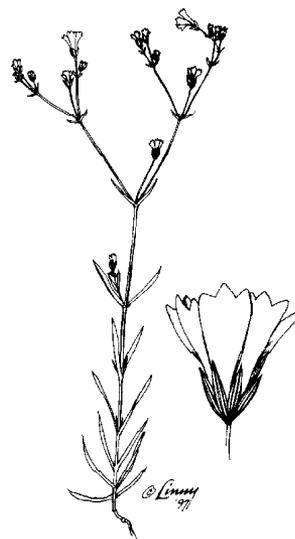
*Loefflingia squarrosa* [GR1]



*Minuartia drummondii* [HEA]



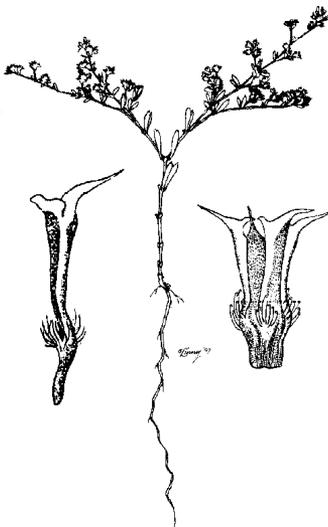
*Minuartia michauxii* var. *texana* [BB2]



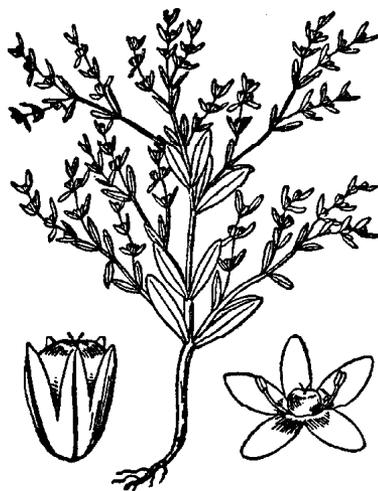
*Minuartia muscorum* [HEA]



*Minuartia patula* [BB2]



*Paronychia drummondii* [HEA]



*Paronychia fastigiata* [BB2]

1. Flowers mostly clustered; calyces (including awns) over 2 mm long; plants pubescent or puberulent; endemic to central Texas \_\_\_\_\_ *P. chorizanthoides*
1. Flowers mostly solitary and separate; calyces (including awns) usually 2 mm long or less; [plants glabrous or at most minutely scabrous]; Edwards Plateau with disjunct stations in east Texas and Trans-Pecos \_\_\_\_\_ *P. lindheimeri*

**Paronychia virginica** Spreng., (of Virginia), PARKS' NAILWORT, BROOM NAILWORT. Perennial branching from woody base, to 40 cm tall, glabrous; leaves green or yellowish green; sepals yellowish, greenish yellow to brownish, ca. 3 mm long, with a short cusp. Limestone outcrops; mainly Blackland Prairie and Grand Prairie sw to Edwards Plateau; according to Turner (1983, 1995b) this species occurs e of a line through Montague, Jack, Parker, Erath, and Mills cos. Aug–Oct. [*P. parksii* Cory, *P. virginica* Spreng. var. *scoparia* (Small) Cory]

### PETORRHAGIA

☛ An Old World genus of 33 species (R. Rabeler, pers. comm.; including *Kohlrauschia* and *Petrorrhagia* sensu stricto as recognized by Bittrich 1993) ranging from the Canary Islands and Mediterranean region to Kashmir. Some are cultivated as ornamentals. (Greek: *petros*, rock, and *rhagas*, chink or fissure, from principal habitat of some species)

REFERENCES: Shinnars 1969; Rabeler 1985.

**Petrorrhagia dubia** (Raf.) G. López & Romo., (doubtful), CHILDRING-PINK. Erect annual to ca. 90 cm tall; stem leaves linear, to ca. 5 cm long and 2 mm wide; inflorescences terminal, with conspicuous bracts subtending flowers or clusters; flowers solitary or in several-flowered head-like clusters; calyces 10–13 mm long; petals pink or purplish, 10–14 mm long. Roadsides and fields; Cooke and Grayson cos., also Limestone Co. (HPC); weedy in e TX, also Hatch et al. (1990) cited vegetational area 7 (Edwards Plateau); first reported for TX by Shinnars (1969) who suggested it was possibly introduced with *Lolium perenne* (RYE GRASS) by the Texas Highway Department. Rabeler (1985) indicated that introduction with *Trifolium incarnatum* (CRIMSON CLOVER) was also a possibility. Apr–Jun. Native of the Mediterranean region. [*P. velutina* (Guss.) P.W. Ball & Heywood, *P. prolifera* of TX auth., not (L.) P.W. Ball & Heywood] ☛

### POLYCARPON POLYCARP

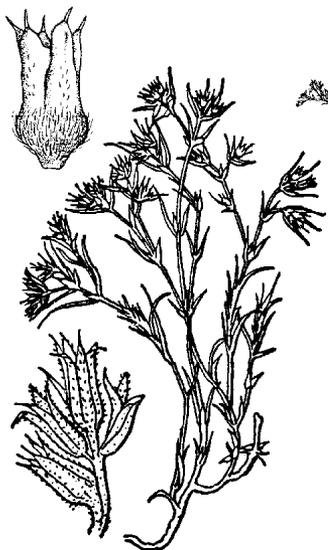
☛ A genus of 18 species, 16 in Europe and the Mediterranean, and 2 in South America (Bittrich 1993). (Greek: *poly*, many, and *carpus*, fruit)

**Polycarpon tetraphyllum** (L.) L., (four-leaved), FOUR-LEAF MANYSEED. Plant small, prostrate, glabrous, much-branched, usually annual; stems to ca. 15 cm long; leaves opposite or mostly in whorls of four, 2–8(–15) mm long, 1–4(–8) mm wide, apically obtuse to rounded, entire, subsessile or on petioles to 1.2 mm long; stipules scarious, ovate, 1–3 mm long; flowers numerous, in dense cymes; bracts scarious; pedicels 0.5–3 mm long; sepals 5, 1.5–2.5 mm long; petals 5, white, 0.5–0.8 mm long, oblanceolate; stamens usually 3–5; styles partly united; capsules 3-valved, many-seeded. Sandy or silty soils, openings; Fort Hood (Bell or Coryell cos.—Sanchez 1997); se and s TX w to Edwards Plateau and n to Post Oak Savannah and s part of nc TX. Mar–Jul. Native of Europe and the Mediterranean. ☛

### SAGINA PEARLWORT

☛ A n temperate and tropical mountain genus of ca. 25 species (Bittrich 1993) of usually tufted herbs. (Latin: *sagina*, fodder or fattening; previously applied to *Spergula* which was used as early forage)

REFERENCES: Crow 1978, 1979.



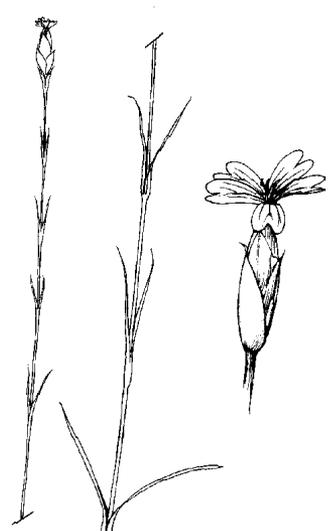
*Paronychia jamesii* [BB2,CHA]



*Paronychia lindheimeri* [HEA]



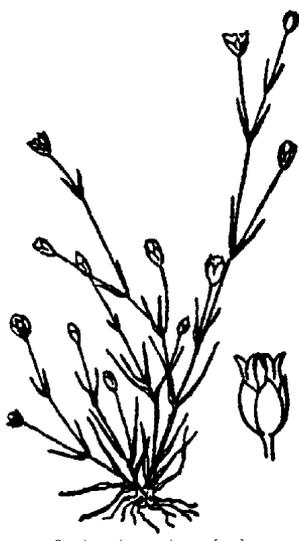
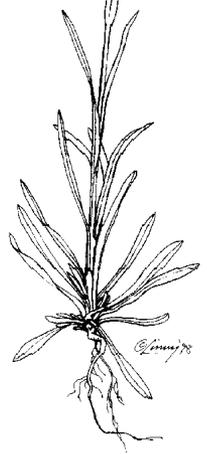
*Paronychia virginica* [BB2]



*Petrorhagia dubia* [HEA]



*Polycarpon tetraphyllum* [LAM]



*Sagina decumbens* [BB2]



*Saponaria officinalis* [GLE]

**Sagina decumbens** (Elliott) Torr. & A. Gray, (trailing with tips upright), TRAILING PEARIWORT. Inconspicuous, small, to ca. 10(-17) cm tall, erect or partly decumbent annual, largely glabrous or with some glandular hairs above; leaves linear to linear-subulate, 3-15 mm long, very narrow, < 1 mm wide; flowers axillary and terminal, long pedicelled (pedicels 3-25 mm long); sepals 4-5, 1.4-2.5 mm long; petals none or 1-5, entire, white, usually slightly shorter than the sepals to sometimes slightly longer; capsules with 4-5 valves. Sandy open woods, roadsides, disturbed sites; se and e TX w to West Cross Timbers, also Edwards Plateau and Trans-Pecos. Late Mar-early May.

### SAPONARIA BOUNCING-BET, SOAPWORT

☞ A temperate Eurasian genus of ca. 40 species (Bittrich 1993). (Latin: *sapo*, soap, referring to the mucilaginous juice of *S. officinalis* forming a lather with water)

**Saponaria officinalis** L., (medicinal), BOUNCING-BET, SOAPWORT, FULLER'S-HERB. Erect glabrous perennial to 30-80(-150) cm tall; leaves 3-10 cm long, 1-5 cm wide, prominently 2-5 nerved; flowers showy; calyx tube 12-20 mm long; calyx lobes ca. 2-5 mm long; petals 5, white or pink; petal claw prominent, 10-20 mm long; petal blade 8-18 mm long, notched apically; stamens 10; capsules 10-12 mm long, 4-6 mm wide. Open areas and waste places; Tarrant Co.; also e TX. Jun-Sep. Native of Europe. Formerly used as a soap substitute, when the rootstocks were beaten in water (Baumgardt 1982); all parts of the plant contain saponins; toxic and potentially lethal to livestock but rarely eaten because it is distasteful (Kingsbury 1964; Burlage 1968; Stephens 1980). ☞ ☞ ☞

### SILENE CATCHFLY, CAMPION

Erect annuals or perennials; flowers in terminal panicles or cymes; calyces tubular to campanulate or funnellform; petals often clawed; fruit in ours a 6-toothed capsule.

☞ A n hemisphere genus of nearly 700 species (Bittrich 1993) of mostly herbs. A number are cultivated as ornamentals. (Name adopted by Linnaeus from earlier authors; probably from mythical Greek *Silenus*, intoxicated foster father of Bacchus being described as covered with foam, from sticky secretions of many species)

REFERENCES: Hitchcock & Maguire 1947; Maguire 1950.

1. Middle stem leaves opposite; stem leaves to ca. 15 mm wide; petals usually 5-10 mm long, 2-lobed \_\_\_\_\_ **S. antirrhina**
1. Middle stem leaves in whorls of 4; stem leaves to ca. 40 mm wide; petals usually 10-20 mm long, fimbriately 8-12-lobed \_\_\_\_\_ **S. stellata**

**Silene antirrhina** L., (possibly for likeness to *Antirrhinum* -snapdragon, whose flowers are said to resemble a snouted dragon; from Greek: *Anti*, against, opposed to, like, and *Rhis*, nose or snout), SLEEPY CATCHFLY. Annual to 1.2 m tall (usually much smaller); leaves linear- or oblong-lanceolate; flowers small, open only in afternoon and evening; calyx tube 6-9 mm long; calyx lobes 0.5-1.6 mm long; petals white to partly (back or crown) or wholly rose-lavender or red-violet, occasionally absent; crown minute or absent. Open woods, prairies, disturbed sites; throughout much of TX. Late Apr-early Jun. Reported to be poisonous (Burlage 1968). ☞ ☞

**Silene stellata** (L.) W.T. Aiton, (starry), WHORLED SILENE, STARRY CAMPION, WIDOW'S-FRILL. Perennial to 1.2 m tall; leaves lanceolate to elliptic or ovate; calyx tube 5-10 mm long; calyx lobes 2-5 mm long; petals large, white, showy, with wide, ragged apex, the claw not well-differentiated from blade; crown absent. Woods and thickets, sandy or clayey soils; in nc TX known only from Dallas, Denton, and Grayson cos.; also e TX. Late May-early Jul.

**SPERGULARIA SANDSPURRY**

Annuals; leaves linear to filiform; stipules scarious; flowers usually numerous in cyme inflorescences, pink or whitish, 5-merous; styles 3; capsules 3-valved.

☛ A cosmopolitan genus of ca. 25 species (Bittrich 1993) including a number of halophytes. (Derived from the name of a related genus, *Spergula*)

REFERENCE: Rossbach 1940.

1. Plants glabrous; sepals 0.8–1.6 mm long; capsules 1.4–2.6 mm long; inflorescences generally 4–7+ times compound \_\_\_\_\_ **S. platensis**

1. Plants glandular-pubescent (at least branches of inflorescence); sepals 2.5–5 mm long; capsules 3–6.5 mm long; inflorescences simple or 1–3+ times compound \_\_\_\_\_ **S. salina**

**Spergularia platensis** (Cambess.) Fenzl, (from the district of the Río de la Plata in South America). Glabrous low annual often forming mats; leaves thread-like, 1–3 cm long, ca. 1 mm wide; flowers in loose terminal cymes; stipules triangular, 1.5–3.5 mm long, ca. as long as broad or a little longer; sepals broadly lanceolate; petals white, small or rarely none; stamens 5. Collected at Dallas by Reverchon in April, 1880, in wet sandy soil, later reported by him as “common,” but not found there since; also s TX and Edwards Plateau. Native of s South America. ☛

**Spergularia salina** J. & K. Presl, (growing in salty places), SALT-MARSH SANDSPURRY, MARSH SANDSPURRY. Erect or diffuse fleshy annual ca. 5–20 cm tall; leaves linear, 0.8–2.5(–4) cm long, to 1.5 mm wide; stipules conspicuous, membranous, triangular, 2–4 mm long, ca. as long as broad or a little longer; flowers in leafy bracted cymes, the inflorescences often making up much of the plant; sepals ovate, exceeding the pink or white petals; stamens 2–5. In brackish or saline soils; Brown (HPC) and Tarrant (Mahler 1988) cos.; mostly coastal and along the Rio Grande. Apr–Sep. Native of Europe. [*S. marina* (L.) Griseb.] ☛

**STELLARIA CHICKWEED, STARWORT, STITCHWORT**

Ours low annual herbs; stipules absent; flowers solitary or in terminal cymes of usually 3–7, 5-merous; petals split more than half way to base (corollas thus appearing to be of 10 petals) or petals absent; stamens 1–10; styles usually 3; capsules dehiscent by 6 valves.

☛ A cosmopolitan genus of ca. 150–200 species (Bittrich 1993) including some cultivated ornamentals. The key to species is modified from Rabeler and Reznicek (1997) with additional characters from Morton (1972). We are following Kent (1997) for nomenclature of *S. pallida*. (Latin: *stella*, a star, in allusion to the star-shaped flowers)

REFERENCES: Whitehead & Sinha 1967; Morton 1972; Rabeler 1988; Kent 1997; Rabeler & Reznicek 1997.

1. Flowers usually open, with white petals; plants green, rarely yellowish green; sepals 3.5–7 mm long, uniformly green; seeds dark brown, (0.8–)0.9–1.3 mm in diam., the surface covered with wavy, blunt papillae; capsules 4.5–9 mm long; stamens 3–10; anthers red-violet \_\_\_\_\_ **S. media**

1. Flowers usually cleistogamous, apetalous; plants yellowish green; sepals seldom over 3 mm long, often with a red basal band; seeds yellowish brown, 0.5–0.8 mm in diam., the surface covered with acute papillae; capsules 3–4 mm long; stamens usually 1–3(–5); anthers gray-violet \_\_\_\_\_ **S. pallida**

**Stellaria media** (L.) Vill., (intermediate, the middle), TENPETAL, COMMON CHICKWEED, CHICKWEED STARWORT. Annual, possibly overwintering in protected places; stems prostrate to ascending, usually pubescent in lines; lower leaves petioled, upper sessile; leaf blades oblong-lanceolate to ovate-lanceolate, widely tapered to abruptly narrowed at base; sepals 3.5–7 mm long; petals white, slightly shorter than the sepals, 2-lobed nearly to base and thus appearing as 10

petals; capsules usually pointing downward, equal or exceeding the calyces by 1-2 mm;  $2n = 40, 42, 44$  (Morton 1972). Widespread weed of stream bottoms, lawns, disturbed sites; nearly throughout TX. Feb-Apr. Native of Europe. This now cosmopolitan weed is usually autogamous. Reported to cause digestive disorders in sheep (Burlage 1968). ☞ ☞

**Stellaria pallida** (Dumort.) Crép., (pale), LESSER CHICKWEED. Annual similar to *S. media*; differing as described in the key;  $2n = 22$  (Morton 1972). Disturbed areas, typically in sand; a Hopkins Co. collection (*Reznicek 10361*, BRCH, MICH) near the edge of nc TX is the first report for this species from TX (Rabeler & Reznicek 1997); in April of 1998 the species was found in Denton and Grayson cos. (e.g., *Rabeler & Diggs 1320*); because of its similarity to *S. media*, this is an easily overlooked species; it is to be expected in other parts of nc TX and possibly elsewhere in the state, especially early in the spring. Spring. Native of Europe. [*S. media* subsp. *pallida* (Dumort.) Asch. & Graebn., *S. apetala* of authors, not Ucria] First documented in North America at Kitty Hawk, NC in 1969 (Morton 1972). ☞

### VACCARIA

☞ A genus of 1 or 4 species (Bittrich 1993) of Eurasia and the Mediterranean. (Latin: *vacca*, cow, from use as fodder or prevalence in pastures)

**Vaccaria hispanica** (Mill.) Rauschert, (Spanish), COWCOCKLE, COWHERB. Erect, glabrous, usually wide-branched annual to 60 cm tall; leaves ovate- to broadly oblong-lanceolate, auricled-clasping; flowers in terminal, open cymes, long-pedicelled; calyces tubular in flower, ovoid, inflated in fruit, sharply 5-angled, the tube 8-14 mm long, the lobes 1.5-3 mm long; petals long-clawed, lavender-pink, showy; capsules dehiscent by 4 valves. Roadsides and disturbed areas, at margins of grain fields; also cultivated as an ornamental; Bosque, Collin, Dallas, Denton, Grayson, Rockwall, and Tarrant cos., also Brown, Erath (Stanford 1976), and Fannin (VDB) cos.; nc TX s to Edwards Plateau. Late Apr-early Jun. Native of Eurasia and the Mediterranean. [*Saponaria vaccaria* L., *V. pyramidata* Medik.] ☞

## CELASTRACEAE BITTERSWEET OR STAFFTREE FAMILY

Ours shrubs, small trees, or woody vines; leaves simple, alternate or opposite, deciduous; stipules minute, falling early; inflorescences terminal or axillary; pedicels jointed; flowers small, radially symmetrical, 4- or 5-merous, perfect or unisexual; stamens inserted on margin of a prominent disk; ovary superior; fruit a loculicidal capsule; seeds arillate.

☞ A medium-large (1,300 species in 88 genera), mainly tropical and subtropical to temperate family of mostly trees, shrubs, or woody vines; laticifers are usually present. The African *Catha edulis* (Vahl) Endl. (KHAT, QAT, CAFTA) is cultivated for the leaves which are chewed by Moslems as a daily stimulant in countries such as Ethiopia, Somalia, and Yemen; in the U.S. it is considered a controlled substance and was of concern when the U.S. deployed troops to Somalia in 1993 (Baker 1993). (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: shrubs, small trees, or woody vines with simple leaves, small flowers with a *disk* beneath or ± surrounding the ovary, and often leathery capsules containing seeds usually with *brightly colored arils*

REFERENCES: Brizicky 1964a; Lundell 1969b.

1. Leaves alternate; twining, high-climbing, woody vine; flowers in terminal racemes or panicles, 5-merous. \_\_\_\_\_ **Celastrus**
1. Leaves opposite; erect shrub or small tree; flowers in axillary cymes, 4-merous. \_\_\_\_\_ **Evonymus**



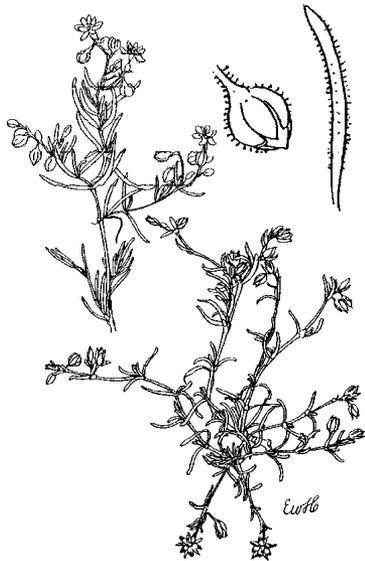
*Silene antirrhina* [BBZ, DL]



*Silene stellata* [GLE]



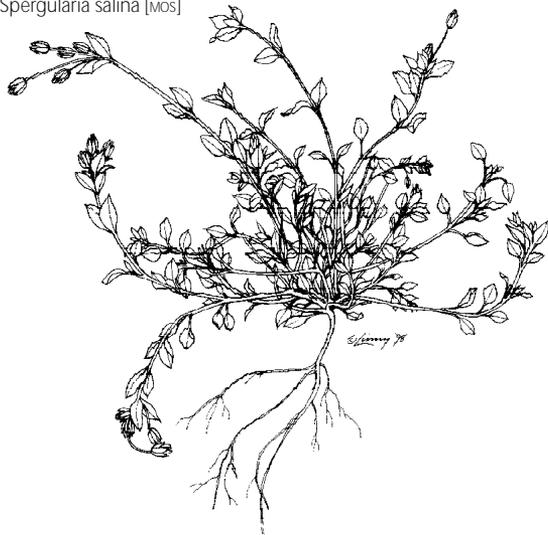
*Spargularia platensis* [HEA]



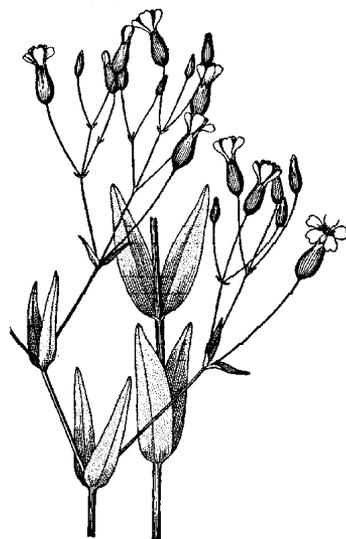
*Spargularia salina* [MOS]



*Stellaria media* [REE]



*Stellaria pallida* [HEA]



*Vaccaria hispanica* [GLE]

**CELASTRUS BITTERSWEET**

☞ A genus of 32 species native from the tropics to warm temperate areas; some are cultivated as ornamentals or used medicinally. (From *celastros*, an ancient Greek name for some evergreen tree)

**Celastrus scandens** L., (scandent, climbing), CLIMBING BITTERSWEET, AMERICAN BITTERSWEET. Twining, climbing shrub/liana to 18 m; main stem to 2.5 cm in diam.; leaves elliptic, ovate to obovate, 5–11 cm long, 2.5–6 cm wide, serrulate-crenulate; petioles ca. 1–2(–3) cm long; inflorescences ca. 3–8 cm long; flowers unisexual, greenish, small, ca. 4–5 mm across; fruits globose, orange or orange-yellow, 3-valved, 6–12 mm in diam.; seeds with conspicuous scarlet to crimson aril. Woods; native to n U.S. and in TX to mountains of Trans-Pecos, apparently introduced in Tarrant Co.; cultivated for the colorful fruits and arils. Apr–Jun. Possibly poisonous to humans and livestock (Kingsbury 1964; Blackwell 1990). ☞

**EVONYMUS SPINDLETREE, STRAWBERRY-BUSH**

☞ A genus of 177 species of evergreen or deciduous trees or shrubs native to n temperate areas, especially Asia; also found in Australia; many are cultivated as ornamentals for their bright autumn foliage, evergreen leaves, or showy capsules with scarlet to orange, bird-dispersed, arilate seeds; ☞ the seeds of many species have cardiotoxic glycosides and the leaves, bark, and seeds of some species are poisonous (Hardin & Arena 1974). The genus is sometimes spelled *Euonymus* (Greek: *eu*, good, and *onoma* name, but used ironically, the plants having had the bad reputation of poisoning cattle)

REFERENCE: Lundell 1941.

**Evonymus atropurpurea** Jacq., (dark purple). Erect shrub or small tree to 8 m tall; bark smooth, gray or green; leaves lanceolate, acute, finely and sharply toothed, with distinct petioles 5–20 mm long; inflorescences pedunculate, of usually 5–19 flowers; flowers perfect, 4-merous, greenish purple to dark-red; fruit a pinkish to reddish or purple, usually deeply 4-lobed, smooth capsule ca. 15 mm in diam.; seeds with scarlet aril. Limestone soils, stream bottom woods. Late Apr–early Jun. This species is the source of the wahoo root bark, formerly used medicinally, and a medicinal resin, called euonymin; euonymin and the fruits are apparently toxic (Duke 1985); Burlage (1968) reported the plant to be a violent purgative, dangerous to livestock and children, with symptoms ranging from vomiting to mental symptoms and loss of consciousness. ☞

1. Lower surface of leaf blades with persistent pubescence, at least on the veins (use lens); leaf blades elliptic to ovate, acute or abruptly short-acuminate. \_\_\_\_\_ var. **atropurpurea**

1. Lower surface of leaf blades glabrous; leaf blades lanceolate to elliptic, long attenuate at apex \_\_\_\_\_ var. **cheatumii**

var. **atropurpurea**, WAHOO, EASTERN WAHOO, BURNING-BUSH, INDIAN ARROW-WOOD, SPINDLETREE. Cooke, Dallas, Grayson, Kaufman, Lamar, Tarrant, and Wise cos., also Bell and Delta cos. (Little 1976 [1977]); in TX only in nc part of state.

☞ var. **cheatumii** Lundell, (for E.P. Cheatum, a colleague of C.L. Lundell at Southern Methodist Univ.), WAHOO. Only known from Dallas Co. (Urbandale); endemic to nc TX. According to Lundell (1969b), “A local endemic population, the stand of which was decimated by a scale insect in 1944.” We have seen only five sheets of this variety and all of these were collected in the same area in the period 1940–1944. While we are following Lundell (1969b), Correll and Johnston (1970), Kartesz (1994), and Jones et al. (1997) in recognizing this variety, it is unknown if the population still exists and it is not completely clear that it should be given varietal recognition. Lundell (1941) indicated that intermediate forms exist in Dallas Co. ☞

*Evonymus americana* L., (of America), (STRAWBERRY-BUSH, BURSTING-HEART, BROOK EVONYMUS),

with 5-merous flowers, tuberculate capsules, and leaves sessile or nearly so (petioles < 5 mm long), occurs in e TX just e of nc TX.

## CERATOPHYLLACEAE HORNWORT FAMILY

☛ A very small cosmopolitan family of 1 genus and 6 species (Les 1997). *Ceratophyllum* is an extremely reduced (e.g., no roots) and highly specialized aquatic. Some molecular analyses have indicated that *Ceratophyllum* is the sister group of all other angiosperms and suggested the genus is a vestige of an ancient angiosperm lineage that diverged early from the line leading to other living angiosperms (Chase et al. 1993; Qiu et al. 1993); a more recent molecular analysis placed *Ceratophyllum* as the sister group to the monocots (Soltis et al. 1997). Its unsealed carpels, among other distinctive characters, makes the genus anomalous among flowering plants (Qui et al. 1993). (subclass Magnoliidae)

FAMILY RECOGNITION IN THE FIELD: rootless aquatics floating below water's surface, with whorled leaves *forked* into nearly thread-like segments.

REFERENCES: Wood 1959; Les 1988a, 1993, 1997; Endress 1994.

### CERATOPHYLLUM HORNWORT, COON-TAIL

Perennial, bushy-branched, rootless, aquatic herbs, floating completely submerged; leaves whorled, sessile, 1-4 times dichotomously forked into nearly thread-like segments; flowers solitary in 1 axil of a whorl, sessile, without perianth but with involucre of 8-12 minute bracts, unisexual, both sexes on the same plant; stamens 4-10; pistil 1; style persistent; ovary superior.

☛ In some parts of the world bilharzia-carrying snails and malaria-carrying mosquito larvae are sheltered by these floating aquatics; they can also choke waterways and disturb operations of hydroelectric plants; on the positive side, they oxygenate the water and provide cover for baby fishes. The flowers are water-pollinated (= hydrophilous) with the anthers breaking off and floating to the surface of the water; the pollen grains are then released at the surface and slowly sink to the female flowers—pollination thus occurs underwater; technically this type of pollination is known as hypohydrophyly (pollination below the water surface) in contrast to epihydrophyly (pollination at the water surface). *Ceratophyllum* is one of only two dicot genera for which hydrophyly has been documented; the other is *Callitriche* in the Callitrichaceae (Cox 1988; Philbrick 1991, 1993; Philbrick & Osborn 1994). When sterile, HORNWORTS are often confused with other aquatics, such as *Myriophyllum*, *Najas*, or the algae *Chara*; however, they can be recognized by their forked leaves. (Greek: *ceras*, a horn, and *phyllon*, leaf, from stiff leaf divisions) REFERENCES: Lowden 1978; Godfrey & Wooten 1981; Les 1986a, 1986b, 1988b, 1988c, 1989; Chase et al. 1993; Qiu et al. 1993; Schneider & Carlquist 1996.

1. Leaves usually forked 1 or 2(-3) times, usually with 2-4 ultimate segments, the segments with 4-5 conspicuous, widely spaced teeth on 1 side (the teeth visible to the naked eye); achenes without spines except at very base \_\_\_\_\_ **C. demersum**
1. Leaves usually forked 2-4 times, usually with 3-8 ultimate segments, the segments entire or obscurely serrate (the teeth not visible to the naked eye); achenes with spines along lateral margins and at base \_\_\_\_\_ **C. echinatum**

***Ceratophyllum demersum* L.**, (under water). Leaves 5-12 per whorl, 1-3 cm long, ultimate segments to ca. 0.5 mm wide, to ca. 1 mm at the teeth; involucre bracts 1-2 mm long; style to ca. 10 mm long; achenes 4-6 mm long. Streams, lakes, and ponds; se and e TX w to Cooke, Dallas, Fannin, and McLennan cos, also Edwards Plateau. By far the most common of the 2 species in nc TX. May-Sep. This species reproduces primarily asexually; it grows prolifically and in some situations can be a serious weed (Les 1997).

**Ceratophyllum echinatum** A. Gray, (prickly). Similar to *C. demersum*; style to ca. 6 mm long; achenes 5–7 mm long. Streams, lakes, and ponds; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990) for *C. muricatum* into which they lumped *C. echinatum*; no other nc TX specimens or citations found; mainly se and e TX, also Edwards Plateau. Summer. Jones et al. (1997) treated this taxon as *C. muricatum* Cham. subsp. *australe* (Griseb.) Les. However, Les (1997) indicated that *C. muricatum* is known in North America only from coastal se United States, while *C. echinatum* occurs in e TX w to near the edge of nc TX.

## CHENOPODIACEAE GOOSEFOOT OR PIGWEED FAMILY

Ours annual, biennial, or perennial herbs with stems often ± succulent; leaves alternate (rarely opposite), simple, the blades entire or rather coarsely or irregularly and bluntly toothed or lobed, often ± succulent; stipules absent; flowers 1-many, glomerate in spikes or panicles of spikes or axillary, perfect or unisexual, very small; sepals 0–5, green, sometimes with white to yellowish or pink margins; petals absent; stamens 0–5; pistil 1; ovary usually superior; fruit a 1-seeded indehiscent or irregularly rupturing urticel.

☛ A medium-large (1,300 species in 103 genera) cosmopolitan family, especially of desert or dry areas; most are herbaceous with some shrubs or rarely small trees; many are halophytes (= capable of living in areas of high salt concentrations) or xerophytes. The family includes food plants such as *Beta vulgaris* L. (BEET, SUGAR BEET, and SWISS CHARD), *Chenopodium quinoa* Willd. (the Andean crop QUINOA), and *Spinacia oleracea* L. (SPINACH) as well as a number of agricultural weeds. They exhibit the unusual, reddish, nitrogen-containing pigments known as betalains (characteristic of most Caryophyllidae—Cronquist & Thorne 1994) which derive their name from the genus *Beta*). Many species have Kranz anatomy and the associated C<sub>4</sub> photosynthetic pathway, an integrated set of anatomical and physiological adaptations for hot dry conditions. Molecular evidence indicated the family is most closely related to Amaranthaceae (Downie & Palmer 1994). ☛ Kühn (1993) cited references indicating that many weedy Chenopodiaceae produce allergy-causing pollen that can give rise to asthma and rhinitis. (sub-class Caryophyllidae)

FAMILY RECOGNITION IN THE FIELD: herbs often with ± succulent stems and leaves; leaves usually alternate, simple; flowers very small, inconspicuous, apetalous, greenish, not subtended by scarious bracts, often in spikes; filaments separate. Amaranthaceae have similar flowers (e.g., very small, lacking petals), but have scarious (= dry, papery), often colored bracts below each flower and united filaments.

REFERENCES: Standley 1916; Reed 1969a; Kühn 1993; Wilken 1993a; Behkne & Mabry 1994; Downie & Palmer 1994.

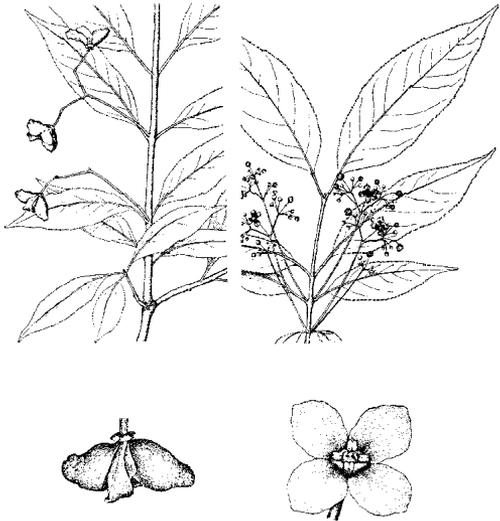
1. Stem leaves petioled or with narrowed, petiolar base; leaf blades usually > 2 mm wide (often much greater), not bristle-tipped.
2. Root greatly thickened, often pinkish or reddish in color; fruits strongly adherent in clusters; introduced cultivar (BEETS) that possibly escapes \_\_\_\_\_ **Beta**
2. Roots not as above; fruits not adherent (but can be in clusters); native and introduced species widespread in nc TX.
3. Flowers all unisexual, the staminate and pistillate often in different inflorescences or in the axils of different leaves; pistillate flowers subtended by 2 bracts, these fused 1/2 or more their length and enclosing the fruit.
4. Leaves and stems glabrous, green; leaf blades 4–10 cm long; lower leaves with conspicuous petioles 10–50 mm long; stigmas 4–5 \_\_\_\_\_ **Spinacia**
4. Leaves and stems (at least when young) covered with scales giving the plant a grayish appearance, sometimes glabrate; leaf blades 1–5 cm long; lower leaves often sessile or nearly so OR with petioles to 20 mm long; stigmas 2–3 \_\_\_\_\_ **Atriplex**



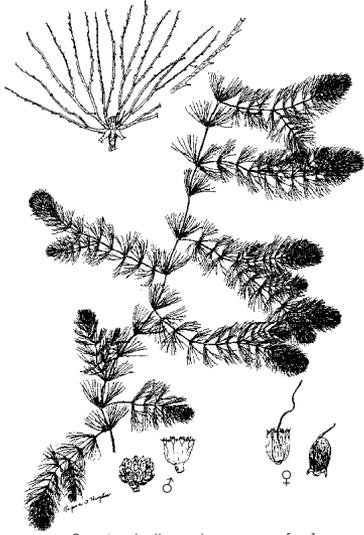
*Celastrus scandens* [CR1]



*Evonymus atropurpurea* var. *atropurpurea* [SA3]



*Evonymus atropurpurea* var. *cheatumii* [LUN]



*Ceratophyllum demersum* [REE]



*Ceratophyllum echinatum* [HEA]

3. Flowers generally with both sexes (some can be unisexual); flowers not subtended by 2 fused bracts; fruit enclosed only by sepals.
5. Leaf blades various, but usually not arrowhead-shaped; sepals 4–5, ovate-lanceolate or oblong-ovate; stamens 3–5 per flower.
6. Plants with silky or woolly pubescence (sometimes glabrate except around flowers); fruiting sepals with a wing running across their backs.
7. Fruiting sepals each with a separate wing across the back; leaf blades entire; plants not tumbleweed-like. \_\_\_\_\_ **Kochia**
7. Fruiting sepals not with a separate wing each, rather the calyces with an irregularly lobed but continuous wing going all the way around; leaf blades sinuate-dentate; plants with roundish, tumbleweed-like appearance. \_\_\_\_\_ **Cycloloma**
6. Plants with glandular or mealy-appearing pubescence (sometimes glabrate); fruiting sepals rounded on back or keeled lengthwise, not winged. \_\_\_\_\_ **Chenopodium**
5. Larger leaf blades typically arrowhead-shaped with 2 basal lobes; sepal 1, linear-oblong-ovate or linear-obovate; stamen 1 per flower. \_\_\_\_\_ **Monolepis**
1. Stem leaves sessile or clasping, widest at base; leaf blades very narrow (2 mm or less wide), short, stiff, bristle-tipped. \_\_\_\_\_ **Salsola**

### ATRIPLEX SALTBUUSH, ORACHE

Annual or perennial, monoecious or dioecious herbs or sometimes ± woody; surfaces usually gray-scurfy, at least when young; leaves alternate or alternate above and opposite below; leaf blades entire; staminate flowers ebracteate, with 5-parted perianth and 5 stamens; pistillate flowers subtended by 2 bracteoles, without perianth or perianth of minute squamellae; fruit enclosed by bracts.

☛ A genus of ca. 300 species of temperate and warm areas; a number are used as salt-tolerant forage; many are edible and some were used by Native Americans. The Asian *A. hortensis* L. (ORACHE) is widely cultivated for its leaves, which are used like spinach. (Ancient Latin name) REFERENCES: Hall & Clements 1923; Brown 1956; Freeman et al. 1984; McGregor 1986.

1. Leaf blades widest below middle; fruiting bracts not winged (but sometimes with tubercles or appendages), 4–8 mm long, usually not united to apex; plants annual monoecious herbs 0.15–0.6 m tall. \_\_\_\_\_ **A. argentea**
1. Leaf blades usually widest at or beyond middle; fruiting bracts very conspicuously winged lengthwise, (4–)8–10(–15) mm long, united nearly to apex; plants usually dioecious ± woody perennials 0.4–1.5(–2.5) m tall. \_\_\_\_\_ **A. canescens**

**Atriplex argentea** Nutt., (silvery). Annual monoecious herb with a ± globose shape; stems erect, 0.15–0.6 m tall, branched from base; leaves alternate or sometimes opposite below; leaf blades 2–5 cm long, triangular-ovate to rounded-ovate; staminate flowers in upper axils or in short dense spikes or the staminate and pistillate mixed in axils near middle of the plant; bracts subtending fruits 2–8 mm wide, united at least 1/2 their length, subentire to irregularly lacinate, not winged but the faces sometimes with appendages or tubercles to 2 mm long. Alkaline areas; w margin of nc TX w to w TX. Jul–Sep.

1. Upper leaves usually subsessile to petioled, the lowest opposite; margins of leaf blades entire \_\_\_\_\_ subsp. **argentea**
1. Upper leaves sessile, the lowest alternate; margins of leaf blades entire or irregularly dentate \_\_\_\_\_ subsp. **expansa**

subsp. **argentea**. SILVER-SCALE SALTBUUSH, SILVER ORACHE. Apparently only to the w of nc TX; in-

cluded based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990), probably based on a Wichita Co. collection.

subsp. **expansa** (S. Watson) H.M. Hall & Clem., (expanded), SPREADING SALT BUSH, FOGWEED. Clay Co. near extreme w margin of nc TX.

**Atriplex canescens** (Pursh) Nutt., (gray-pubescent), FOUR-WING SALT BUSH, CHAMIZA. Dioecious (rarely monoecious) perennial herb; stems erect, 0.4–1.5(–2.5) m tall; leaves alternate, sessile or nearly so; leaf blades 1–5 cm long, linear-spatulate to narrowly oblong, entire, thickish, the upper and lower surfaces both gray-scurfy, becoming glabrous; staminate flowers in glomerules in dense spikes arranged in terminal panicles; pistillate flowers in short axillary spikes; bracts subtending fruits with prominent longitudinal wings (total of 4 wings per fruit); wings each ca. 2–9 mm wide. Saline or alkaline soils; Callahan and Shackelford cos., also Brown Co. (HPC); w margin of nc TX s and w to w TX. Apr–Oct. Native Americans ground the seeds into a “baking powder” to use in making bread (Powell 1988). Individuals of this species are sexually labile, i.e., able to change from one sex to the other. Sex change (generally from female to male) is apparently associated with stress such as unusually cold or drought and, “... appears to confer a survival advantage to the individual” (Freeman et al. 1984). Reported to cause bloat in sheep (Burlage 1968). ☞

### BETA BEET

☞ A genus of 11–13 species of Europe and the Mediterranean region. (Celtic: *bett*, red, presumably in reference to the betalain pigments)

**Beta vulgaris** L., (common), BEET, SUGAR BEET, SWISS CHARD. Glabrous annual or biennial; stems to 0.6–1.2 m tall, green or often red; basal leaves in a rosette, long-petioled, reduced up the stem; flowers in glomerules, these axillary or in terminal spike-like panicles, perfect; sepals 5; stamens 5; ovary sunken in a disk. Cultivated; included based on reference that it is occasionally escaped in TX (Correll & Johnston 1970). Spring–fall. Native of s Europe and adjacent areas. Cultivated since the time of the Assyrians for its edible roots, for the roots as a source of sugar (up to 20% by weight), and for its edible leaves; the roots have high concentrations of the red pigments known as betalains (Mabberley 1987); ca. half the world’s sugar supplies are derived from BEET; a different subspecies (subsp. *cicla* (L.) Koch), SWISS CHARD, SPINACH BEET, is cultivated for the edible leaves (Mabberley 1987; Hyam & Pankhurst 1995). ☞

### CHENOPODIUM LAMB’S-QUARTERS, GOOSEFOOT, PIGWEED

Weedy annual (rarely biennial or perennial) herbs, some strongly aromatic, often with mealy-coated or glandular foliage; leaves alternate; flowers crowded in small bunches (= glomerules), axillary or in terminal paniced spikes, usually perfect; calyces usually white-mealy or glandular-pubescent outside; petals absent; stamens usually 5; fruit a small urticle with thin pericarp that is easily separable or firmly attached; because of the thinness of the pericarp, the seed and fruit are essentially the same size; embryo partly or completely encircling the endosperm.

☞ A genus of ca. 100 species of mostly weedy herbs of temperate areas; some are cultivated as “grains,” as ornamentals, or for medicinal uses. *Chenopodium quinoa* Willd. (QUINUA, QUINOA), of Andean South America, was an important pre-Colombian “grain” and is currently making a resurgence; various QUINUA products (e.g., cereals, pastas) are at present widely available in health food stores; see Wilson (1990) for information on the origin of QUINUA. *Chenopodium* species are often difficult to distinguish because of vegetative variability and the small size of the taxonomically important reproductive characters (e.g., fruits, calyces). Mature fruits are extremely helpful in identification. Because of the difficulties involved, several species can be

reached more than one way in the key. (Greek: *chen*, a goose, and *pous* foot, in allusion to the shape of the leaves of some species)

REFERENCES: Aellen & Just 1943; Wahl 1954; Reed 1969a; Crawford 1975; Crawford & Wilson 1986; Dorn 1988.

1. Leaves and inflorescences glandular (the glands stalked or sessile) and often pubescent with non-glandular hairs; leaves coarsely toothed or pinnately lobed; plants usually with a strong odor.
  2. Sepals densely glandular, the glands stalked or sessile; leaf blades mostly 4(–4.5) cm or less long; rare if present in nc TX.
    3. Leaves conspicuously lobed, the sinuses usually cutting more than 1/2 way to the midrib; glands on calyces short-stalked; seeds mostly horizontal within calyces. \_\_\_\_\_ **C. botrys**
    3. Leaves quite coarsely toothed (2–4 teeth per side) but not deeply lobed; glands on calyces sessile; seeds mostly vertical within calyces. \_\_\_\_\_ **C. pumilo**
  2. Sepals usually glabrous or inconspicuously glandular; leaf blades mostly (4–)6–15 cm or more long; weedy species widespread in nc TX. \_\_\_\_\_ **C. ambrosioides**
1. Leaves and inflorescences glabrous or mealy but neither glandular nor pubescent; leaf blades entire, dentate, or lobed; plants usually without a strong odor (sometimes with an odor).
  4. Leaf blades linear to oblong, usually less than 15(–18) mm wide, 3 times as long as wide or longer.
    5. Leaf blades with 3 or more veins from near base, 4–18 mm wide, typically wider toward the middle or base, not of the same width for the whole length of the blade, the sides usually not parallel.
      6. Lower surface of leaf blades densely mealy, usually conspicuously whitened; sepals completely enclosing the mature fruit; inflorescences usually dense, stout. \_\_\_\_\_ **C. pratericola**
      6. Lower surface of leaf blades glabrous or very sparsely mealy below, green in color; sepals barely curling over the margins of the mature fruit; inflorescences usually loose, open, slender, and often nodding. \_\_\_\_\_ **C. standleyanum**
    5. Leaf blades 1-veined, usually 1–3(–6) mm wide, of about the same width for the whole length of the blade, the sides nearly parallel.
      7. Plants densely mealy; fruits 0.9–1.2 mm in diam.; seeds 0.8–1.1 mm in diam.; calyces open in fruit. \_\_\_\_\_ **C. leptophyllum**
      7. Plants nearly glabrous; fruits 1.3–1.6 mm in diam.; seeds 1.2–1.5 mm in diam.; calyces closed in fruit. \_\_\_\_\_ **C. pallescens**
  4. Leaves ovate, deltoid to rhombic, wider than 15 mm, 1–3 times as long as wide.
    8. Leaf blades ca. as wide as long, 1–3.5 cm long, essentially entire; plants with semi-prostrate habit. \_\_\_\_\_ **C. vulvaria**
    8. Leaf blades longer than wide, 2–10 (rarely more) cm long, at least the lower often toothed at very base; plants with various habits.
      9. Glomerules with mature fruits and flowers simultaneously.
        10. Leaf blades large, 50–150 mm wide, with 1–4, large, conspicuous teeth per side; fruits 1.5–2.5(–2.7) mm in diam. \_\_\_\_\_ **C. simplex**
        10. Leaf blades small, usually 20 mm or less wide (reports up to 50 mm[?]), entire or with a few low teeth; fruits 1–1.5(–1.6) mm in diam. \_\_\_\_\_ **C. standleyanum**
      9. Glomerules either flowering or fruiting but usually not both (*C. simplex* and *C. standleyanum* can also be keyed here).
        11. Leaf blades except uppermost deltoid; seeds (pericarp removed) dull; rare in nc TX. \_\_\_\_\_ **C. murale**
        11. Leaf blades ovate to rhombic, gradually reduced upward; seeds (pericarp removed) shiny; including species widespread in nc TX.
          12. Leaf blades large, 50–150 mm wide, with 1–4 large prominent teeth per side; fruits 1.5–2.5(–2.7) mm in diam. \_\_\_\_\_ **C. simplex**

12. Leaf blades not as above; fruits up to 1.5 mm in diam.
13. Pericarp with alveolae giving the fruit surface a "honeycombed" appearance (under a lens or scope); fresh plant with unpleasant odor \_\_\_\_\_ **C. berlandieri**
13. Pericarp without alveolae, the fruit surface not "honeycombed" or this not discernable (*C. berlandieri* can also be reached this way); fresh plant with OR without unpleasant odor.
14. Lower surface of leaf blades densely white-mealy.
15. Plants flowering ca. 2nd week in Sep.; fruits 0.9–1.2 mm in diam.; inflorescences of small delicate glomerules, typically diffuse and often pendulous at maturity \_\_\_\_\_ **C. missouriense**
15. Plants flowering Apr–Sep; fruits 1–1.5 mm in diam.; inflorescences often of relatively large glomerules, usually dense but sometimes diffuse, typically erect to ascending or spreading.
16. Sepals broadly keeled; pericarp "honeycombed" (quite clear under dissecting scope); fresh plants with unpleasant odor \_\_\_\_\_ **C. berlandieri**
16. Sepals with keel absent or poorly developed; pericarp not "honeycombed"; fresh plants without unpleasant odor \_\_\_\_\_ **C. album**
14. Lower surface of leaf blades not densely white-mealy.
17. Sepals sharply keeled, completely enclosing the mature fruit; glomerules of flowers usually in dense, erect inflorescences; pericarp "honeycombed," rather adherent to the seed; fresh plants with unpleasant odor \_\_\_\_\_ **C. berlandieri**
17. Sepals rounded, not sharply keeled, barely curling over the margins of the mature fruit; glomerules of flowers in open, sometimes nodding inflorescences; pericarp not "honeycombed," easily separable from seed; fresh plants without unpleasant odor \_\_\_\_\_ **C. standleyanum**

**Chenopodium album** L., (white), LAMB'S-QUARTERS, PIGWEED. Plant annual, pale-green; stems erect to 0.6–3 m tall, solitary; lateral branches well-developed, ascending and compacted; nodes and infructescences without dark pigmentation; leaf blades moderately to densely mealy; blades of lower leaves 1.5 times as long as wide or longer; flowers in large glomerules in axillary or terminal, dense, paniculate spikes; sepals densely mealy, enclosing the mature fruit; fruits 1.1–1.5 mm in diam., the pericarp not "honeycombed"; seeds shiny, black. Around old homesteads and abandoned farms, disturbed areas; Denton Co., also Dallas and Grayson cos. (Reed 1969a); widespread in TX. Apr–Sep. Apparently native of Eurasia. As is the case in the Great Plains (Crawford & Wilson 1986), this species is probably less abundant in nc TX than generally assumed because individuals of the similar *C. berlandieri* are often identified as *C. album*. However, the "honeycombed" pericarp of *C. berlandieri* clearly distinguishes it from *C. album*. It was used medicinally by Native Americans and by pioneers as a potherb; however, the plants may contain toxic quantities of nitrate and oxalic acid; poisoning and death in cattle, horses, and pigs have been reported (Burlage 1968; Schmutz & Hamilton 1979; Mulligan & Munro 1990). ☒ ☞

**Chenopodium ambrosioides** L., (resembling *Ambrosia*—ragweed), MEXICAN-TEA, WORMSEED, EPAZOTE, SPANISH-TEA, WORMSEED LAMB'S-QUARTERS. Plant annual or perennial, strongly aromatic; stems erect or ascending, 0.3–1 m tall; leaf blades densely yellow-glandular to nearly glabrous; calyces completely enclosing the fruit; fruits 0.6–1.0 mm in diam.; seeds blackish. Disturbed habitats, sandy soils of woodlands; se and e TX w to West Cross Timbers and Edwards Plateau. Aug–Nov. Weed and medicinal herb native to tropical America; used as a condiment in Mexican cooking and as an antifatulent. An anthelmintic (= agent that expels worms) oil is obtained from the seeds with the active ingredient being a terpene; the plant has been variously

used medicinally including in the treatment of malaria; the oil is toxic and overdoses have been fatal to humans and animals (Burlage 1968; Kingsbury 1964; Leung & Foster 1996). ☠ 🌿

**Chenopodium berlandieri** Moq., (for Jean Louis Berlandier, 1805–1851, French botanist who explored TX, NM, and Mexico, and one of the first botanists to make extensive collections in TX), PIT-SEED GOOSEFOOT. Plant annual, typically ill-scented; stems erect, 0.4–1.5 m tall; leaf blades often densely mealy when young, later glabrate, irregularly sinuate-dentate; inflorescences typically dense, erect, although sometimes more diffuse; sepals densely mealy, completely enclosing the fruit; seeds 0.8–1.5 mm in diam., shiny, black. Dry disturbed habitats. Jul–Sep.

1. Leaf blades definitely 3-lobed \_\_\_\_\_ var. **sinuatum**
1. Leaf blades usually not 3-lobed.
  2. Inflorescences leafy; seeds 1.2–1.5 mm in diam. \_\_\_\_\_ var. **zschackei**
  2. Inflorescences sparsely leafy; seeds 0.8–1.3 mm in diam.
    3. Sepals sparsely mealy, the lobes green, white-margined; leaf blades not prominently toothed; seeds 1.3 mm in diam. \_\_\_\_\_ var. **boscianum**
    3. Sepals densely mealy, the lobes uniform in color; leaf blades ± toothed; seeds 0.8–1 mm in diam. \_\_\_\_\_ var. **berlandieri**

var. **berlandieri**. Leaf blades 1.2–3 cm long, irregularly sinuate-dentate; sepals strongly keeled. Brown, Coleman, and Milam cos., also Bell, Denton, Tarrant, and Young cos. (Reed 1969a); widespread in TX.

var. **boscianum** (Moq.) Wahl, (for its discoverer, Louis Augustin Guillaume Bosc, 1759–1828, French naturalist). Leaf blades 2–6 cm long, triangular-oblong; tepals slightly keeled. Tarrant Co. (*Ruth 321*); also e TX.

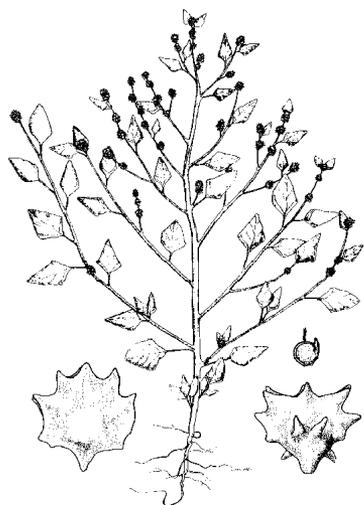
var. **sinuatum** (Murray) Wahl, (wavy-margined). Leaf blades ca. 2.5 cm long; inflorescences somewhat leafy; tepals with small keel; seeds 1.0–1.3 mm in diam. Palo Pinto Co.; mainly Plains Country w of nc TX.

var. **zschackei** (Murray) Murray ex Asch., (for Georg Zschacke, 1867–1937, German botanist). Leaf blades variable but typically larger than in other varieties; tepals strongly keeled. Brown, Denton, Grayson, Montague, Shackelford, and Wise cos., also Stephens and Tarrant cos. (Reed 1969a); e TX w to nc TX.

**Chenopodium botrys** L., (a bunch of grapes), JERUSALEM-OAK, FEATHER-GERANIUM. Annual with strong, not unpleasant scent; stems erect, 0.2–0.6 m tall, densely glandular-viscid throughout; sepals densely glandular-pubescent, imperfectly enclosing the fruit; stamens 5; fruits 0.6–0.8 mm in diam.; seeds dull, dark-brown. Disturbed habitats; collected by Reverchon (819) in 1879 (Dallas Co.); apparently otherwise unknown in TX. Jul–Oct. Native to Eurasia. 🌿

**Chenopodium leptophyllum** (Moq.) Nutt. ex S. Watson, (slender-leaved), SLIM-LEAF GOOSEFOOT, NARROW-LEAF GOOSEFOOT, NARROW-LEAF LAMB'S-QUARTERS. Annual to ca. 0.9 m tall; leaf blades 1–6 cm long, densely white-mealy; sepals densely white-mealy, barely covering the fruit; fruits 0.9–1.2 mm in diam.; seeds shiny, black. Dry places, slopes; included based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990); mainly w 1/2 of TX. Jun–Sep.

**Chenopodium missouriense** Aellen, (of Missouri). Annual; stems to ca. 1.5 m tall (often over 1 m), solitary; lateral branches usually well-developed, spreading, and flexuous at maturity; nodes and infructescences often with dark pigmentation; leaf blades coarsely toothed, those of lower leaves < 1.5 times as long as wide; inflorescences flexuous and arching, of relatively small, delicate glomerules, usually diffuse, typically pendulous at maturity; sepals slightly mealy, the keel not well-developed; fruits 0.9–1.2 mm in diam. Disturbed habitats; Dallas, Grayson, Limestone, and Tarrant cos., also McLennan Co. (Reed 1969a); in TX apparently only in nc part of the



*Atriplex argentea* subsp. *argentea* [BCM]



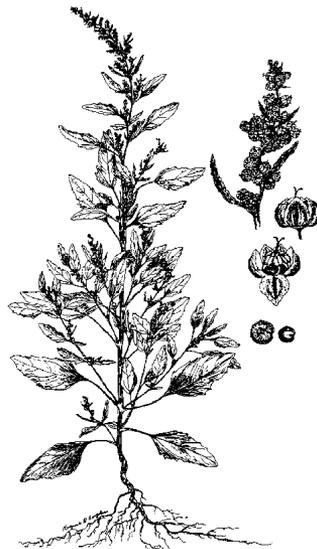
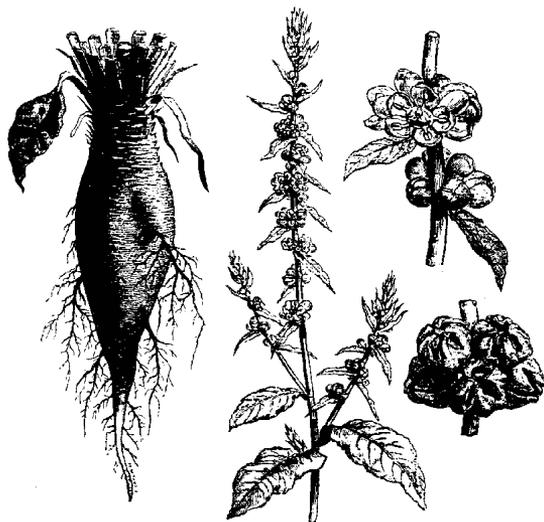
*Atriplex argentea* subsp. *expansa* [BB1]



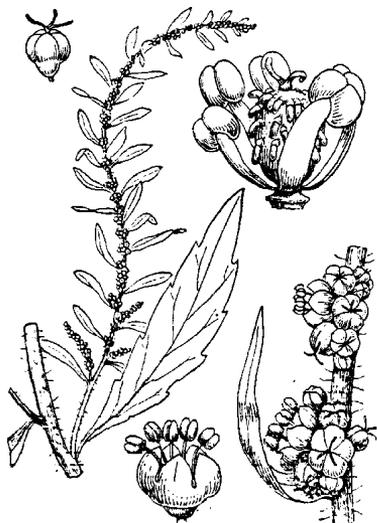
*Atriplex canescens* [POW]



*Beta vulgaris* [BL2]



*Chenopodium album* [REE]



*Chenopodium ambrosioides* [FAW]



*Chenopodium berlandieri* var. *boscianum* [BB2]



*Chenopodium botrys* [BB2]

state. Flowering restricted to ca. 2nd week in Sep. This taxon is lumped by some authorities (e.g., Kartesz 1994; Jones et al. 1997) with *C. album* [as *C. album* var. *missouriense* (Aellen) Bassett & Crompton]; however, we are following Reed (1969a), Correll and Johnston (1970), and Crawford and Wilson (1986) in recognizing it as a separate species.

**Chenopodium murale** L., (of walls), NETTLE-LEAF GOOSEFOOT, SOWBANE. Annual; stems erect or decumbent, 0.1–0.6 m long; leaf blades thin, ovate to rhombic-ovate, coarsely sinuate-dentate; sepals partly covering the fruit; seeds 1.2–1.5 mm in diam., dull, black. Disturbed habitats. Collected “in the streets of Dallas” in Jun 1874 and Jun 1875 by Reverchon; not found there since (Mahler 1988); widely scattered in TX. Native of Old World. 🇺🇸

**Chenopodium pallescens** Standl., (rather pale), LIGHT GOOSEFOOT. Annual; stems erect, 0.3–0.6 m tall; leaf blades linear, 1.5–4 cm long, 1.5–3(–6) mm wide, 1-nerved; petioles 2–5 mm long; flowers in large glomerules; sepals slightly mealy, completely enclosing the fruit; fruits 1.3–1.6 mm in diam.; seeds shiny, black. Open floodplains; Parker Co. (Mineral Wells State Park, *Lipscomb* 2393); known from a few scattered localities in TX. Aug–Oct.

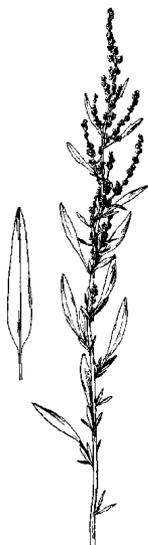
**Chenopodium pratericola** Rydb., (living in meadows or prairies), THICK-LEAF GOOSEFOOT. Annual; stems 0.2–0.9 m tall; leaf blades densely mealy beneath; petioles ca. half as long as the blades; sepal lobes white-margined; sepals completely enclosing the fruit; fruits 1–1.5 mm in diam.; seeds shiny, black. Stream banks, disturbed sites, sandy soils; Dallas, Denton, Jack, Parker, Tarrant, and Young cos., also Erath, Grayson, and Palo Pinto cos. (Reed 1969a); widespread mainly in w 2/3 of TX e to East Cross Timbers. Late May–Oct. [*C. desiccatum* A. Nelson var. *leptophylloides* (Murray) Wahl]

**Chenopodium pumilo** R. Br., (dwarf), RIDGED GOOSEFOOT. Annual, both glandular and pubescent; stems prostrate to ascending, 0.2–0.4 m long; leaf blades ovate or oblong to lanceolate, with lower surface conspicuously glandular; petioles ca. 1/2 as long as blades. Waste places; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. 1990; Reed (1969a) cited only 1 county in TX; Hatch et al. (1990) cited vegetational areas 1 through 10 [?]; the only TX specimen we have seen is from Upshur Co. in e TX. Nov. Native of Australia. 🇺🇸

**Chenopodium simplex** (Torr.) Raf., (simple, unbranched), MAPLE-LEAF GOOSEFOOT, BIG-SEED GOOSEFOOT. Annual; stems glabrous, erect, 0.6–1.3 m tall; leaf blades with 1–4 large teeth on each side; panicles open, leafless; sepals partly covering the fruit; fruits 1.5–2.5(–2.7) mm in diam.; seeds umbonate-lenticular, tapering from raised center to margin, shiny, black. Disturbed woodlands; Bell, Collin, Dallas, and Tarrant cos.; nc TX s and w to w TX. Jun–Aug. [*C. gigantospermum* Aellen]

**Chenopodium standleyanum** Aellen, (for Paul Carpenter Standley, 1884–1963, student of floras of sw U.S., Mexico, and Central America), STANDLEY’S GOOSEFOOT. Annual; stems erect or arched to 1(–2.5) m long, usually much smaller; leaf blades to 8 cm long, usually 20 mm or less wide (reports up to 50 mm); inflorescence a slender, often nodding terminal panicle; sepals slightly mealy; fruits 1–1.5(–1.6) mm in diam.; seeds shiny, black. Disturbed wooded habitats, floodplains; Dallas, Grayson, and Tarrant (*Ruth*) cos., also Bell and Brown cos. (Reed 1969a); e TX w to nc TX, also Edwards Plateau.

**Chenopodium vulvaria** L., (old generic name). Annual with bad odor, strongly white-mealy; stems erect or ascending, branched at base, 0.1–0.5 m tall; sepals densely mealy, rounded on back, completely enclosing the fruit; seeds ca. 1 mm in diam., dull, black. Included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); Reed (1969a) indicated that TX is cited in the literature, but cited no specimens; Hatch et al. (1990) cited vegetational areas 1 through 10 [?]. We have seen no TX specimens. Native of Europe. 🇺🇸



*Chenopodium leptophyllum* [GLE]



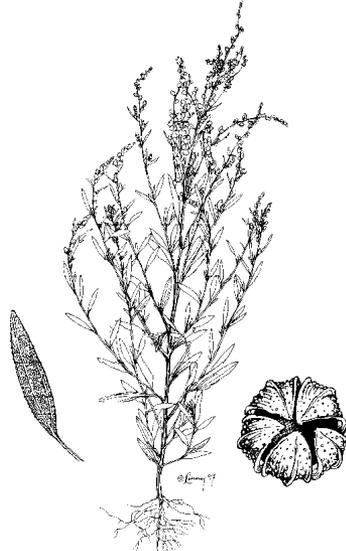
*Chenopodium missouriense* [BAR]



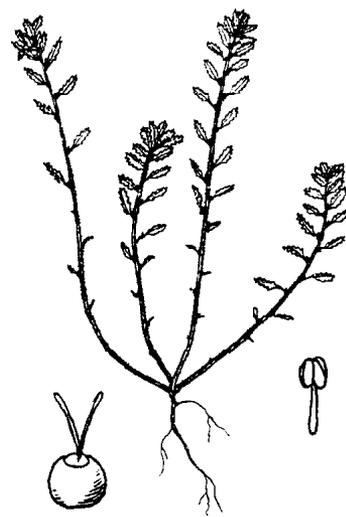
*Chenopodium murale* [SMI]



*Chenopodium pallescens* [HEA]



*Chenopodium pratericola* [HEA]



*Chenopodium pumilo* [SM1, STE]



*Chenopodium simplex* [ST2]



*Chenopodium standleyanum* [ST2]



*Chenopodium vulvaria* [GLE]

**CYCLOLOMA** WINGED-PIGWEEED

☛ A monotypic c and w North American genus. (Greek: *cyclos* a circle, and *loma* a border or fringe, from the encircling wing of the calyx)

**Cycloloma atriplicifolium** (Spreng.) J.M. Coult., (with leaves resembling *Atriplex*—saltbush), WINGED-PIGWEEED, TUMBLE-RINGWING, PLAINS TUMBLEWEED. Bushy annual 15–100 cm tall and broad, with habit of a tumbleweed, glabrous or with thin pubescence; leaves sessile or short-petioled; leaf blades 2–8 cm long, oblong-lanceolate, irregularly sinuately toothed or pinnately lobed; flowers sessile and rather widely spaced in terminal paniculate spikes, perfect, some pistillate; sepals 5; calyces with a conspicuous wing; stamens 5; styles 2–3. Loose sandy soils, roadsides and disturbed sites; more common in w part of nc TX; widespread in TX. Jun–Oct. The seeds were eaten by Native Americans (Mabberley 1987). Used medicinally by Native Americans (Hopi) for conditions including fever, rheumatism, and headache (Burlage 1968).

**KOCHIA** SUMMER-CYPRESS

☛ A genus of ca. 20 species of w North America and Eurasia (Wilken 1993a); sometimes lumped into the genus *Bassia* (Kühn 1993; Mabberley 1997). (Named for Wilhelm Daniel Joseph Koch, 1771–1849, German botanist and physician)

REFERENCE: Blackwell et al. 1978.

**Kochia scoparia** (L.) Schrad., (broom-like), MEXICAN FIREWEED, BELVEDERE SUMMER-CYPRESS, SUMMER-CYPRESS, MOCK CYPRESS, MEXICAN FIREBUSH. Annual, woolly to glabrate; stems erect, 0.3–2(–4) m tall, often with reddish or purplish streaking; leaves 2–7(–10) cm long, 0.5–8(–12) mm wide, linear to lanceolate, ± sessile to petioled; inflorescences dense, leafy, spike-like, some plants with flowers nearly throughout; flowers mostly perfect, some pistillate; calyces with 5 lobes, each with a wing; stamens 5; styles 2(–3). Waste places; Grayson Co.; scattered in TX but mainly in Plains Country to the w of nc TX. Jun–Aug. Native of Eurasia. A cultivated form is sometimes grown as an ornamental for its purplish red autumn foliage. Considered a weed but high in protein and readily grazed by livestock; ingestion may, however, cause photosensitization in cattle, sheep, and horses; reported to contain saponins (Burlage 1968; McGregor 1986). ☛ ☚

**MONOLEPIS** POVERTY-WEED

☛ A genus of 6 species of n and e Asia, North America, and temperate South America; some were formerly eaten. (Greek: *monos* solitary, and *lepis*, scale, from sepal number in most species)

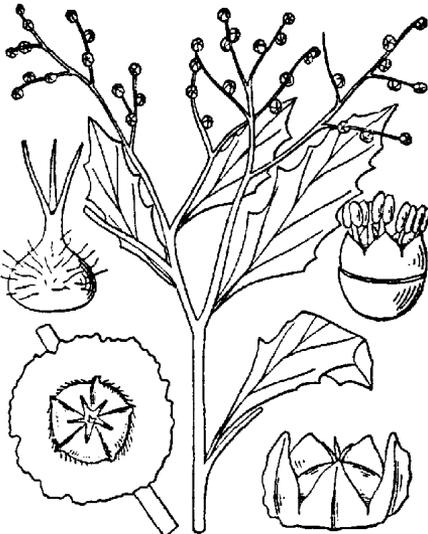
**Monolepis nuttalliana** (Schult.) Greene, (for Sir Thomas Nuttall, 1786–1859, English-American botanist), NUTTALL'S MONOLEPIS, POVERTY-WEED. Glabrous or sparsely mealy annual with prostrate to erect stems 5–35 cm long; foliage pale green; lower leaves long-petioled; leaf blades fleshy, 1–6.5 cm long, rhombic or lanceolate, with 1 or few coarse teeth or often a pair of lobes toward base, giving the leaf an arrowhead shape; flowers axillary, sessile, crowded, in upper part of stem and branches, mostly perfect or a few pistillate; the single bract-like sepal 1.5–2.5 mm long; styles 2. Stream bottoms, roadsides, disturbed sites; widespread in TX but more common in the w 1/2 of nc TX and to the w. Mar–May.

**SALSOLA**

☛ A cosmopolitan genus of 150 species primarily of coastal or other saline habitats. Nomenclature for *Salsola* follows Mosyakin (1996). (Latin: *salsus*, salty, from habitat of some species)

REFERENCES: Beatley 1973; Mosyakin 1996.

**Salsola tragus** L., (Greek: *tragos*, a goat), RUSSIAN-THISTLE, TUMBLEWEED. Bushy, glabrous annual 15–100 cm or more tall and broad, with habit of a tumbleweed; stems usually with reddish or



*Cycloloma atriplicifolium* [BB2]



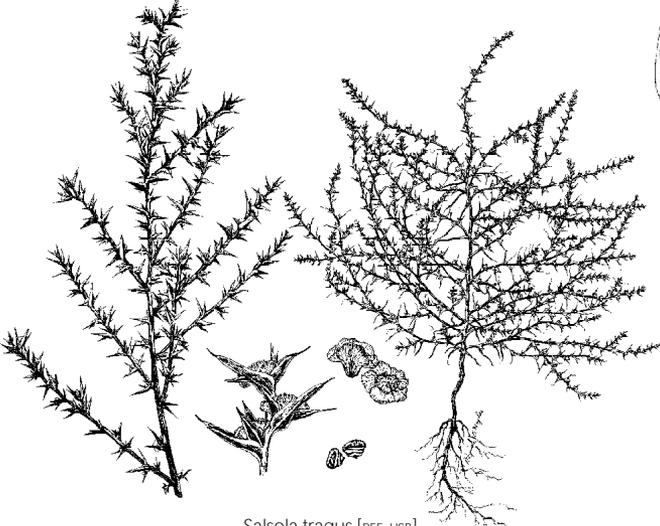
*Kochia scoparia* [RE]



*Monolepis nuttalliana* [BB2]



*Spinacia oleracea* [HEA]



*Salsola tragus* [RE, USB]

purple streaks; leaves filiform, 2–8 cm long, only 1–2 mm wide; flowers in interrupted terminal spikes, enclosed or subtended by a pair of stiff, spine-pointed bracts 3–8 mm long, perfect; sepals 5; stamens 3–5; stigmas 2–3; fruit with a prominently winged apex, 3–6 mm wide including wing. Roadsides, disturbed sites; Clay and Jack cos. in West Cross Timbers, also Parker Co. (R. O'Kennon, pers. obs.), also Grayson Co. in Red River drainage; widespread in w 1/2 of TX. Jun–Oct. Native of e Europe and Asia that is now a drought resistant agricultural pest in parts of North America; possibly introduced into the U.S. in South Dakota in 1873 or 1874 in flax seed imported from Russia (Mosyakin 1996; Tellman 1997); this species rapidly became a noxious weed in the w U.S. According to Tellman (1997), “The newly built railroad was an ideal vehicle for spreading tumbleweed throughout the west and the tumbleweed’s early distribution pattern shows it moving outward along railways and roadways.” [*S. australis* R. Br., *S. kali* L. subsp. *tenuifolia* Tausch, *S. kali* L. subsp. *tragus* (L.) Celak., *S. pestifer* A. Nelson, *S. tragus* subsp. *iberica* Sennen & Pau] The bushy, roughly globe-shaped plants break off at ground level in late fall; the whole plant, when blown by the wind, rolls or tumbles across open areas and disperses the seeds (Kirkpatrick 1992). Reported to contain the alkaloids, salsolidine and salsoline, and to be poisonous to livestock (Burlage 1968). ☣ 🌿

### SPINACIA SPINACH

☞ A genus of 4 species of sw Asia and n Africa. (Latin: *spina*, spine, referring to spine-tipped bracts around the fruits)

***Spinacia oleracea* L.**, (of the vegetable garden, a potherb used in cooking), SPINACH. Glabrous annual; stems erect, 30–45 cm tall; basal leaves in a rosette, long-petioled, reduced up the stem; leaf blades oval to triangular-ovate to hastate, entire or sinuate-dentate; flowers usually unisexual; staminate flowers with 4–5 sepals and 4–5 stamens; pistillate flowers without sepals, subtended by 2 usually spine-tipped bracts that grow together and enclose the fruit; stigmas 4–5; fruiting bracts 2–4 mm long. Cultivated for the edible leaves; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); occasionally escapes throughout TX. Spring–summer. Native of sw Asia. The tissue contains high levels of oxalic acid which combines with calcium and can cause kidney problems or calcium deficiencies; occasional consumption rarely causes ill effects (Schmutz & Hamilton 1979). ☣ 🌿

## CISTACEAE SUN-ROSE OR ROCK-ROSE FAMILY

Ours low perennial herbs; leaves alternate or opposite, sessile, simple, linear to elliptic or oblanceolate, entire; flowers small, terminal or in upper leaf axils, solitary, racemose, or in paniced, compact clusters; sepals 3, united at base, bractless or with 1–2 narrow bracts [sepals?] attached on calyx-base (bracts sepal-like in some species, more often resembling reduced upper leaves); petals 3 or 5, opening in sunshine, lasting for one day only (or flowers cleistogamous); stamens 3–many; pistils 2- to 3-carpellate; ovary superior; fruit a capsule.

☞ A small (175 species in 8 genera), mainly n temperate and warm area, especially Mediterranean family of shrubs, subshrubs, or herbs; some are important as ornamentals, for example in rock gardens. Family name from *Cistus*, ROCK-ROSE, a Mediterranean genus of 17 species of shrubs. The leaves of some *Cistus* species exude an aromatic resin, laudanum, used in making perfumes and formerly in medicines (Woodland 1997). (Greek: *kistos*, classical name for these plants) (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: perennial, sometimes stellate-pubescent herbs with simple entire leaves; petals convolute (= twisted), quickly falling; ovary one-celled, many-seeded, superior; stamens sometimes numerous.

REFERENCES: Brizicky 1964b; Wilbur 1969.

1. Petals 5 (except in late-appearing cleistogamous flowers), yellow, 4–12 mm long; plants pubescent with stellate hairs \_\_\_\_\_ **Helianthemum**
1. Petals 3, usually reddish to purplish (can also vary to yellowish white or greenish), 1.5–3 mm long; plants pubescent with simple hairs OR largely glabrous \_\_\_\_\_ **Lechea**

### HELIANTHEMUM SUN-ROSE, ROCK-ROSE, FROSTWEED

Ours perennial herbs with stellate pubescence on stems, leaves, and in inflorescence; leaves alternate; flowers dimorphic; cleistogamous flowers often present, with 3–8 stamens, without petals; chasmogamous flowers with 15–36 stamens, with 5 conspicuous yellow petals.

☛ A genus of ca. 110 species native from Europe to the Sahara, ne Africa to c Asia, and North and South America; a number are cultivated as ornamental shrublets. (Greek: *helios*, the sun, and *antheon*, flower, the flowers of some tending to open only in bright sunshine)

REFERENCES: Wilbur & Daoud 1964; Daoud & Wilbur 1965.

1. Leaves usually 6–8 mm wide; petals 6–12 mm long; calyces (3–)4–6.6 mm long (3–4.2 mm long in cleistogamous flowers); capsules 4–6 mm long, with 12–35 seeds \_\_\_\_\_ **H. georgianum**
1. Leaves usually < 4(–7) mm wide; petals 4–6.4 mm long; calyces 1–4 mm long (< 2 mm long in cleistogamous flowers); capsules 1.3–4 mm long, with 1–6 seeds \_\_\_\_\_ **H. rosmarinifolium**

**Helianthemum georgianum** Chapm., (of Georgia), GEORGIA SUN-ROSE, GEORGIA ROCK-ROSE, HOARY SUN-ROSE. Stems 10–40 cm tall; basal leaves present or absent, similar to stem leaves; stem leaves elliptic to oblanceolate, 10–28(–35) mm long, usually 6–8 mm wide; pedicels of chasmogamous flowers 3–15 mm long; pedicels of cleistogamous up to 3(–6) mm long; chasmogamous sepals 3.6–6.6 mm long; seeds 12–35 per capsule. Sandy open woods, roadsides; se and e TX w to West Cross Timbers and Edwards Plateau. Late May–Jun. ☒/91

**Helianthemum rosmarinifolium** Pursh, (with leaves like *Rosemarinus*—rosemary), ROSEMARY SUN-ROSE. Stems 13–50 cm tall; basal leaves absent; stem leaves linear to narrowly oblanceolate, 5–14 times as long as wide, 2–4(–7) mm wide; pedicels of chasmogamous flowers usually 10–22 mm long; pedicels of cleistogamous up to 3 mm long; seeds 1–6 per capsule. Sandy open woods; se and e TX w to e Rolling Plains and Edwards Plateau. Mid-May–Jun (cleistogamous flowers Jun–Jul).

### LECHEA PINWEED

Ours perennial herbs lacking stellate pubescence; petals 3, usually reddish to purplish (can be yellowish white or greenish); stamens (3–)6–15(–25); style absent; seeds 2–6 per fruit.

☛ A genus of 17 species native to the Americas. (Named for Johan Leche, 1704–1764, Swedish botanist)

REFERENCES: Hodgdon 1938, 1966; Wilbur & Daoud 1961.

1. Mid-stem leaves linear-lanceolate to almost thread-like, not over 2 mm wide; stems inconspicuously appressed-pubescent.
2. Pedicels 2–3 mm long (up to 4 or 5 mm in fruit), widely spreading or reflexed; seeds 6 per fruit \_\_\_\_\_ **L. san-sabeana**
2. Pedicels 0.5–1.5 mm long (up to 2.5 mm in fruit), ascending or loosely appressed; seeds usually 3(–5) per fruit \_\_\_\_\_ **L. tenuifolia**
1. Mid-stem leaves lanceolate, 3–9 mm wide; stems spreading-pilose \_\_\_\_\_ **L. mucronata**

**Lechea mucronata** Raf., (mucronate, pointed), HAIRY PINWEED, PINE PINWEED. Stems usually 30–90 cm tall; flowers few–several in a compact cluster; seeds (2–)3(–4) per fruit. Sandy woods, old fields, and roadsides; se and e TX w to e Rolling Plains and Edwards Plateau. Jun–Jul. [*L. villosa* Elliott]

**Lechea san-sabeana** (Buckley) Hodgdon, (of San Saba Co., TX), SAN SABA PINWEED, DRUMMOND'S PINWEED. Similar to *L. tenuifolia*; stems 15–35 cm tall; flowers spaced apart. Sandy open woods; Bosque, Brown, Jack, Montague, Parker, Tarrant, and Wise cos., also Dallas Co. (Mahler 1988); se and e TX w to West Cross Timbers and Edwards Plateau; endemic to TX. Apr–Jun. 🌿

**Lechea tenuifolia** Michx., (slender-leaved), NARROW-LEAF PINWEED. Stems 12–40 cm tall; flowers spaced apart. Sandy woods; se and e TX w to West Cross Timbers and Edwards Plateau, also Trans-Pecos. May–Jul.

## CLUSIACEAE (GUTTIFERAE) ST. JOHN'S-WORT OR GARCINIA FAMILY (INCLUDING HYPERICACEAE)

Ours annual or perennial herbs or small shrubs; foliage often pellucid or black punctate/dotted; leaves opposite; leaf blades entire; flowers solitary or in cymose inflorescences, perfect, radially symmetrical; sepals (2–)4 or 5; petals 4 or 5, free, usually yellow or orange-yellow or in one rare nc TX species pinkish or reddish; stamens few–numerous, sometimes in groups; pistil 1; ovary superior; fruit a capsule.

☛ A medium-large (1,370 species in 45 genera), mainly tropical but also n temperate family of trees, shrubs, lianas, and herbs usually with yellow or brightly colored resinous sap; a number of species are important sources of woods, gums, pigments, drugs, oilseeds, and fruits. *Garcinia mangostana* L. (MANGOSTEEN) with delicious arils, and *Mammea americana* L. (MAMMEY-APPLE) are well known tropical fruits. The alternate family name, Guttiferae, means “drop-bearing” and refers to the resinous sap, oil vesicles, glands, and dots seen in many species. Our species are sometimes treated in the Hypericaceae, a family now generally lumped with the Clusiaceae. Family name from *Clusia*, a genus of ca. 145 species of dioecious trees and shrubs of tropical and warm areas of the Americas; they can be epiphytic or in some cases stranglers with roots surrounding and damaging the host. (Named for Charles de l'Ecluse (Carolus Clusius), 1526–1609, of Arras, France, botanist, gardener, and author; he introduced the tulip to the Netherlands) (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: herbs or small shrubs with mostly opposite, simple, entire, *dotted* (dots visible when leaves are held up to a light) leaves; flowers with 4 or 5 separate colorful (yellow to orange-yellow, pinkish, or reddish) petals which often have a slight contortion or twist; stamens often in bundles, sometimes numerous.

REFERENCES: Adams 1973; Wood & Adams 1976.

1. Petals yellow or orange-yellow; stamens few–numerous, in bundles or not so, without glands at base; widespread in nc TX. \_\_\_\_\_ **Hypericum**
1. Petals pinkish or reddish; stamens 9, in 3 bundles of 3, with 3 orange glands at base alternating with stamen bundles; on e margin of nc TX. \_\_\_\_\_ **Triadenum**

### HYPERICUM ST. JOHN'S-WORT

Ours annual or perennial herbs or small shrubs often punctate with resin or oil dots or glands on leaves or other parts (the dots visible on surfaces or using transmitted light); leaves simple, sessile; flowers solitary or in dichotomously cymose inflorescences; sepals (2–)4 or 5; petals 4 or 5, yellow or orange-yellow; stamens few–numerous, often in small bunches; ovary 2- to 5-carpellate.

☛ A genus of ca. 370 species of trees, shrubs, and herbs native to temperate regions and tropical mountains. Many are used as cultivated ornamentals while some have medicinal uses. ☛ A number of *Hypericum* species, especially *H. perforatum*, contain hypericin, a reddish, fluorescent, multiple-ringed phenolic substance concentrated in the glandular dots on the leaves.



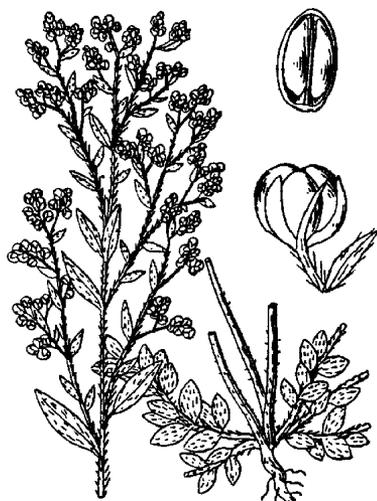
Helianthemum georgianum [HEA]

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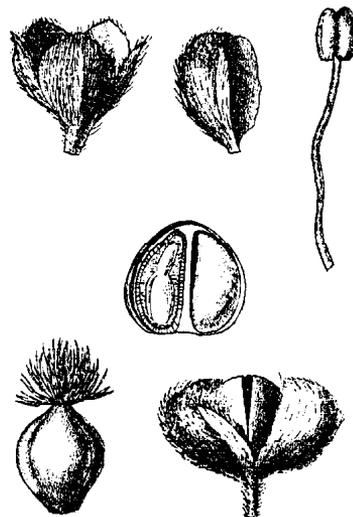


Helianthemum rosmarinifolium [HEA]

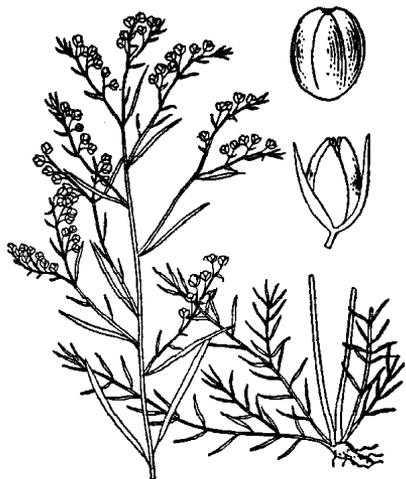
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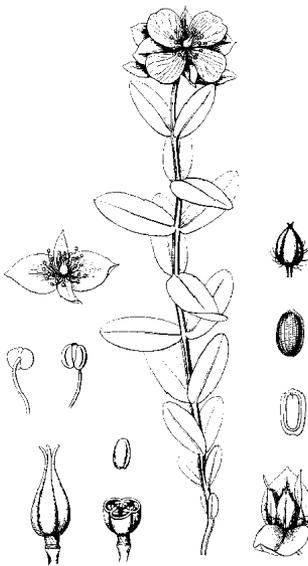
Lechea mucronata [BB2]



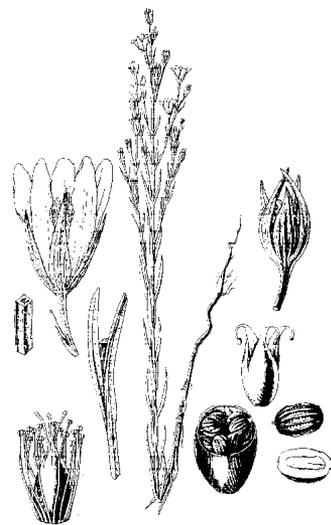
Lechea san-sabeana [EV1]



Lechea tenuifolia [BB2]



Hypericum crux-andreae [GR1]



Hypericum drummondii [ANO]

When the plant is eaten, hypericin, whose numerous double bonds absorb UV radiation, increases skin sensitivity and can cause photosensitization and consequent dermatitis in light-skinned livestock; symptoms include swelling, blistering, and lesions as well as more serious reactions including death. Contact may also cause dermatitis in humans (Muenscher 1951; Lewis & Elvin-Lewis 1977; Stephens 1980; Crompton et al. 1988; Turner & Szczawinski 1991). (Greek: *hyper*, above, and *eikon*, picture; some species were hung above pictures to ward off evil spirits)

REFERENCES: Adams & Robson 1961; Adams 1957, 1962; Robson 1980.

1. Petals 4; sepals 2 or 4 and unequal (2 large and leaf-like, 2 smaller or absent); stamens free, not in clusters.
  2. Inner 2 sepals minute or absent; petals ca. 6–10 mm long, to 4(–7) mm wide; styles 2; leaves 9 mm or less wide; widespread in nc TX. \_\_\_\_\_ **H. hypericoides**
  2. Inner 2 sepals smaller than outer but well-developed, 7–14 mm long, to 4 mm wide; petals 10–18 mm long, 7–15 mm wide; styles 3–4; leaves (at least some) 9–17(–20) mm wide; e margin of nc TX. \_\_\_\_\_ **H. crux-andreae**
1. Petals 5; sepals 5 and equal; stamens clustered in 3–5 groups OR free, not in clusters.
  3. Sepals densely and conspicuously black gland-dotted (visible under a hand lens); petals conspicuously black dotted over their surfaces; stamens numerous, usually 20 or more; plants with perennial roots.
    4. Main stem mostly unbranched, with branches only near the summit; leaves obtuse, rounded, or even retuse at apex; sepals 2.5–4 mm long; petals 4–7.5 mm long; styles 2–4 mm long, mostly persistent. \_\_\_\_\_ **H. punctatum**
    4. Main stem mostly with small axillary branches throughout; leaves acute or narrowly obtuse at apex; sepals 4–7 mm long; petals 8–14 mm long; styles 6–10 mm long, mostly soon withering. \_\_\_\_\_ **H. pseudomaculatum**
  3. Sepals not densely and conspicuously black gland-dotted (can have obscure light-colored glands; petals not black dotted or in 1 species with black dots limited to the margins only; stamens few (6–20) or numerous; plants annual or perennial.
    5. Leaves flat, 2 mm or more wide (usually much more), usually 3 or more nerved, spreading.
      6. Petals 5–12 mm long, with or without black dots along margins; stamens > 12 per flower; ovary and capsule with or without prominent, elongate, yellow-amber oil vesicles visible under a hand lens.
        7. Petals usually with black dots along margins, 7–12 mm long; ovary and capsule with prominent, elongate, yellow-amber oil vesicles visible under a hand lens; leaves usually rather small, 10–15(–25) mm long, 2–5(–11) mm wide. \_\_\_\_\_ **H. perforatum**
        7. Petals without black dots along margins, 5–9 mm long; ovary and capsule without prominent oil vesicles; leaves larger, usually 30–70 mm long, 5–15 mm wide. \_\_\_\_\_ **H. sphaerocarpum**
      6. Petals 6 mm or less long, without black dots along margins; stamens 12 or fewer per flower; ovary and capsule without prominent oil vesicles visible.
        8. Main stem with scattered spreading branches; middle and upper leaves rounded at apex; capsule with rounded end (but tipped by persistent style ca. 1 mm long); bracts leaf-like in much of inflorescence. \_\_\_\_\_ **H. mutilum**
        8. Main stem unbranched or nearly so; middle and upper leaves usually tapering to apex; capsule with pointed end (and tipped by persistent style); bracts reduced, narrow and awl-like in much of inflorescence. \_\_\_\_\_ **H. gymnanthum**
5. Leaves subulate (= awl-shaped) or linear, 1.5 mm or less wide, 1-nerved, appressed or strongly ascending.
  9. Leaves 6–20 mm long, linear; capsules ovoid, slightly longer than calyces; sepals 3–5 mm long. \_\_\_\_\_ **H. drummondii**

9. Leaves < 4 mm long, scale-like; capsules elongate, lance-subulate, much longer than calyces; sepals ca. 2 mm long \_\_\_\_\_ **H. gentianoides**

**Hypericum crux-andreae** (L.) Crantz, (St. Andrew's cross), ST. PETER'S-WORT. Glabrous, essentially evergreen, erect or suberect small shrub 30–100 cm tall; upper leaves almost clasping; flowers axillary or in small clusters, pedicelled, subtended by 2 lanceolate bractlets; sepals 4, the 2 larger sepals 10–15 mm long and ca. as wide, broadly ovate to suborbicular; petals light yellow. Low woods, pond margins, and other moist areas; Limestone Co. at extreme e edge of nc TX; mainly se and e TX. Jul–Sep. [*Ascyrum stans* Michx. ex Willd.]

**Hypericum drummondii** (Grev. & Hook.) Torr. & A. Gray, (for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), NITS-AND-LICE, DRUMMOND'S ST. JOHN'S-WORT. Erect much branched annual to ca. 80 cm tall; flowers solitary in upper axils; petals orange-yellow, 2.5–4.5 mm long; stamens to ca. 12. Dry sandy or gravelly soils in fields or open woods; in nc TX either in the Cross Timbers or on the sandy soils at the extreme e margin of the area; se and e TX w to Rolling Plains and Edwards Plateau. Jul–Sep.

**Hypericum gentianoides** (L.) Britton, Sterns, & Poggenb., (resembling *Gentiana*—gentian), PINEWEED ST. JOHN'S-WORT, ORANGE-GRASS, PINEWEED. Erect much branched annual to ca. 60 cm tall; stems and erect branches thread-like and wiry; flowers minute; petals 1.5–4 mm long; stamens few. Dry gravelly or sandy soils; Palo Pinto and Parker cos., also Lamar Co. (Carr 1994); se and e TX w to Rolling Plains and Edwards Plateau. May–Sep.

**Hypericum gymnanthum** Engelm. & A. Gray, (naked flower), CLASPING ST. JOHN'S-WORT. Erect perennial to ca. 90 cm tall; leaves cordate-clasping; petals 3–6 mm long; stamens 10–12. Sandy soils; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); mainly se and sc TX. Jun–Jul.

**Hypericum hypericoides** (L.) Crantz, (resembling *Hypericum*—St. John's wort; this species was originally treated in the genus *Ascyrum*), ST. ANDREW'S-CROSS, ST. PETER'S-WORT. Glabrous, low, essentially evergreen shrub with punctate leaves; stems erect-ascending to decumbent, 30–100+ cm tall; flowers axillary, solitary or in small clusters, pedicelled, subtended by 2 narrow bracteoles; sepals 2 or 4, the 2 larger sepals ovate to elliptic, ca. 5–12(–15) mm long and ca. 3–10 mm broad; petals light yellow. Sandy woods. May–Sep. Often segregated into the genus *Ascyrum*. The following two subspecies seem to intergrade.

1. Erect and freely branched above the ground \_\_\_\_\_ subsp. **hypericoides**

1. Decumbent with several basal stems \_\_\_\_\_ subsp. **multicaule**

subsp. **hypericoides**. Se and e TX w to West Cross Timbers and Edwards Plateau. [*Ascyrum hypericoides* L. var. *oblongifolium* (Spach) Fernald]

subsp. **multicaule** (Michx. ex Willd.) Robson, (many-stemmed). Se and e TX w to West Cross Timbers. [*Ascyrum hypericoides* L. var. *multicaule* (Michx. ex Willd.) Fernald]

**Hypericum mutilum** L., (cut-off, the Linnean type being merely a cut-off fragment of a plant), DWARF ST. JOHN'S-WORT. Erect annual or perennial to 90 cm tall; leaves clasping basally; flowers very small; petals ca. 2–3 mm long, light yellow; stamens 6–12, free. Edge of water or other wet areas; Henderson and Hopkins cos. near e margin of nc TX, also Lamar Co. in Red River drainage (Carr 1994); mainly se and e TX and Edwards Plateau. May–Oct.

**Hypericum perforatum** L., (perforated, having or appearing to have small holes), COMMON ST. JOHN'S-WORT, KLAMATHWEED, TIPTONWEED, GOATWEED, EOLA-WEED, AMBER, ROSIN-ROSE. Erect, rhizomatous, branched perennial to 70(–150) cm tall; petals orange-yellow, with black oil dots usually present along margins, 7–12 mm long; stamens numerous, united below into 3–5

groups; capsules with numerous yellow-amber oil vesicles. Roadsides; originally seen in TX (Lipscomb 1984) between Bowie and Decatur along Hwy 287 (Wise and Montague cos.); now also in Grayson Co. along Hwy 82, also Tarrant Co.; possibly introduced with CROWN-VETCH by the Highway Department (Mahler 1988). Jun–Sep. Native of Europe. Eating the plant can cause photosensitization and consequent dermatitis in light-skinned livestock; contact may also cause dermatitis in humans—see discussion in generic synopsis. This species is also used medicinally as a possible herbal treatment for depression (Leung & Foster 1996). ☠ 🌿

**Hypericum pseudomaculatum** Bush, (false *Hypericum maculatum*; maculatum = spotted), FALSE SPOTTED ST. JOHN’S-WORT. Erect perennial to ca. 80 cm tall; petals conspicuously black-dotted. Fields; included based on citation of vegetational area 5 (Fig. 2) by Hatch et al. (1990); mainly e TX. May–Jun.

**Hypericum punctatum** Lam., (dotted), SPOTTED ST. JOHN’S-WORT. Erect perennial to ca. 100 cm tall; petals pale yellow, streaked with numerous black oil dots; stamens united below into 3–5 groups; capsules ovoid, 4–6 mm long, with numerous yellow-amber oil vesicles. Edges of woodlands; Denton, Grayson, Hunt, Lamar, Limestone, and Tarrant cos., e TX w to nc TX. Jun–Jul. Reported to be poisonous to horses (Burlage 1968). ☠

**Hypericum sphaerocarpum** Michx., (globe- or round-fruited), ROUND-FRUIT ST. JOHN’S-WORT. Erect perennial; stems 30–60 cm tall from thin woody rhizome; leaves usually 3–7 cm long, 5–15 mm wide, obtuse to acute; sepals 3–5 mm long; stamens numerous, free. Prairies, embankments; Fannin Co. in Red River drainage and Collin Co. near the Heard Museum; mainly e TX. May–Jul.

### TRIADENUM ST. JOHN’S-WORT

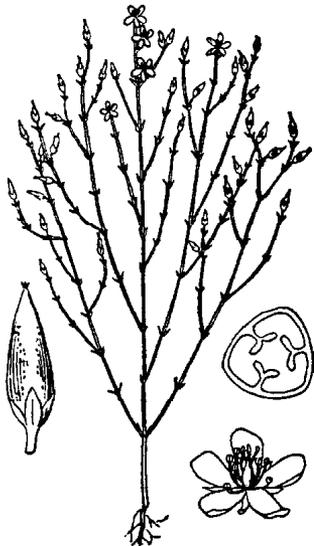
☞ A genus of 6–10 species of e Asia and e North America; this disjunct distribution pattern is discussed under the genera *Campsis* (Bignoniaceae) and *Carya* (Juglandaceae). (Greek: *tri*, three, and *aden*, gland, referring to the three large glands alternating with three sets of stamens)

**Triadenum walteri** (J.G. Gmel.) Gleason, (for Thomas Walter, 1740–1789, British-American botanist and Carolina planter). Perennial herb with rhizomes; stems erect, 40–100 cm tall; leaves 2–15 cm long, 1–5 cm wide, obtuse or rounded apically; petioles 3–15 mm long; flowers usually in axillary cymes or solitary; sepals 5; petals 5, 4–7 mm long, pinkish or reddish; filaments fused 1/2–2/3 of their lengths; ovary 3-carpellate; capsules 7–11 mm long. In or on edge of water or in moist woods; se and e TX w to Milam Co. near extreme e margin of nc TX. Aug–Oct. [*Hypericum walteri* J.G. Gmel.]

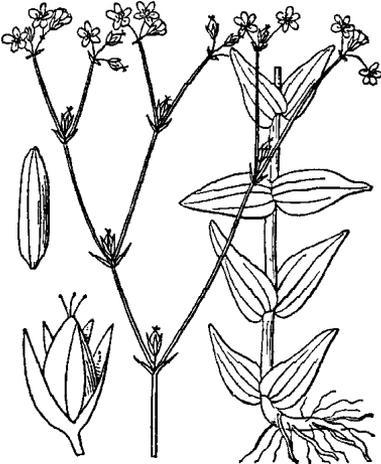
## CONVOLVACEAE MORNING-GLORY FAMILY

Ours annual or perennial, herbaceous, some with milky sap; twining and climbing vines or stems trailing to erect; leaves alternate, simple or palmately compound, entire or lobed or with few, coarse teeth, exstipulate; flowers perfect, axillary, solitary or few in small cymes (the cymes head-like in *Jacquemontia*); calyx lobes or sepals 5; corollas sympetalous, funnellform to campanulate, salverform, or rotate, 5-toothed, -angled, or -lobed; stamens 5, distinct, attached at base or on tube of corolla; pistil usually 2-carpellate; ovary superior, styles 1–2; fruit a capsule with usually 1–4 seeds.

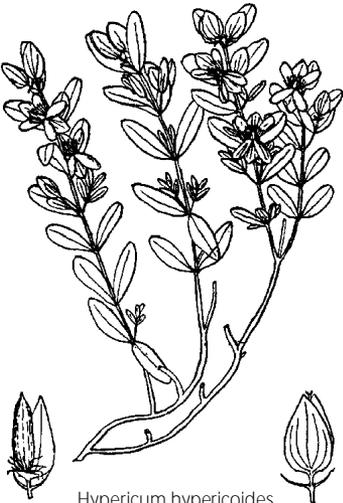
☞ A medium-large family of 55 genera (Austin 1998) and 1,600 species. It is a cosmopolitan family of herbaceous climbers, lianas, herbs, shrubs, or rarely trees; a number are showy ornamentals; *Ipomoea batatas* (L.) Lam. (SWEET-POTATO) is widely cultivated; some are problematic weeds (e.g., *Convolvulus*). (subclass Asteridae)



*Hypericum gentianoides* [BB2]



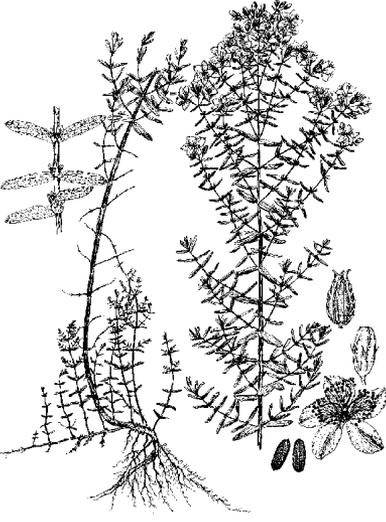
*Hypericum gymnanthum* [BB2]



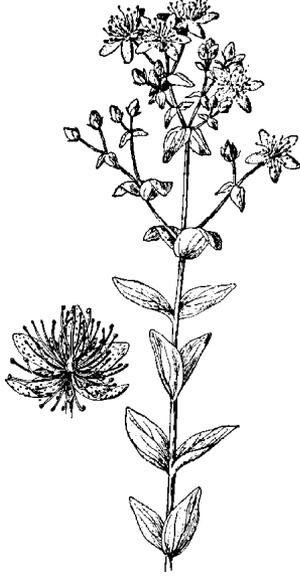
*Hypericum hypericoides*  
subsp. *hypericoides* [BB2]



*Hypericum mutilum* [BB2]



*Hypericum perforatum* [RE]



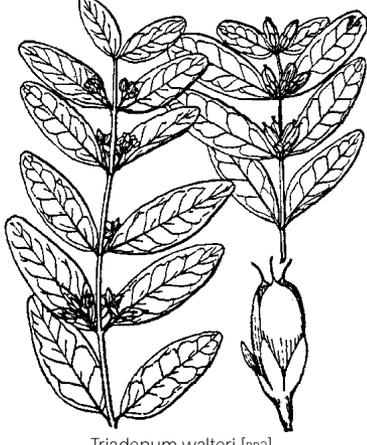
*Hypericum pseudomaculatum* [GL]



*Hypericum punctatum* [BB2]



*Hypericum sphaerocarpum* [BB1]



*Triadenum walteri* [BB2]

FAMILY RECOGNITION IN THE FIELD: *twining* herbs (2 species erect to decumbent) with alternate, sometimes cordate leaves; sap sometimes milky; corollas often showy, sympetalous, radially symmetrical, variable in shape but often funnellform to campanulate; ovary superior.

REFERENCES: Wilson 1960c; Austin 1986a, 1990, 1998.

1. Parasitic vines, yellowish brown; leaves absent \_\_\_\_\_ **Cuscuta** (see Cuscutaceae)
1. Plants green, chlorophyllous; leaves present.
  2. At least some leaf blades usually kidney-shaped, on petioles longer than the blades; open corollas 1.5–7 mm broad; corollas light green or greenish white, deeply lobed, the lobes longer than the tube; capsules with 2 distinct lobes \_\_\_\_\_ **Dichondra**
  2. Leaf blades usually not kidney-shaped, on petioles shorter to longer than the blades; open corollas 8–70 mm or more broad; corollas variously colored including white, not deeply lobed; capsules without 2 distinct lobes.
  3. Stigmas or stigma lobes 2 or 4 per flower, variously shaped (filiform to linear or oblong- or elliptic-flattened) but neither globose nor subglobose; corollas either 25(–30) mm or less long OR if longer (in *Calystegia*) then completely white.
  4. Flowers numerous in a densely crowded, leafy-bracted, head-like inflorescence; sepals with conspicuous, long (ca. 2–3 mm), tawny hairs easily visible to the naked eye; corollas blue \_\_\_\_\_ **Jacquemontia**
  4. Flowers solitary or in 2s or 3s; sepals glabrous to pubescent, but without long hairs conspicuous to the naked eye; corolla color various including blue.
    5. Erect to decumbent herbs with short stems to only 35 cm long; flowers sessile or short-pedicelled; pedicels shorter than calyces; corollas rotate to shallowly campanulate, white or pale to deep lavender; stigmas 4 per flower \_\_\_\_\_ **Evolvulus**
    5. Vines with elongate stems that can reach 1–2 m in length; flowers on long pedicels or peduncles exceeding calyces; corollas funnellform; variously colored including white or lavender; stigmas 2 per flower.
    6. Leaves narrowly linear to linear, 1–3 mm wide, entire; corollas white \_\_\_\_\_ **Stylisma**
    6. Leaves variously shaped but not narrowly linear to linear, much > 3 mm wide, entire to toothed or lobed; corollas white to pink or pink with red eye to white or pink inside, with the outside wholly pinkish or brownish lavender or with broad bands of those colors.
      7. Calyces ebracteate; corollas 1.2–3 cm long, usually with some color, sometimes all white \_\_\_\_\_ **Convolvulus**
      7. Calyces immediately subtended by 2 large floral bracts; corollas 4–5 cm long, white \_\_\_\_\_ **Calystegia**
  3. Stigma globose and unlobed OR stigma with 2–3 globose or subglobose lobes; corollas usually > 25 mm long (< 25 mm in 2 red-flowered *Ipomoea* species and in the white-flowered *Ipomoea lacunosa*), usually not completely white.
    8. Leaves with 5–7 palmate lobes that are toothed to pinnatifid; corollas white with purple-red center \_\_\_\_\_ **Merremia**
    8. Leaves not 5–7 palmately lobed with the lobes toothed to pinnatifid; corollas variously colored, usually not as above \_\_\_\_\_ **Ipomoea**

### CALYSTEGIA HEDGE-BINDWEED

☛ A genus of ca. 25 species widespread in the temperate zones (D. Austin, pers. comm.); it includes cultivated ornamentals and pernicious weeds. (Greek: *kalyx*, cup, cover, calyx, and *stega*, cover, alluding to the two bracts that subtend the flowers and conceal the calyx)

REFERENCES: Brummitt 1965, 1981; Lewis & Oliver 1965; Austin 1986a, 1992; Austin et al. 1997.

**Calystegia macounii** (Greene) Brummitt, (for John Macoun, who collected the type specimen in

1895). Semi-erect or sparsely twining, pubescent, perennial herb; leaf blades 2–6 cm long, 1–5 cm wide, basally cordate to subsagittate, marginally entire; petioles 0.5–40 mm long; flowers axillary, solitary, on peduncles usually 3–5 cm long; floral bracts 2, enclosing calyces, foliaceous, strongly inflated, 20–25 mm long, 10–15 mm wide; sepals 10–12 mm long, 5–7 mm wide; corollas funnellform, 4–5 cm long, white; style 1. Along a stream bank in limestone area, typically sandy soils near waterways in open grasslands or openings in woodlands; Cooke Co. (*Shinners 13256*, BRIT/SMU); otherwise unknown in TX; the presence of *C. macounii* in TX was only recently recognized (Austin et al. 1997). May–Jun. [*Convolvulus interior* House, *Convolvulus macounii* Greene]

*Calystegia sepium* (L.) R. Br. subsp. *angulata* Brummitt, (sp.: growing along hedges; subsp.: angular), TRAILING HEDGE-BINDWEED, *Calystegia sepium* (L.) R. Br. subsp. *limnophila* (Greene) Brummitt, (swamp-loving), and *Calystegia silvatica* (Kit.) Griseb. subsp. *fraterniflora* (Mack. & Bush) Brummitt, (sp.: pertaining to the woods; subsp.: with brotherly flowers, these sometimes in pairs), are also known from TX (Hatch et al. 1990; Austin et al. 1997). Because of past confusion involving TX *Calystegia* taxa and because of the possibility of these additional taxa being found in nc TX, the following key (from Austin et al. 1997) is included.

1. Leaf sinus quadrate (= nearly square); blade tissues not beginning for 2–5(–10) mm from petiole attachment (only vascular tissue near attachment) \_\_\_\_\_ *C. silvatica* subsp. *fraterniflora*
1. Leaf sinus V- or U-shaped; blade tissues beginning at the point of petiole attachment.
  2. Basal lobes of leaf blades with 1–2 small, tooth-like angles; plants normally glabrous or with a few trichomes on petioles \_\_\_\_\_ *C. sepium* subsp. *angulata*
  2. Basal lobes of leaf blades usually rounded; plants normally pubescent on all vegetative parts.
    3. Plants twining throughout; leaf blades narrow (mostly 3:1 length to width ratio) \_\_\_\_\_ *C. sepium* subsp. *limnophila*
    3. Plants semi-erect or sparsely twining; leaf blades broad (mostly 2:1 length to width ratio) \_\_\_\_\_ *C. macounii*

### CONVOLVULUS BINDWEED

Trailing to decumbent or twining perennials; leaves petioled; leaf blades entire, toothed, or lobed, basally truncate to cordate, hastate, or sagittate; flowers axillary, solitary or in cymes of 2 or 3; corollas campanulate; style 1; stigmas 2, linear, ± flattened, slightly acute; capsules 1–4-seeded.

☛ A cosmopolitan, but especially temperate genus of ca. 100 species; some have alkaloids. A number are cultivated as ornamentals, while others can be pernicious weeds. (Latin: *convolvere* to entwine, in reference to the twining habit of some species)

REFERENCE: Lewis & Oliver 1965.

1. Calyces 3–5 mm long, inconspicuously pubescent or glabrous; corollas merely 5-angled; plants sparsely pubescent; leaf blades entire except for basal lobes, ovate to ovate-lanceolate to elliptic, often almost as wide as long \_\_\_\_\_ **C. arvensis**
1. Calyces 6–12 mm long, densely pubescent; corollas with margin having 5 sharp points or projections; plants densely gray-pubescent; leaf blades from entire to toothed or deeply lobed, variously shaped, usually much longer than wide, sometimes with the main part very long and narrow \_\_\_\_\_ **C. equitans**

**Convolvulus arvensis** L., (of fields), POSSESSION-VINE, BINDWEED, FIELD BINDWEED, COMMON BINDWEED, CORNBIND. Perennial from deep creeping root, forming extensive beds; stems to 1 m or more long, decumbent or twining; calyx lobes elliptic-orbicular; corollas white to pink inside, outside with broad bands or wholly pinkish or brownish lavender, 1.2–2.5 cm long. Roadsides, disturbed sites, a problematic weed in gardens and difficult to eradicate because of the deep root; throughout much of TX. May–Jul, less freely later. Native of Eurasia. ☛

**Convolvulus equitans** Benth., (riding a horse, like legs of a rider around a horse), GRAY BINDWEED, TEXAS BINDWEED. Perennial from taproot, not forming extensive beds; stems to 2 m long, trailing to decumbent; leaves very variable; calyx lobes auricled basally to not auricled; corollas white, pink, or pink with red eye, 1.5–3 cm long. Prairies, disturbed areas; nearly throughout TX except extreme e. May–Oct.

### DICHONDRA PONY-FOOT

Small, mat-forming, sparsely pubescent, creeping or trailing perennials rooting at the nodes; leaves long-petioled; leaf blades orbicular-ovate to reniform, entire or notched at apex; flowers small, 1–2 per axil, long-pedicelled but pedicels shorter than petioles; corollas with lobes longer than the tube, light green or greenish white; styles 2, 1 from each of the 2 nearly separate carpels; capsules with 2 or 4 seeds.

☛ A genus of 16 species (D. Austin, pers. comm.) native to tropical and warm areas of the world. (Greek: *di*, two or double, and *chondros*, a grain, from the deeply lobed fruit)

REFERENCES: Tharp & Johnston 1961; Johnston 1963a.

1. Pedicels straight; calyx lobes 2–3 times as long as wide; corollas nearly as long as calyces; wide-spread in nc TX \_\_\_\_\_ **D. carolinensis**
1. Pedicels abruptly recurved near summit; calyx lobes 1.5–2 times as long as wide; corollas almost 1/3 longer than calyces; found only in extreme s part of nc TX \_\_\_\_\_ **D. recurvata**

**Dichondra carolinensis** Michx., (of Carolina). Plant to 12 cm high; pedicels during flowering 1/3–2/3 as long as petioles; calyx lobes oblong or oblanceolate, separate nearly to base, slightly exceeding the corolla. Damp sandy or silty ground, also a common lawn weed; Bell, Dallas, Denton, and Grayson cos.; se and e TX w to East Cross Timbers. Apr. [*Dichondra repens* J.R. Forst. var. *carolinensis* (Michx.) Choisy]

**Dichondra recurvata** Tharp & M.C. Johnst., (curved backward). Plant to 17 cm high; pedicels during flowering 1/10 to 1/2 as long as petiole; flowering calyces 2.5–3.2 mm long, shorter than corollas. Roadsides, brushy creekbanks; Mills and Williamson cos., also Bell and Burnet cos. (Johnston 1963a); s part of nc TX s to c TX; endemic to nc and c TX. 📍

### EVOLVULUS

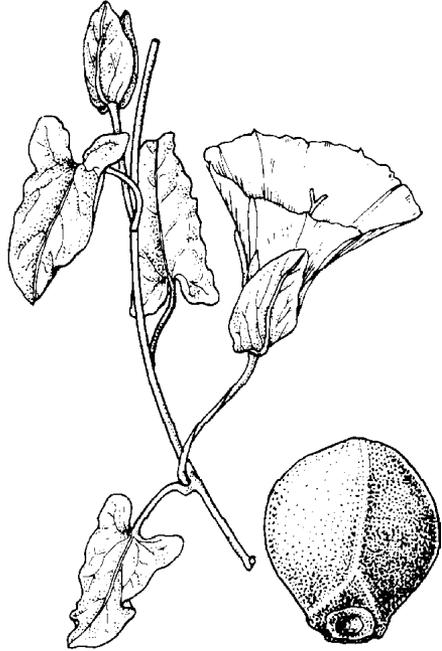
Ours small pubescent perennials with several erect to ascending stems from a small woody base; stems decumbent to erect; leaves sessile, entire, narrowly lanceolate to oblong-lanceolate, small, 3 cm or less long, 1–8 mm wide; flowers solitary, axillary; corollas 8–18 mm across, rotate or shallowly campanulate; styles 2, each with 2 branches, the 4 stigmas linear or filiform; capsules 1–4-seeded.

☛ A genus of 98 species of warm and tropical areas of the Americas; 2 species extend to the Old World. (Latin: *evolvere*, to untwist or unroll, alluding to the non-climbing habit compared with other members of the family)

REFERENCES: Van Ooststroom 1934; Perry 1935.

1. Leaves densely pubescent on both surfaces; corollas pale to deep lavender; sepals lanceolate to narrowly lanceolate, 4–5 mm long, spreading pilose \_\_\_\_\_ **E. nuttallianus**
1. Leaves glabrous above or nearly so; corollas white; sepals oblong lanceolate, 3–5 mm long, appressed pilose \_\_\_\_\_ **E. sericeus**

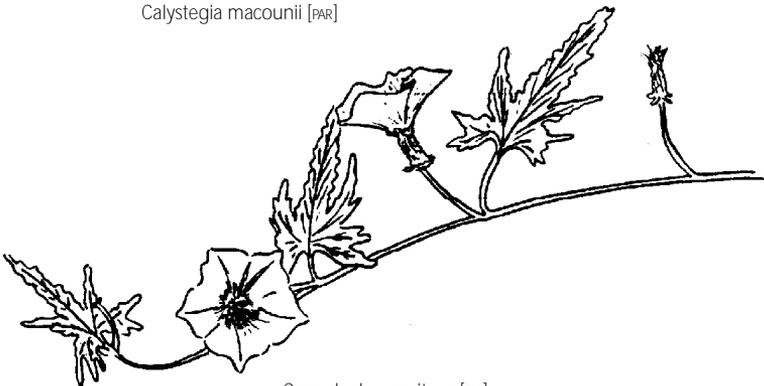
**Evolvulus nuttallianus** Schult., (for Sir Thomas Nuttall, 1786–1859, English-American botanist), HAIRY EVOLVULUS, NUTTALL'S EVOLVULUS, SHAGGY EVOLVULUS, DWARF-MORNING-GLORY. Stems 5–



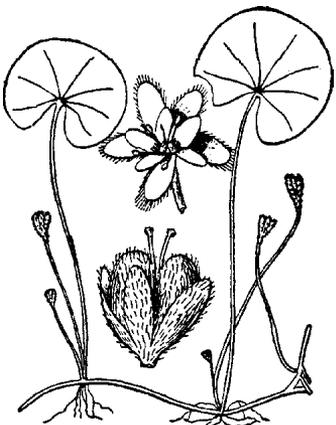
*Calystegia macounii* [PAR]



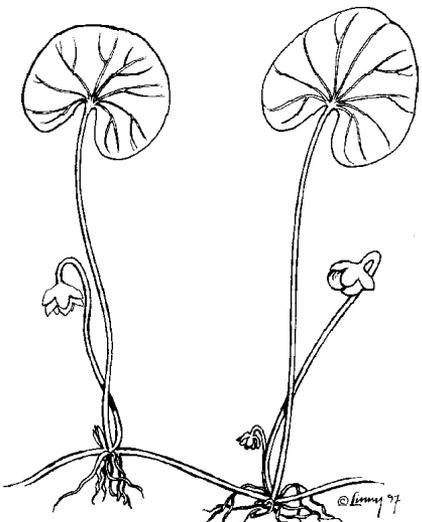
*Convolvulus arvensis* [NIC, REE]



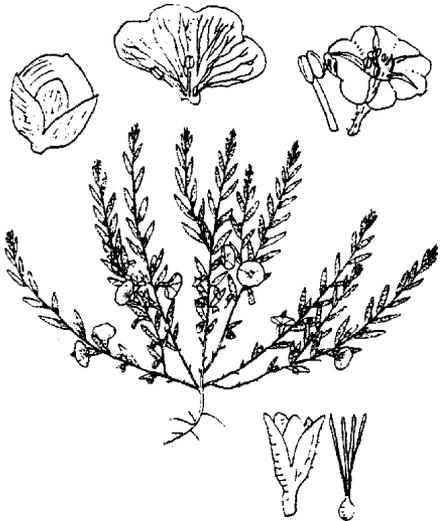
*Convolvulus equitans* [SHI]



*Dichondra carolinensis* [BB2]



*Dichondra recurvata* [HEA]



*Evolvulus nuttallianus* [SM1, STE]

25 cm long, densely villous. Sandy or rocky limestone soils; nearly throughout TX except extreme e. Apr–Oct. [*Evolvulus pilosus* Nutt.]

**Evolvulus sericeus** Sw., (silky), SILKY EVOLVULUS. Stems 6–35 cm long, densely villous; leaves densely pubescent on lower surface in contrast to the upper surface. Sandy, mixed sandy and gravelly, or rocky limestone soils, on hillsides, roadsides, and in open woods; nearly throughout TX except extreme e part.

### IPOMOEA MORNING-GLORY, MOONFLOWER

Ours trailing or twining annual or perennial vines or rarely a shrubby perennial, mostly flowering in summer and fall; leaves petioled; leaf blades variable in shape, often ± cordate at base, entire to lobed or apparently compound; flowers axillary, solitary or in 2- to ca. 5-flowered cymose inflorescences; corollas funnellform, funnellform-campanulate, or salverform, usually large and showy, often open for less than 8 hours; style 1; stigma solitary, unlobed, globose or with 2–3 globose or subglobose lobes; capsules usually with 1–4 seeds.

☛ A huge genus of ca. 600–700 species (Austin & Huáman 1996) of climbing vines or shrubs native to tropical and warm temperate regions. Many species are cultivated as ornamentals for their flowers; some escape and become troublesome weeds; ☛ others are toxic and hallucinogenic due to ergoline alkaloids; a Mexican species was used in religious ceremonies by the Aztecs (Schmutz & Hamilton 1979). The genus includes the SWEET-POTATO or YAM as discussed below. According to Strausbaugh and Core (1978), the common name, MORNING-GLORY, is derived from the tendency of the flowers of some species to open at night or in diffuse light (frequently in the morning). The rust fungus *Coleosporium ipomoeae* Burrill sometimes forms conspicuous yellow lesions on the leaves of *Ipomoea* species in nc TX; it is a heterecious rust (= uses more than one host to complete its life cycle) that also infects *Pinus taeda* (LOBLOLLY PINE), but it can survive using only MORNING-GLORIES (J. Hennen, pers. comm.) (Greek: *ips*, a worm, and *homois*, resembling, from the twining habit)

REFERENCES: O'Donnell 1959; Jones & Deonier 1965; Austin 1976, 1978, 1988; Woolfe 1992; Bohac et al. 1995; Austin & Huáman 1996.

1. Corollas red, orange-red, or red with yellow tube (white in some cultivated forms), 2–3.5 cm long, salverform, the tube abruptly flared near the summit; stamens exserted—in other words, projecting beyond plane of limb (= open face of corolla); corolla limb 2 cm or less wide.
  2. Leaf blades pinnately divided into very narrow, linear, almost thread-like segments ca. as wide as the midrib \_\_\_\_\_ **I. quamoclit**
  2. Leaf blades entire to angle-toothed, not pinnately divided \_\_\_\_\_ **I. coccinea**
1. Corollas variously colored, usually not red, of variable length, often longer than 4 cm long, funnellform or funnellform-campanulate, the tube gradually expanded from below middle; stamens included within corolla, not exserted; corolla limb usually > 2 cm wide (except in the small white-flowered *I. lacunosa*).
  3. Leaves palmately compound with 3–7 leaflets (blades divided to base) \_\_\_\_\_ **I. wrightii**
  3. Leaves entire to variously and sometimes deeply divided, but not divided to base (thus not compound).
    4. Pedicels and peduncles with reflexed hairs; corollas variable in color but in some light blue to blue with white or yellowish center.
      5. Corollas purple or blue-purple to pink or white; sepals 6–17 mm long, lanceolate-elliptic or lanceolate-oblong, with slightly narrowed straight tips shorter to slightly longer than sepal body, glabrous to pubescent; leaf blades variable but often unlobed \_\_\_\_\_ **I. purpurea**
      5. Corollas usually light blue to blue with white or yellowish center, sometimes drying purplish pink (varying to all lavender or in cultivated forms other colors); sepals 12–24 mm

long, with very narrow, elongate, usually curved, tail-like tips much longer than ovate sepal body, at least the body densely long hirsute; leaf blades variable but usually 3-lobed \_\_\_\_\_

**I. hederacea**

4. Pedicels and peduncles with spreading to ascending hairs or glabrous; corollas variable in color but neither light blue nor blue with white or yellowish center.

6. Leaf blades linear-lanceolate to linear, 2–8 mm wide; petioles 1–7 mm long \_\_\_\_\_ **I. leptophylla**

6. Leaf blades triangular to cordate-ovate or sagittate, usually wider than 8 mm; petioles usually 10–80 mm long.

7. Corollas white or white with a tinge of pink, 1.6–2(–2.5) cm long \_\_\_\_\_ **I. lacunosa**

7. Corollas white with purple-red center, or pink to purplish, or pink to purplish with dark center, or rarely all white, 2.8–8 cm long.

8. Corollas 5–8 cm long, white (rarely pink) with purple-red center; sepals rounded or nearly so at apex; leaf blades ovate-lanceolate to broadly ovate or cordate, entire or pandurate (= contracted at sides so as to be fiddle-shaped).

9. Leaf blades pandurate or not so, 2–9 cm wide, broadly ovate to cordate in outline, cordate to rounded-truncate at base; widespread in nc TX \_\_\_\_\_ **I. pandurata**

9. Leaf blades not pandurate, 1–4 cm wide, narrowly ovate to narrowly ovate-lanceolate, rounded to cuneate at base; extremely rare, in nc TX known only from Cooke and Montague cos. \_\_\_\_\_ **I. shumardiana**

8. Corollas 3–5 cm long, pink to purplish or pink to purplish with dark center or rarely all white; sepals pointed at apex; leaf blades ovate to cordate-ovate or nearly triangular, entire or 3–5-lobed.

10. Sepals about equal in length; root not tuberous; corollas pink to purplish with dark center or rarely all white; stems not rooting at the nodes; leaf blades ovate to cordate-ovate, entire or 3–5-lobed; native species widespread in nc TX \_\_\_\_\_

**I. cordatotriloba**

10. Sepals unequal in length, the outer 3/4–5/6 as long as the inner; root tuberous; corollas pink to purplish; stems rooting at the nodes; leaf blades nearly triangular in outline, usually entire or 3–5-lobed; cultivated plant introduced to nc TX, possibly persisting but unlikely to be found in the wild \_\_\_\_\_ **I. batatas**

**Ipomoea batatas** (L.) Lam., (vernacular name for this species from Chibchan-speakers of Colombia; from it is derived the English word potato—Austin 1988), SWEET-POTATO, YAM. Perennial (but cultivated as an annual) vine, trailing or twining, from soft tuberous root; sepals acuminate; corollas funnellform to funnellform-campanulate, pink to purplish, 4–7 cm long. Widely cultivated and possibly persisting; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); mainly e TX. May–Sep. Probably native of tropical America, now widely grown in tropical and warm areas for its edible root; it is cultivated in more than 100 countries (Woolfe 1992) and is especially important in Japan (Mabberley 1987) and China; in terms of production, SWEET POTATO is the world's seventh largest food crop (Woolfe 1992; Bohac et al. 1995). Contreras et al. (1995) gave information about the SWEET POTATO in Mexico. True YAMS are in the genus *Dioscorea* (Dioscoreaceae). ☞

**Ipomoea coccinea** L., (scarlet), SCARLET-CREEPER, SCARLET MORNING-GLORY, STARGLORY, RED MORNING-GLORY. Low-climbing annual vine; leaf blades broadly ovate, entire to dentate with 3–5 teeth; sepals obtuse with a narrow awl-like appendage from just below the apex; corollas salverform, orange-red or red with yellow tube, 2–2.5(–4) cm long, the limb 1.7–1.9 mm wide; stamens exerted, 2.7–3 cm long. Cultivated and escapes; McLennan Co.; otherwise known from coastal TX and Edwards Plateau. Jul–Nov. Native of se U.S. Austin (1975) considered this species adapted for pollination by ruby-throated hummingbirds (*Archilochus colubris*).

***Ipomoea cordatotriloba*** Dennst., (cordate or heart-shaped and three-lobed). Perennial (but flowering the first year), twining and low-climbing vine from branched root; sepal tips acute or acuminate; corollas funnellform to funnellform-campanulate, purple-rose with dark eye, rarely white, 2.8–5.5 cm long. Stream bottoms, fencerows, disturbed sites. Jun–Sep. According to Austin (1976), the following two varieties occupy different habitats in TX; var. *torreyana* is found mainly in prairie and plain areas, while var. *trichocarpa* is found mainly in deciduous forest; some intermediates are known where the two habitat types meet.

1. Sepals pubescent or pilose, at least at apex or on margins; leaves and stems glabrous to pilose

\_\_\_\_\_ var. **cordatotriloba**

1. Sepals glabrous; leaves and stems glabrous \_\_\_\_\_ var. **torreyana**

var. **cordatotriloba**, SHARP-POD MORNING-GLORY, WILD MORNING-GLORY, PURPLE MORNING-GLORY, TIEVINE. Dallas, Hill, Limestone, Parker, and Tarrant cos., also Bell, Ellis, Falls, Grayson, and Johnson cos. (Austin 1976); se and e TX w to nc TX. [*Ipomoea trichocarpa* Elliott] ☒/94

var. **torreyana** (A. Gray) D.F. Austin, (for John Torrey, 1796–1873, coauthor with Asa Gray of *The Flora of North America*), COTTON MORNING-GLORY. Coryell, Parker, and Tarrant cos., also Bell, Brown, Dallas, Hood, Johnson, Lampasas, McLennan, Mills, Palo Pinto, Somervell, and Williamson cos. (Austin 1976); se and e TX w to nc TX. [*Ipomoea trichocarpa* Elliott var. *torreyana* (A. Gray) Shinnery]

***Ipomoea hederacea*** Jacq., (resembling *Hedera*—English ivy), IVY-LEAF MORNING-GLORY. Annual twining vines; stems retrorsely pubescent; leaf blades usually 3-lobed to rarely unlobed or 5-lobed; sepals with tail-like tips much longer than ovate sepal body, at least the body densely long hirsute; corollas funnellform, usually light blue or blue with white or yellowish center (varying to all lavender or in cultivated forms other colors), sometimes drying puplish pink, 2.5–5 cm long. Disturbed areas, roadsides; Bell, Dallas, Grayson, and Rockwall cos.; scattered localities in TX. Jul–Oct.

***Ipomoea lacunosa*** L., (with air spaces, holes or pits, from the loosely reticulate venation of the leaves), PITTED MORNING-GLORY, SMALL WHITE MORNING-GLORY, WHITE MORNING-GLORY. Annual often twining vine from taproot, sparsely to densely hispid-pubescent; leaf blades unlobed or angulate or lobed; sepals acuminate; corollas funnellform, white or white with a tinge of pink, 1.5–2(–2.5) cm long. Disturbed areas; Dallas and Grayson cos., also Tarrant Co. (Mahler 1988); se and e TX w to nc TX, also Edwards Plateau. Sep–Oct.

***Ipomoea leptophylla*** Torr., (thin-leaved), BUSH MORNING-GLORY. Perennial herb; stems erect to decumbent, bushy-branched, to ca. 1.2 m tall; leaf blades lanceolate to linear, unlobed; petioles 1–7 mm long; corollas funnellform to funnellform-campanulate, lavender-pink with dark center or completely purple-red, 5–9 cm long; Clay and Montague cos.; West Cross Timbers s and w to w TX.

***Ipomoea pandurata*** (L.) G. Mey., (fiddle-shaped), BIG-ROOT MORNING-GLORY, WILD POTATO-VINE, MAN-OF-THE-EARTH, WILD POTATO, WILD SWEET-POTATO, INDIAN-POTATO. Perennial twining or trailing vine; juice milky; leaf blades cordate-ovate, often fiddle-shaped (= pandurate); sepal tips obtuse; corollas funnellform, white with purple-red eye, 5–8 cm long. Sandy roadsides and disturbed ground; Cooke, Dallas, Grayson, and Tarrant cos., also Montague Co. (S. Lusk, pers. comm.) e TX w to nc TX, also Edwards Plateau. Jun–Sep. The starchy, enormously thickened roots of old plants can weight up to 25 pounds (Wills & Irwin 1961); they were reportedly used by Native Americans as food; they are also reported to be poisonous, to have a milky resinous juice, and to contain the glucoside ipomoein (Burlage 1968). ☒ ☒/94

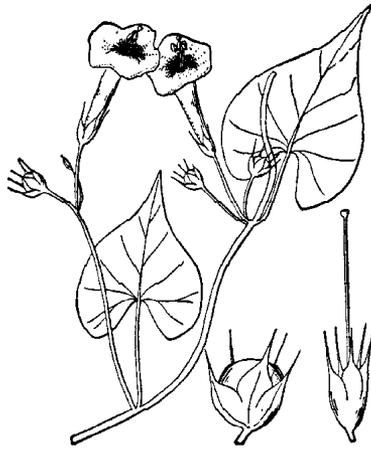
***Ipomoea purpurea*** (L.) Roth, (purple), MEXICAN MORNING-GLORY, WOOLLY MORNING-GLORY, COMMON MORNING-GLORY. Annual, low- to high-climbing, twining vine; leaf blades usually unlobed



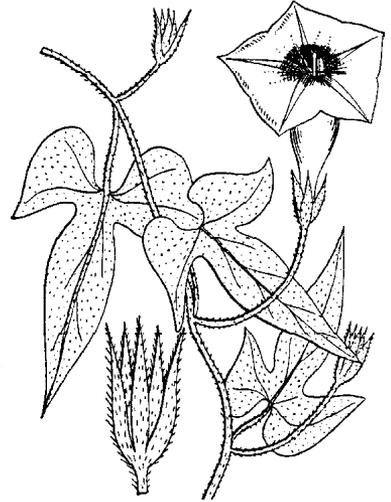
*Evolvulus sericeus* [Ru]



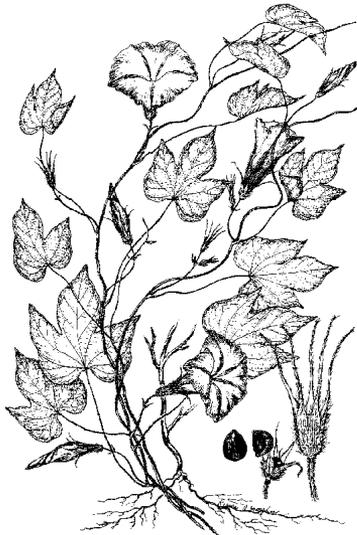
*Ipomoea batatas* [BR2]



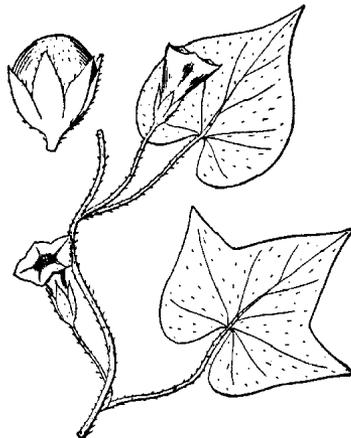
*Ipomoea coccinea* [BB2]



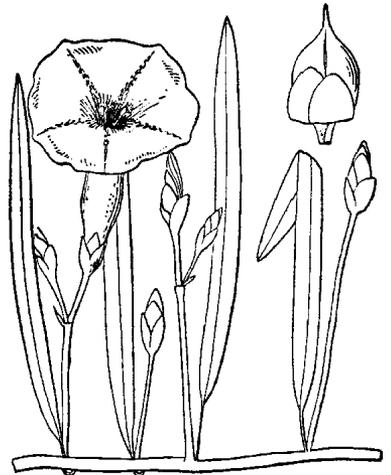
*Ipomoea cordatotriloba*  
var. *cordatotriloba* [BB1]



*Ipomoea hederacea* [REE]



*Ipomoea lacunosa* [BB2]



*Ipomoea leptophylla* [BB2]

to rarely 3- or 5-lobed; corollas funnellform, blue-purple to reddish or white (variable in cultivated forms), 2.5-5(-7) cm long. Stream banks, disturbed or waste areas; Dallas Co.; mainly w part of TX. [*I. purpurea* (L.) Roth var. *diversifolia* (Lindl.) O'Donell] Reported to be poisonous (Burlage 1968). ☞☞

***Ipomoea quamoclit*** L., (native Mexican name), CYPRESSVINE. Low-climbing, twining, annual vine; leaf blades pinnately divided into very narrow, linear, almost thread-like segments about as wide as the midrib (0.2-1.5 mm wide); corollas salverform, deep red (white in some cultivated forms), 2-3 cm long, limb 1.8-2 cm wide; stamens exserted, 2.5-3 cm long. Cultivated and spreads; Grayson Co.; also Blackland Prairie and Post Oak Savannah. Jul-Nov. Native of se U.S.

***Ipomoea shumardiana*** (Torr.) Shinnery, (for Benjamin Franklin Shumard, 1820-1869, state geologist of TX in 1860), NARROW-LEAF MORNING-GLORY. Perennial vine similar to *I. pandurata* but leaf blades often narrower, 3-8 cm long; corollas funnellform, white (rarely pink) with purple-red throat, 5-8 cm long. Possibly a hybrid between *I. leptophylla* and *I. pandurata* (Correll & Johnston 1970). Gravelly roadside prairie; rare; Montague Co. (*S. Lusk sn.*, 1997), also Cooke Co. (Correll & Johnston 1970); also Edwards Plateau; endemic of TX, OK, and KS. Jun-Aug. The recent Montague Co. collections are the only ones known from nc TX for many decades. [*Convolvulus shumardianus* Torrey, *I. carletoni* Holz.]

***Ipomoea wrightii*** A. Gray, (for Charles Wright, 1811-1885, TX collector), WRIGHT'S MORNING-GLORY. Low climbing vine with palmately compound leaves. Alluvial or damp soils; Grayson (Hagerman Nat. Wildlife Refuge) and Rockwall cos.; mainly c and s TX. Jun-Oct. Native probably of India. ☞☞

## JACQUEMONTIA

☞ A genus of 80-100 species of tropical and warm areas, especially the Americas; some are cultivated as ornamentals. (Named for Victor Jacquemont, 1801-1832, botanical explorer)

***Jacquemontia tamnifolia*** (L.) Griseb., (with leaves resembling *Tamnus* of Dioscoreaceae), HAIRY CLUSTERVINE. Annual; stems twining, to 2 m long, but can flower while still small and erect; leaves long-petioled; leaf blades ovate-elliptic to ovate, 3-12 cm long, 2-9 cm wide, the larger ones basally cordate, acute to acuminate at apex; flowers many, densely arranged in a leafy-bracted, pedunculate, head-like inflorescence; peduncles shorter to longer than leaves; bracts and sepals with conspicuous long hairs; bracts lanceolate to elliptic; sepals lance-linear; corollas 12-16 mm long, blue; style 1; stigmas 2, ± flattened; capsules 4-seeded. Cultivated, escaped in Dallas Co.; native to se and e TX. Jul-Oct. [*Ipomoea tamnifolia* L., *Thyella tamnifolia* (L.) Raf.]

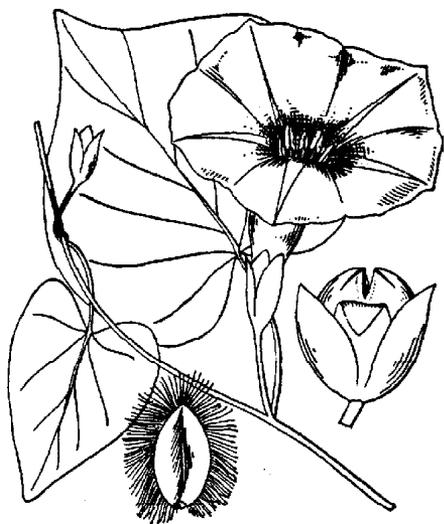
## MERREMIA

☞ A primarily tropical genus of ca. 70 species including some that are serious weeds in plantations; others are cultivated as ornamentals or used medicinally. (Named for Blasius Merrem, died 1824, German naturalist)

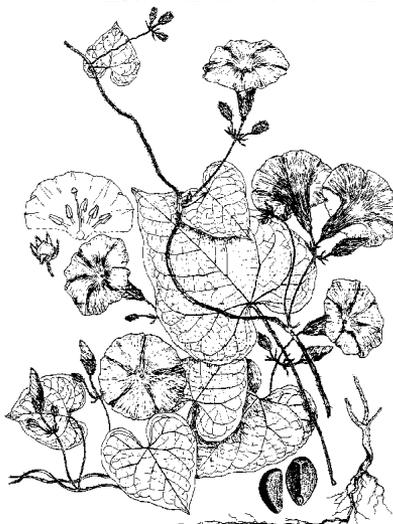
***Merremia dissecta*** (Jacq.) Hallier f., (dissected, deeply cut), ALAMO-VINE, CORREHUELA DE LAS DOCE. Low-climbing to trailing perennial vine; leaf blades palmately deeply 5- or 7-lobed, 4-15 cm long, ca. as wide, the lobes toothed to pinnatifid, obtuse; peduncles 1-2-flowered; corollas white with purple-red center, 3.5-5 cm long. Open and disturbed areas, banks of stream; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); c TX, native at least as far n as Travis Co. May-Nov. Sometimes lumped into the genus *Ipomoea* [as *I. sinuata* Ortega].

## STYLISMA BONAMIA

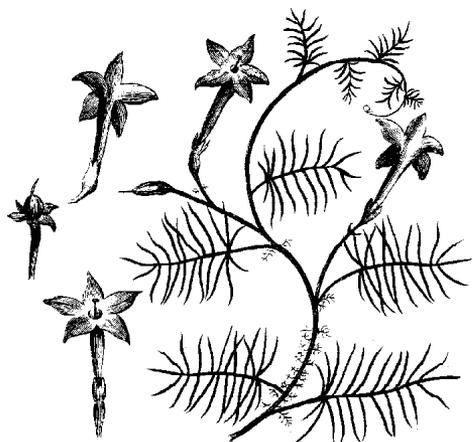
☞ A genus of 6 species native to s and e U.S. (Derivation of generic name unexplained by origi-



*Ipomoea pandurata* [BB2]



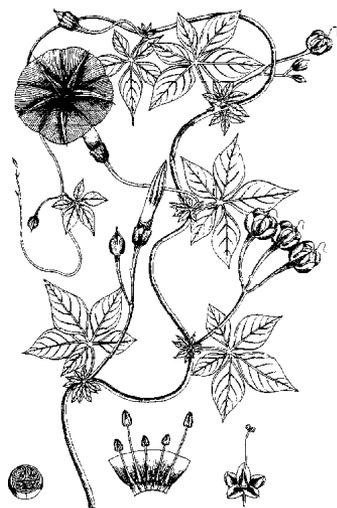
*Ipomoea purpurea* [RE1]



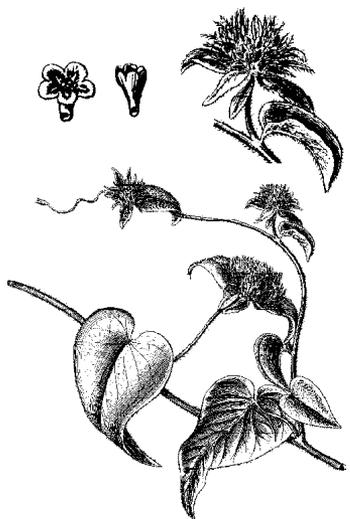
*Ipomoea quamoclit* [LAM]



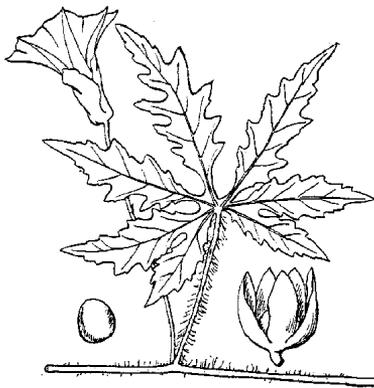
*Ipomoea shumardiana* [USH]



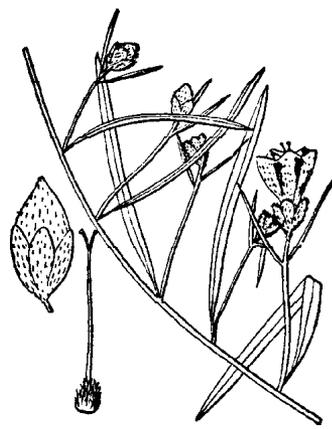
*Ipomoea wrightii* [WC]



*Jacquemontia tamnifolia* [DL]



*Merremia dissecta* [BR2]



*Stylisma pickeringii* var. *pattersonii* [BB2]

nal author, but possibly from Greek: *stylus*, a pillar, stake, or column, in reference to the style)  
 REFERENCES: Fernald & Schubert 1949; Shinnors 1962a; Myint 1966; Lewis 1971.

***Stylisma pickeringii*** (Torr. ex M.A. Curtis) A. Gray var. ***pattersonii*** (Fernald & B.G. Schub.) Myint, (sp.: for Charles Pickering, 1805–1878, botanist and physician on Wilkes expedition in the Columbia River area; var.: for Harry Norton Patterson, 1853–1919, American printer, botanist, and explorer), BIG-POD BONAMIA. Vine-like, pubescent, perennial herb with long, prostrate or trailing to ascending stems to 2 m long; leaves sessile or nearly so; leaf blades entire, narrowly linear to linear, 1–3 mm wide; flowers 1–3(–5) together, on short pedicels at tips of long axillary peduncles; peduncles with leafy bracteoles at tip; bracteoles 1.5–2.5 cm long; sepals hoary pubescent on back; corollas white, 10–18 mm long, funnellform to campanulate; filaments glabrous or nearly so; styles 2, fused nearly to base of the capitate stigmas; capsules with 1–2 seeds. Sandy open woods; Parker and Tarrant cos.; mainly se and e TX. May–Aug. [*Breweria pickeringii* (Torr. ex M.A. Curtis) A. Gray var. *pattersonii* Fernald & B.G. Schub.]

Hatch et al. (1990) cited 2 additional species, *S. aquatica* (Walter) Raf. (growing in or near water) (PURPLE BONAMIA) and *S. villosa* (Nash) House (covered with soft hairs) (HAIRY BONAMIA), for vegetational area 4 (Fig. 2); both of these apparently occur only to the s and e of nc TX. *Stylisma aquatica* can be distinguished by its filaments glabrous or nearly so, lavender corollas, and styles divided half way or more; *S. villosa* has filaments densely spreading-pilose in lower part, sepals pilose on the back, and white corollas. Another species, *S. humistrata* (Walter) Chapm., (stretched out on the ground), extends up the Sabine River to Wood Co. just e of nc TX. It has peduncles only minutely bracted, the elliptic-oblong leaves short-petioled, filaments densely spreading-pilose in lower part, sepals glabrous on the back, and white corollas.

## CORNACEAE DOGWOOD FAMILY

☛ A small (90 species in 12 genera—Mabberley 1987), mainly n temperate family rare in the tropics and subtropics; most are trees and shrubs or rarely rhizomatous herbs; several are cultivated including the ornamentally important genus *Cornus* (DOGWOOD). The Nyssaceae, here recognized as a distinct family, is sometimes lumped into the Cornaceae (e.g., Burckhalter 1992; Mabberley 1997). Recent molecular analyses (Xiang et al. 1993, 1998) suggest that *Cornus*, Nyssaceae, Hydrangaceae, and Loasaceae, as well as several other groups, form a “cornaceous clade”; however, they do not support the lumping of Nyssaceae into Cornaceae. (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: shrubs or small trees with opposite simple leaves with *arcuate veins* (= pinnate veins arching toward leaf tip) and small 4-merous flowers in open terminal inflorescences or in some cases in heads subtended by showy bracts; inferior ovary developing into a drupe fruit. The “*Cornus* test” discussed below is also distinctive.

REFERENCES: Coulter & Evans 1890; Rickett 1945a; Ferguson 1966c; Ziang et al. 1998.

### CORNUS DOGWOOD, CORNEL

Ours shrubs or small trees; leaves opposite, short-petioled, simple, entire, with prominent pinnate veins arching toward the leaf tip; flowers very small, perfect, in open inflorescences or conspicuously bracteate heads terminal on branches or branchlets; calyx lobes or sepals 4; petals 4, creamy white or yellow-green; stamens 4; filaments longer than the anthers; pistil 1; ovary inferior; fruit a small drupe.

☛ A genus of ca. 65 species of trees, shrubs, and rhizomatous herbs native mainly to n temperate areas with a few taxa in South America and Africa. A number of *Cornus* species are widely cultivated for the showy, bract-surrounded inflorescences that resemble individual flowers. An

interesting field character which can be used to identify *Cornus* species is the “*Cornus* test”—if a leaf is very gently torn into 2 pieces (apical part separated from basal), the primary veins remain connected by delicate whitish threads which represent the slinky-like, unraveled, spiral thickenings of the vascular tissue (Zomlefer 1994). (Latin: *cornu*, a horn, alluding to the hardness of the wood, the European *C. sanguinea* L. having long been used for skewers by butchers, whence SKEWERWOOD in English provinces and DAGWOOD from the old English: *dagge*, a dagger or sharp pointed object)

REFERENCES: Wilson 1964 [1965]; Ferguson 1966a, 1966b; Eyde 1987; Xiang et al. 1993, 1996 [1997].

1. Flowers in open inflorescences, with no large bracts; petals creamy white; fruits white \_\_\_\_\_ **C. drummondii**  
 1. Flowers in small compact inflorescences (heads) subtended by 4 large (to 5 cm long and 3 cm wide), white (rarely pink), petal-like bracts; petals yellow-green; fruits usually red \_\_\_\_\_ **C. florida**

**Cornus drummondii** C.A. Mey., (for its discoverer, Thomas Drummond, 1780–1835, Scottish botanist and collector in North America), ROUGH-LEAF DOGWOOD. Shrub or bushy small tree to ca. 5 m tall; twigs sometimes reddish; leaf blades pale and densely spreading pubescent or less often appressed pubescent beneath; calyx lobes shorter than the tube; petals 3.5–5.5 mm long. Stream banks, hillsides, woodlands, and thickets; e 1/2 of TX. May. [*C. priceae* Small] During the winter, the naked reddish twigs are often conspicuous.

**Cornus florida** L., (free flowering, producing abundant flowers), FLOWERING DOGWOOD, EASTERN DOGWOOD. Small tree with wide-spreading branches, to ca. 12 m tall; young branches usually greenish but sometimes reddish; leaf blades glabrous or silky-pubescent beneath, often scarlet in fall; inflorescence resembling a large 4-petaled flower. Wooded areas; Cooke, Grayson, Fannin, and Lamar cos. in Red River drainage, also Limestone Co. (J. Stanford, pers. comm.) and reported by Mrs. Stillwell from one Dallas locality (Mahler 1988); common in sandy woods in e TX to the e of nc TX; mainly e and c TX. This native understory species is widely cultivated as an ornamental. Late Mar–Apr Dogwood anthracnose, a fungal disease caused by a member of the genus *Discula*, is currently damaging FLOWERING DOGWOODS in the e U.S. (Mielke & Daughtrey 1990). The wood is extremely shock resistant and was therefore widely used historically for applications including golf club heads, chisel handles, and the shuttles used in the textile industry (Peattie 1948). The fruits are bird-dispersed and have a high lipid content (up to 35% dry weight) which makes them particularly attractive to migratory birds which have high energy demands (Stiles 1984).

## CRASSULACEAE STONECROP, ORPINE OR SUCCULENT FAMILY

Ours annual or perennial, often succulent herbs; leaves alternate, opposite, or whorled, simple, entire, slightly to very thick and fleshy; stipules absent; flowers axillary or usually terminal, solitary or in 1-sided racemes or in cymes; sepals 3–5(–7); petals 0–5; stamens 3–10; pistils 3–5(–7); ovaries superior; fruit a follicle or capsule.

☛ A medium-large (1,100 species in 33 genera) nearly cosmopolitan, especially s African family of usually succulent shrubs, herbs, and treelets with crassulacean acid metabolism (CAM photosynthesis—allows night absorption and storage of CO<sub>2</sub> thereby reducing water loss through transpiration during the day). A number are cultivated as ornamentals including species of *Crassula* (e.g., JADE PLANT), *Echeveria*, *Kalanchoe* (MOTHER-OF-THOUSANDS), and *Sedum* (STONECROPS). Crassulaceae show similarities to Saxifragaceae and the two families are thought by some to be related (e.g., Heywood 1993). (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: often succulent herbs (*Penthorum* not succulent) with radially symmetrical flowers with separate petals and usually separate (at least above) carpels of

the same number as the sepals. The somewhat similar Saxifragaceae are not succulent and typically have fused carpels fewer in number than sepals.

REFERENCES: Britton & Rose 1905; Spongberg 1978.

1. Leaves 5–15 cm long, lanceolate to elliptic-lanceolate, serrate, alternate, scattered along the stem; plants upright perennials to 80 cm tall; petals absent or inconspicuous \_\_\_\_\_ **Penthorum**
1. Leaves 2.5 cm or less long, linear to linear-oblong, entire, opposite OR if alternate, then crowded; plants small annuals to 30 cm tall (usually less); petals present, often conspicuous.
  2. Flowers minute, < 2 mm across, axillary, solitary, white to greenish white (rarely pinkish); leaves opposite; stamens as many as calyx segments \_\_\_\_\_ **Crassula**
  2. Flowers ca. 7–12 mm across, in terminal raceme-like cymes, yellow, white, pink, or lavender; leaves alternate; stamens twice as many as calyx segments \_\_\_\_\_ **Sedum**

## CRASSULA

☛ A nearly cosmopolitan, but especially tropical and s African genus of ca. 200 species of succulent herbs, shrubs, and treelets including many cultivated ornamentals; many have xeromorphic features. (Diminutive of Latin: *crassus*, thick, alluding to the succulent texture)

REFERENCES: Cody 1954; Tölkin 1977.

**Crassula aquatica** (L.) Schönl., (growing in or near water), WATER PIGMYWEED. Inconspicuous, glabrous, green or reddish, moisture-loving annual with decumbent to erect stems to 10 cm long; leaves opposite, linear to linear-oblong, to ca. 7 mm long, with united bases; flowers 3–4-merous; some pedicels exceeding the leaves; follicles ca. 1.5–2 mm long. Damp bare spots, pond margins, pathways, mudflats, sandy soils; collected by Reverchon in Dallas Co., also Navarro Co.; probably often overlooked; mainly se and e TX, also Edwards Plateau. Mar–Apr. Sometimes put in the genus *Tillaea* [as *T. aquatica* L.]. Relatively long-pedicelled plants, such as those in nc TX, are sometimes segregated as *C. drummondii* (Torr. & A. Gray) Fedde (e.g., Kartesz 1994), leaving those with sessile or short pedicellate flowers in *C. aquatica*; we are following Correll and Johnston (1970) and Hatch et al. (1990) in lumping [*C. drummondii*] into *Crassula aquatica*.

## PENTHORUM DITCH-STONECROP

☛ A genus of 1–3 species of e and se Asia and e North America; this disjunct distribution pattern is discussed under the genera *Campsis* (Bignoniaceae) and *Carya* (Juglandaceae). *Penthorum* is sometimes put into the Saxifragaceae; other authors have separated it into its own family the Penthoraceae. (Greek: *pente*, five, and *hos*, a mark, from the often symmetrically 5-parted flower)

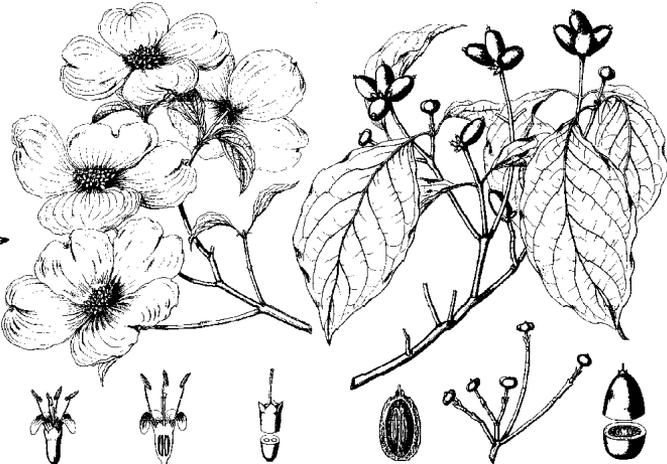
**Penthorum sedoides** L., (resembling *Sedum*—stonecrop). Rhizomatous and stoloniferous, largely glabrous, succulent, perennial herb to 80 cm tall; leaves alternate, short-petioled or sessile; leaf blades lanceolate to elliptic-lanceolate, 50–100(–150) mm long, sharply toothed; flowers yellowish green, in curved, 1-sided, spike-like, paniced cymes; sepals usually 5(–7); petals usually absent or inconspicuous; stamens 10; pistils 5(–7), united below; fruit a 5-angled capsule. Stream bottom thickets or damp open ground; Dallas, Fannin, Grayson, Henderson, Hunt, Lamar, and Tarrant (Fort Worth Nature Center) cos.; se and e TX w to nc TX. Jul–Sep.

## SEDUM STONECROP, ORPINE

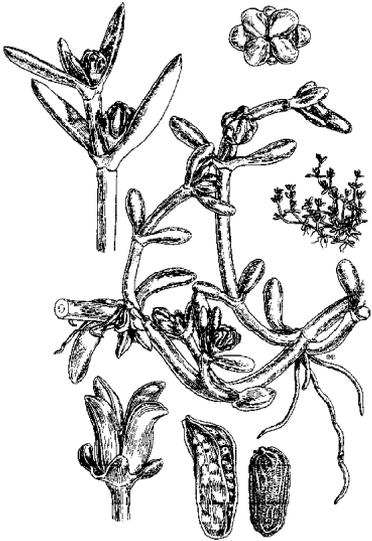
Ours glabrous annuals; leaves alternate, crowded, terete or nearly so; sepals and petals 4–5; stamens 8–10; pistils 4–5; fruit a dry, many-seeded follicle with tapered beak. (Classical Latin name for several succulent plants, from *sedo*, to sit, alluding to the manner in which many species affix themselves to rocks or walls)



*Cornus drummondii* [GLE]



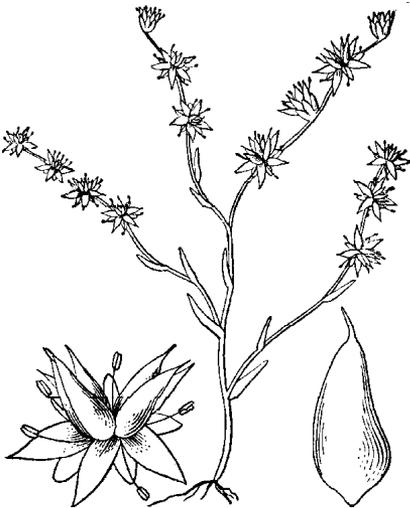
*Cornus florida* [SA3]



*Crassula aquatica* [MAS]



*Penthorum sedoides* [CO1]



*Sedum nuttallianum* [BB2]



*Sedum pulchellum* [BB2]

☛ A genus of ca. 280 species of n temperate areas, tropical mountains, Madagascar, and Mexico; it includes many cultivated, ornamental, succulent herbs and shrublets.

REFERENCES: Clausen 1975; Nesom & Turner 1995; White et al. 1998.

1. Petals yellow; flowers ca. 7 mm across; follicles widely divergent in fruit \_\_\_\_\_ **S. nuttallianum**

1. Petals white to pink or lavender; flowers 8–12 mm across; follicles ascending in fruit \_\_\_\_\_ **S. pulchellum**

**Sedum nuttallianum** Raf., (for Sir Thomas Nuttall, 1786–1859, English-American botanist), YELLOW STONECROP. Glabrous pale green annual to 13(–20) cm tall; leaves linear-oblong, nearly as thick as wide; inflorescences with 2–5 branches, the flowers remote. Loose sandy or eroding limestone slopes, shallow soils, or on sandstone outcrops; Post Oak Savannah w to West Cross Timbers and s to Edwards Plateau. May–Jun.

**Sedum pulchellum** Michx., (beautiful), TEXAS STONECROP, ROCK-MOSS, WIDOW'S-CROSS. Stems ascending, 10–30 cm tall; leaves linear, terete; inflorescences with 2–7 branches, the flowers closely spaced. Moist rocky areas; Bell Co. (Fort Hood—Sanchez 1997), also Coryell, Grayson, Lamar, and Limestone cos. (White et al. 1998); also far e TX and e Edwards Plateau. Mar–May.

## CUCURBITACEAE

### SQUASH, GOURD OR CUCUMBER FAMILY

Herbaceous annual or perennial vines; monoecious or dioecious; stems with tendrils, trailing or climbing; leaves usually palmately lobed or compound; flowers unisexual, radially symmetrical; corollas 5-lobed, yellow to greenish yellow, yellow-orange, or white; stamens 3 or 5, free or variously united; ovary inferior, usually 3-carpellate; fruit in ours a berry (sometimes with a firm rind and then called a pepo).

☛ A medium-sized family (775 species in 119 genera) of mainly tropical and warm area (few temperate) vines containing numerous economically important food plants including SQUASHES, PUMPKINS, AND MELONS (see following treatments); the fruits and/or flowers of a number of species are edible; other species provide ornamental and useful gourds. (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: herbaceous *vines* with *tendrils* and alternate, palmately-veined, usually lobed or compound, often conspicuous leaves; flowers usually yellow to white, unisexual; ovary inferior.

REFERENCES: Jeffrey 1975, 1990; Bates et al. 1990; Lira et al. 1997 [1998].

1. Corollas over 5 cm long or across; fruits > 5 cm long or broad, smooth.

2. Corollas light yellow to yellow or yellow-orange; leaf without disk-shaped gland at base of leaf blade; fruits globose to obovoid or cylindrical.

3. Fruits globose to obovoid, to ca. 9 cm long, fleshy inside, with a hard rind; corollas yellow or yellow-orange; flowers all solitary; anthers united \_\_\_\_\_ **Cucurbita**

3. Fruits cylindrical, curved or straight, 30–60 cm long, fibrous inside, the rind becoming dry and papery; corollas light yellow to yellow; staminate flowers racemose; anthers free \_\_\_\_\_ **Luffa**

2. Corollas white; leaf with disk-shaped gland on each side of the base of the leaf blade at junction with petiole; fruits variously shaped (bottle, dumbbell, club, crook-necked) \_\_\_\_\_ **Lagenaria**

1. Corollas < 5 cm long or across (often much less); fruits 5 cm or less long or broad (except much larger in *Cucumis melo*, MUSKMELON, and *Citrullus lanatus*, WATERMELON), smooth or prickly.

4. Stems and petioles glabrous.

5. Flowers greenish yellow; fruits unarmed, orange to red when ripe; leaves nearly unlobed to deeply 3–5-lobed but not divided into separate leaflets \_\_\_\_\_ **Ibervillea**

5. Flowers white; fruits conspicuously armed with long slender spines, green; leaves divided into 3–7 distinct leaflets \_\_\_\_\_ **Cyclanthera**

4. Stems and/or petioles pubescent (use lens).
6. Fruits smooth, reddish, 12–14 mm long, with 3–6 seeds; corollas greenish white \_\_\_\_\_ **Cayaponia**
6. Fruits prickly or smooth, not reddish, small to very large, with seeds 1–very numerous; corollas yellow to greenish yellow to white (if white then fruits with only 1 seed).
7. Corollas about 4 cm across, yellow; tendrils 2–3-forked; fruits very large (to 60 cm or more in length), smooth; seeds obovoid, flat, often 10–15 mm long; leaves very deeply lobed, the large central lobe itself ± pinnately lobed \_\_\_\_\_ **Citrullus**
7. Corollas 2.5 cm or less across, white to yellow or greenish yellow; tendrils usually unbranched (if branched then fruits prickly); fruits 5 cm or less long (except in *Cucumis melo*), smooth or prickly; seeds variously shaped, 10 mm or less long (to 12 mm in *Cucumis melo*); leaves usually angled or shallowly lobed, or if deeply lobed, then the central lobe itself not pinnately lobed.
8. Tendrils branched; fruits ovoid, pointed, 1–1.5 cm long, with a single seed, usually with prickly bristles; corollas white to cream \_\_\_\_\_ **Sicyos**
8. Tendrils unbranched; fruits either not pointed or > 3 cm long, many-seeded, smooth or prickly; corollas yellow or greenish yellow.
9. Corollas < 8 mm across; leaves mostly 5-lobed (the basal 2 lobes sometimes small); fruits green often with lighter patterning (like a baby watermelon), turning purplish black when ripe, smooth, 1–2 cm long \_\_\_\_\_ **Melothria**
9. Corollas > 10 mm across; leaves either unlobed (but angled) or 3-lobed; fruits never purplish blackish, either prickly or much > 2 cm long \_\_\_\_\_ **Cucumis**

## CAYAPONIA

☞ A mainly tropical and subtropical New World genus of 60 species (1 in tropical Africa and Madagascar) (Jeffrey 1990). (A Brazilian name)

**Cayaponia quinqueloba** (Raf.) Shinners, (five-lobed). Monoecious, rhizomatous, climbing perennial; leaves long-petiolate; leaf blades 3-angled or -lobed, 5–10 cm long; tendrils simple or branched; pistillate flowers and fruits on short stalks to 4 mm long or nearly sessile; corollas greenish white; stamens 3; ovary 3-carpellate with 1 or 2 ovules in each cell; fruits reddish, ovoid to ellipsoid, somewhat fleshy, 12–14 mm long; seeds 3–6. River bottoms and along streams; included based on citation for vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); Post Oak Savannah w to nc TX and s to Edwards Plateau. Jun–Aug.

## CITRULLUS

☞ A genus of 4 species native to tropical and s Africa and probably also Asia. (Diminutive of *Citrus*, from the supposed resemblance of the fruits to those of that genus of Rutaceae)

REFERENCES: Bailey 1930b; Hara 1969a.

**Citrullus lanatus** (Thunb.) Matsum. & Nakai var. **lanatus**, (woolly), WATERMELON, SANDÍA. Monoecious annual with branched tendrils; stems long-trailing, prostrate; leaf blades once or twice deeply lobed or dissected; ovary densely lanate; fruits green or mottled or striped, very large, the flesh sweet, succulent, edible, usually red but can be orange, yellow, or white; seeds numerous, obovoid, variously colored. Commonly cultivated and found as a waif around picnic areas, trash heaps, roadsides, and waste areas; Grayson, Lamar, Palo Pinto, and Somervell cos.; scattered mainly in e 1/2 of TX. May–Nov. Native of Africa. [*C. citrullus* (L.) H. Karst, *C. vulgaris* Schrad.] This species has long been in cultivation; it was known in Egypt in the Bronze Age and probably much earlier (Zohary 1982); seeds were found in the tomb of Tutankhamun (Hepper 1990). ☞

*Citrullus lanatus* var. *citroides* (L.H. Bailey) Mansf., (resembling *Citrus*), (CITRON or PRESERVING MELON), with smaller fruits having hard white flesh that is not edible raw, is also cultivated for making preserves. 🌿

The name, *Citrullus colocynthis* (L.) Schrad., (from the classical name), was misapplied to the WATERMELON by Hatch et al. (1990) and apparently Jones et al. (1997). *Citrullus colocynthis* is an Old World species commonly known as the BITTER-APPLE or BITTER-CUCUMBER, is a perennial with small fruits (< 8 cm in diam.) and a sparsely hispid ovary; it is used as a purgative; we have no evidence that it is cultivated or escaped in nc TX. For discussion of nomenclature see Hara (1969a). 🌿

## CUCUMIS MELON

Annual, trailing or climbing, pubescent vines; usually monoecious; tendrils unbranched; leaf blades entire or somewhat lobed; flowers usually short-stalked and hidden by foliage; corollas yellow, bell-shaped to rotate, deeply 5-parted; fruits fleshy, prickly or smooth; seeds numerous.

☛ An Old World tropical genus of ca. 30 species, mainly of tropical and s Africa (Jeffrey 1990); cultivated since early times. It includes *C. sativus* L. (CUCUMBER). (Name from classical Latin word for cucumber)

REFERENCE: Kirkbride 1993.

1. Leaf blades with 3 prominent lobes; ovaries and fruits prickly; flowers ca. 13 mm across (staminate sometimes larger); seeds < 5 mm long \_\_\_\_\_ **C. anguria**
1. Leaf blades angled, but usually not distinctly lobed; ovaries and fruits not prickly; flowers ca. 25 mm across; seeds ca. 12 mm long \_\_\_\_\_ **C. melo**

**Cucumis anguria** L., (Greek name for cucumber), BUR GHERKIN, WEST INDIAN GHERKIN. Leaf blades to 9 cm long, deeply 3-lobed, with sinuses rounded and lobes obtuse; fruits oval or oblong, furrowed, prickly, ca. 5 cm long, on crooked peduncles. Occasionally cultivated, escapes [?]; included based on citation for vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); nc to s TX. Aug–Sep. Native of Africa. Kirkbride (1993) named the wild plants var. *longaculeatus* J.H. Kirkbr., (long sharp-pointed, in reference to the fruit prickles), with the cultivars treated as var. *anguria*. Since Hatch et al. (1990) did not distinguish varieties and we have seen no nc TX material, we are uncertain which variety is present in nc TX. The two can be distinguished as follows (modified from Kirkbride 1993): 🌿

1. Prickles on fruits 0.8–1.9 mm long, appearing as small bumps or warts; apical hyaline bristle of prickles on hypanthium of female flowers 2–3 times longer than the opaque base \_\_\_\_\_ var. *anguria*
1. Prickles on fruits 4–10(–15) mm long, appearing as prickles; apical hyaline bristle of prickles on hypanthium of female flowers shorter than the opaque base \_\_\_\_\_ var. *longaculeatus*

**Cucumis melo** L., (melon), MUSKMELON, MELON, CANTELOPE. Leaf blades to 13 cm wide, rounded at apex; fruits mostly globular or ellipsoid with musky fragrance, the flesh usually yellowish or orangish to green; corolla tube of male flowers 0.8–2 mm long; corolla tube of female flowers 0.8–2.8 mm long; seeds slender, white. Commonly cultivated and found as a waif around picnic areas, trash heaps, roadsides, and waste areas; Dallas and Lamar cos.; mainly e 1/2 of TX. May–Oct. Native of Asia. 🌿

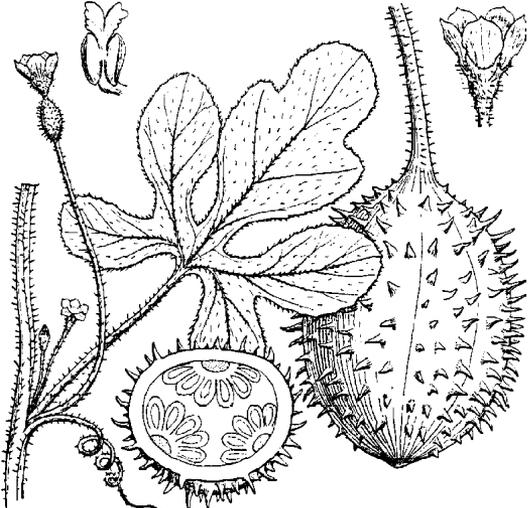
*Cucumis sativus* L., (cultivated), is the cultivated CUCUMBER; it has ± prickly fruit, corolla tube of male flowers 3.4–4.9 mm long, corolla tube of female flowers 3.5–6.5 mm long, and leaves angled or shallowly 3-lobed, with a pointed middle lobe and with ± acute sinuses. It is native to s Asia. 🌿



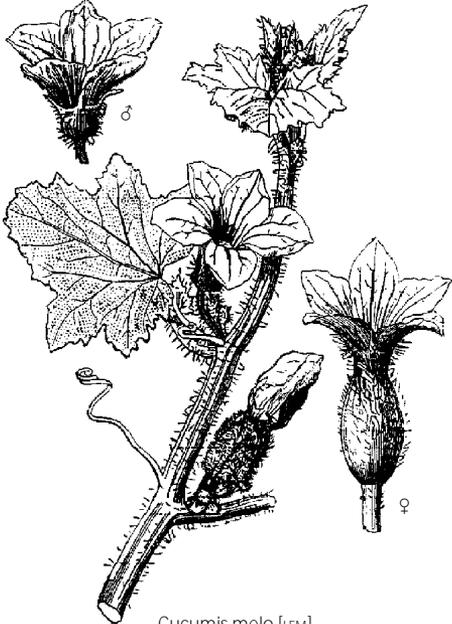
Cayaponia quinqueloba [STE]



Citrullus lanatus [NIC]



Cucumis anguria [FAW]



Cucumis melo [LEM]



Cucurbita foetidissima [BB1, MUN]

## CUCURBITA GOURD, SQUASH

Annuals or perennials with long running stems; leaf blades large, scabrous, 15–30 cm long; flowers yellow, solitary in axils; staminate flowers with long pedicels; fruits smooth, fleshy, indehiscent, with a hard rind; seeds usually numerous.

☛ A genus of ca. 20 species (Jeffrey 1990) of tropical and warm parts of the Americas including a number of widely cultivated food plants. The genus was important in pre-Colombian Mesoamerica as part of the maize/beans/squash agricultural system. (Classical Latin name for a type of gourd)

REFERENCES: Bailey 1929, 1930b; Whitaker & Bemis 1964, 1975; Rhodes et al. 1968; Bemis et al. 1970; Heiser 1979; Decker & Wilson 1986, 1987; Andres 1987; Decker 1988; Decker-Walters 1990; Nee 1990.

1. Leaf blades usually longer than wide, triangular-ovate, to 30 cm long, angled to weakly lobed, scabrous, extremely ill-smelling especially when bruised \_\_\_\_\_ **C. foetidissima**
1. Leaf blades usually nearly as wide as long, broadly ovate to reniform, angled to deeply lobed, to 15 cm long, pubescent, not noticeably ill-smelling \_\_\_\_\_ **C. texana**

**Cucurbita foetidissima** Kunth, (very fetid, very bad-smelling), BUFFALO GOURD, STINKING GOURD, FOETID GOURD, CALABAZILLA, CHILICOTE, CALABACILLA LOCA, CHILICOYOTE. Rank-growing, ill-smelling perennial; stems widely running, to 6 m or more long; leaf blades irregularly and finely toothed, thickish, often gray-green, rough to the touch; corollas to 10 cm long; fruits globose, green with lighter stripes, lemon-yellow at maturity, to 7.5 cm broad. Disturbed areas; nearly throughout TX, more common in w 1/2. Apr–Jul. The seeds were eaten by Native Americans; the plant was also used as soap (contains a saponin) and medicinally (Heiser 1979). During frontier days, the leaves and roots were used as a purgative (Crosswhite 1980). This species is being investigated as a source of starch and oil (Heiser 1993). ☒/86

**Cucurbita texana** A. Gray, (of Texas), TEXAS GOURD. Annual; leaves, at least some, distinctly lobed, relatively thin, green, the margins sharply serrate; corollas to 7 cm long; fruits obovoid to subglobose, green with lighter stripes or nearly white, to 9 cm long and 6 cm broad, bitter. Along streams and tributaries, weedy areas; Bell and Lamar (in a seasonally wet ox-bow off the Red River and in weedy pastures) cos., also Denton, Hamilton, Milam, Navarro (TOES 1993), and Hamilton (HPC) cos.; scattered in e 1/2 of TX. Jul–Oct. This species was thought to be endemic to TX (Correll & Johnston 1970), but naturally occurring populations have apparently rarely been found in several other states (Decker-Walters 1990; Nee 1990). According to M. Nee (pers. comm.) and Decker-Walters (1990), *C. texana* is involved in the origin of *C. pepo*. Because of the ability of *C. texana* and the various *C. pepo* cultivars to hybridize (Whitaker & Bemis 1964), nomenclature of the group is unsettled. Names such as [*C. pepo* subsp. *ovifera* (L.) D.S. Decker var. *texana* (Scheele) D.S. Decker] have been proposed; since there is no current consensus, we are following tradition and recognizing *C. texana* at the specific level. (TOES 1993: V) ▲ ☒/86

*Cucurbita pepo* L., (one-celled, many-seeded, pulpy fruit), PUMPKINS and SQUASH (including SUMMER CROOK-NECK, SUMMER STRAIGHT-NECK, ZUCCHINI, SCALLOP, PATTYPAN, and ACORN), was brought into cultivation by Native Americans. This species, with leaves mostly strongly lobed, can be distinguished from *C. texana* by its very variable (in the different cultivated forms), but usually larger and conspicuously differently shaped and colored fruits. While there has been controversy over whether *C. texana* populations are naturally occurring or represent escapes from cultivation of *C. pepo* var. *ovifera* (L.) Alef., (egg-bearing), (ORNAMENTAL GOURDS—with very variable fruits), electrophoretic evidence indicates *C. texana* populations are distinct from *C. pepo* var. *ovifera*; *C. texana* is fairly homogeneous genetically with the low levels of genetic

diversity probably related to endemism and small population size (Decker & Wilson 1987); hybridization between the two can occur (Heiser 1979). It now seems likely that *C. texana* is a natural element of the flora (Heiser 1993). Two other *Cucurbita* species are also cultivated. Both have foliage soft, or at least not harsh to the touch, in contrast to the rough or harsh foliage of *C. pepo*; they also both have the leaves mostly not lobed:

*Cucurbita moschata* (Duchesne ex Lam.) Duchesne ex Poir., (musky), WINTER CROOK-NECK SQUASH, BUTTERNUT SQUASH (native of tropical America). *Cucurbita moschata* has the leaf blades broadly ovate to ± triangular in outline and peduncles long, furrowed, and flared at junction with the fruit. 🍂

*Cucurbita maxima* Duchesne, (largest), AUTUMN SQUASH, WINTER SQUASH, HUBBARD SQUASH, TURBAN SQUASH (probably native of South America). *Cucurbita maxima* has the leaf blades circular to reniform in outline and peduncles short and spongy, nearly cylindrical, and not flared at attachment to the fruit. 🍂

## CYCLANTHERA

☞ A mainly Neotropical genus of ca. 30 species (Jeffrey 1990). (Greek: *cyclos* circle, and *anthera*, anther, possibly in reference to the united stamens)

**Cyclanthera dissecta** (Torr. & A. Gray) Arn., (dissected, deeply cut), CUT-LEAF CYCLANTHERA, BUR-CUCUMBER. Annual monoecious climber with slender stems to 3 m or more long; tendrils simple to trifid; leaves 3- to 7-foliolate, to 6 cm long; staminate and pistillate flowers both from the same axils; staminate flowers in racemes or panicles; stamens united into a central column; pistillate flowers solitary; corollas rotate, 5-parted, white, to 7 mm across; fruits peduncled, 2-3 cm long, ovoid, armed with slender smooth spines, rupturing irregularly, with several seeds. Rocky soils; Bell and Palo Pinto cos.; widespread in TX. May–Oct.

## IBERVILLEA GLOBEBERRY

☞ A genus of 5 species native to the s U.S. and Mexico (Jeffrey 1990). (Derivation of generic name not explained by original author; however, possibly named for Iberville, a parish in LA) REFERENCE: Kearns 1994.

**Ibervillea lindheimeri** (A. Gray) Greene, (for Ferdinand Jacob Lindheimer, 1801–1879, German-born TX collector), BALSAM GOURD, LINDHEIMER'S GLOBEBERRY, BALSAM-APPLE. Perennial dioecious climber with turnip-like taproot; leaves petioled; leaf blades mostly deeply to shallowly 3-lobed (rarely unlobed or 5-lobed), to 12 cm wide, rather fleshy, with swollen-based hairs; corollas greenish yellow; staminate flowers 5–8 per raceme, tubular, glandular-puberulent, 6–8 mm long; stamens 3; pistillate flowers solitary, funnellform, ca. 10 mm long; ovary 3-carpellate; berry globose, ca. 3 cm in diam., reddish orange when ripe, when immature green with lighter patterning (resembling a small watermelon); seeds numerous. Prairies, woodlands, thickets; Bell, Callahan, Cooke, Grayson, McLennan, and Palo Pinto cos., also Brown, Kaufman (HPC), Parker, Somervell, and Tarrant (R. O'Kennon, pers. obs.) cos.; mainly nc to c TX, also w to Plains Country; endemic to TX and s OK. Apr–Sep. 🍂/93

## LAGENARIA BOTTLE GOURD, GOURD

☞ A genus of 6 species of tropical Africa and Madagascar with 1 species widespread in rest of tropics. (Greek: *lagenos*, flask, referring to the shape and use of the fruits) REFERENCE: Heiser 1979.

**Lagenaria siceraria** (Molina) Standl., (intoxicating, perhaps derived from use of a *Lagenaria* species in making an intoxicating drink), BOTTLE GOURD, WHITE-FLOWER BOTTLE GOURD, CALABASH

GOURD. Viscid-pubescent, monoecious or rarely dioecious, climbing or trailing annual; tendrils branched; leaf blades triangular-ovate, shallowly palmately 3-5 lobed or unlobed, 15-30 cm wide, cordate basally; flowers 1-2 from leaf axils; corollas white, 5-10 cm across; fruits to 30 cm long or more, variously shaped, without spines or prickles but sometimes with knobs or ridges; seeds numerous. Cultivated for the fruit; the tough pericarp is used in making containers (cups, dippers, bowls, etc.) and decorations; escapes to weedy areas; Dallas Co.; also scattered in se and e TX. ?-Oct. Native of the Old World tropics. [*L. vulgaris* Ser.] This species has long been in cultivation; BOTTLEGOURDS have been found in Egyptian tombs dating to ca. 3500-3000 BC and in New World sites dating to ca. 7000 BC; apparently they dispersed by floating across the Atlantic from Africa (Zohary 1982). ☞

### LUFFA VEGETABLE-SPONGE, LOOFAH

☞ A genus of 7 species, 4 of the Old World tropics and 3 of the Neotropics; several are variously cultivated for the fibrous interior of the fruit, for food, or medicinally (Heiser & Schilling 1990). (From the Arabic name)

REFERENCES: Heiser 1979; Heiser & Schilling 1990.

**Luffa aegyptiaca** Mill., (of Egypt), VEGETABLE-SPONGE, ESTROPAJO. Monoecious strong vine with branched tendrils; leaf blades 3-7-lobed, deltoid to nearly orbicular, 12-30 cm long; corollas deeply 5-lobed, 5-10 cm across, light yellow to yellow; anthers free; fruits large and conspicuous, ± cylindrical, with light furrows and stripes but without ribs or angles, the interior conspicuously fibrous; seeds numerous, narrowly winged. Cultivated for use as a sponge (dried vascular system of fruit); escapes to weedy areas; Montague Co.; also s TX. ?-Oct. Native of the Old World. [*L. cylindrica* (L.) M. Roem.] ☞

### MELOTHRIA MELONETTE

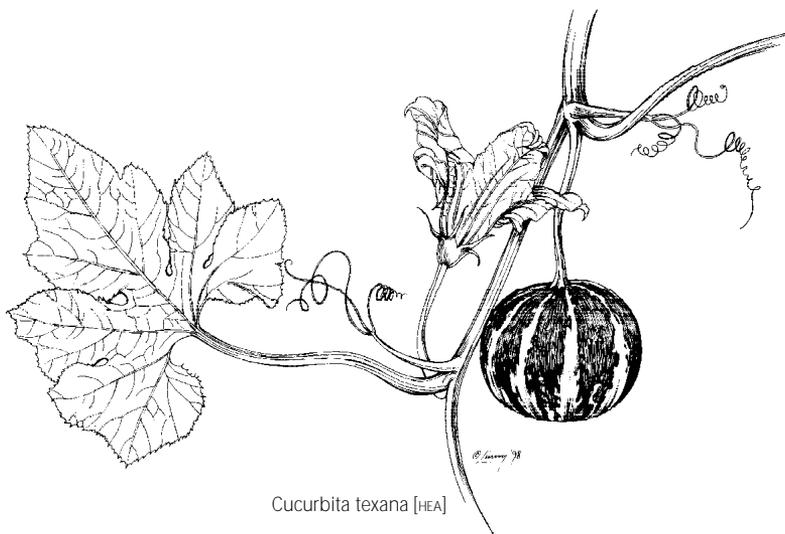
☞ A genus of 12 species native to the New World (Jeffrey 1990). (Altered from *melothron*, an ancient Greek name for some fruiting vine)

**Melothria pendula** L., (pendulous, hanging), DROOPING MELONETTE, CREEPING-CUCUMBER, MELONCITO. Slender, usually monoecious, climbing perennial; stems glabrous or nearly so; tendrils simple; leaf blades orbicular, 5-angled or -lobed, 3-7 cm long, with pubescence at least on the veins beneath; cordate at base; petioles pubescent, the hairs sometimes stiff; flowers axillary, small; corollas yellowish green, 5-angled or -lobed; staminate flowers in racemose or corymbose inflorescences, the corollas campanulate; stamens 3; anthers free to barely united; pistillate flowers usually solitary or few in a cluster, peduncled, the corollas rotate; ovary 3-carpellate; fruits smooth, green often with lighter patterning (like a baby watermelon), turning purplish black, ovoid, 1-2 cm long; seeds numerous, white. Wooded areas, exposed sites; se and e TX w to Rolling Plains and Edwards Plateau. May-Nov. The fruits are reported to act as a drastic purgative (Burlage 1968). ☞

### SICYOS BUR-CUCUMBER

☞ A genus of ca. 40 species of the New World, Hawaiian Islands, and Australasia (Jeffrey 1990). (Greek: *sicyus*, cucumber or gourd)

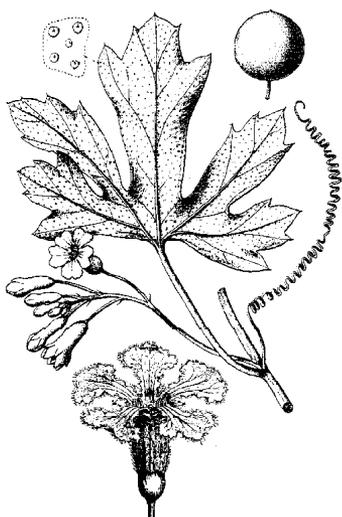
**Sicyos angulatus** L., (angled), ONE-SEED BUR-CUCUMBER, WALL BUR-CUCUMBER. Glandular-pubescent, monoecious, climbing annual; tendrils divided into 4 segments; leaves petioled, the petioles to 8 cm long; leaf blades to 20 cm long, suborbicular in outline, 5-angled or -lobed; staminate flowers in axillary racemes or corymbs; pistillate flowers usually from the same axils in long-peduncled capitate clusters; corollas white to cream; fruits yellowish, 1-1.5 cm long, ovoid, villous with prickly bristles, with a single seed. Wooded areas; Bell, Cooke, Denton, Tarrant, and



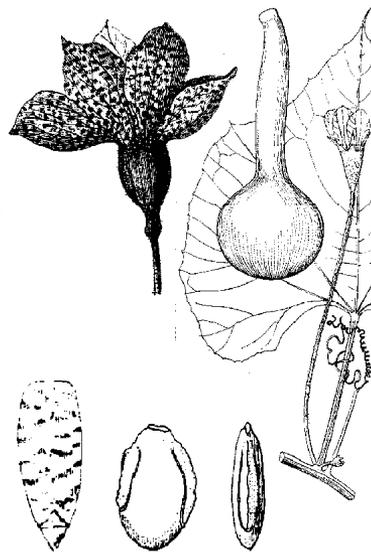
*Cucurbita texana* [HEA]



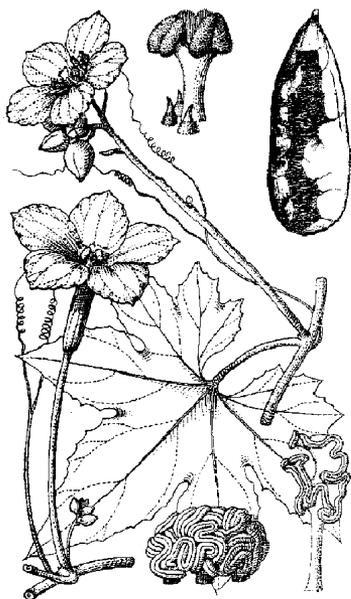
*Cyclanthera dissecta* [BB2]



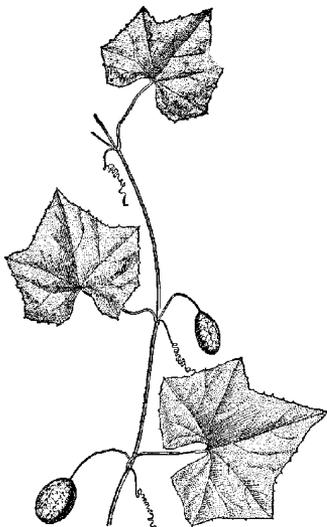
*Ibervillea lindheimeri* [EN1]



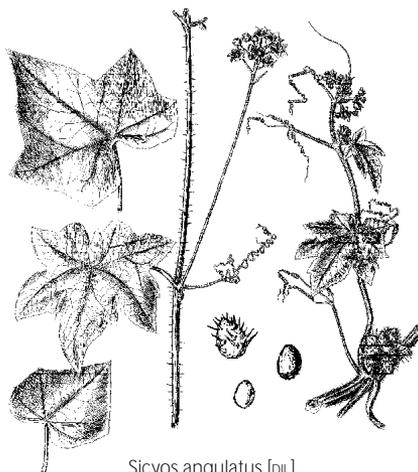
*Lagenaria siceraria* [KER, LAM]



*Luffa aegyptiaca* [EN1, EN2]



*Melothria pendula* [GLE]



*Sicyos angulatus* [DU]

Williamson cos.; e and nc TX, also Edwards Plateau. May–Sep. Sometimes cultivated as a climbing screen in landscapes (Mabberley 1997).

## CUSCUTACEAE DODDER FAMILY

☛ A small (ca. 145 species), cosmopolitan family of often brightly colored, ± chlorophyll-less, twining parasites. *Cuscuta* is the only genus. Related to the Convolvulaceae and sometimes treated as a monogeneric tribe in that family; however, Cuscutaceae can be readily distinguished by their parasitic habit, absence of chlorophyll, and lack of contact with the soil after parasitizing a host (Tyril et al. 1994). (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: orange to yellow or whitish, essentially leafless, parasitic herbs with *thread-like* stems *twining* on other plants; flowers small, white to yellowish.

REFERENCES: Austin 1986b; Gandhi et al. 1987.

### CUSCUTA DODDER, LOVEVINE

Ours glabrous annual herbs, ± without chlorophyll, with thread-like, orange, yellow, to whitish, irregularly twining stems; growing as parasites on other plants and attached by haustoria invading the host tissue; losing their chlorophyll upon contact with host plant as a seedling; essentially leafless, the leaves reduced to functionless scales; flowers small, usually numerous, in loose or dense cymose clusters, pedicelled or sessile; calyces of 3–5 lobes or sometimes of separate or nearly separate sepals, the lobes or sepals often overlapping laterally; corollas globose, white to yellowish, 3- to 5-lobed, with a ring of small, flat, fringed or fimbriated scales inside at base opposite the stamens; stamens 3–5, attached above the scales; ovaries superior, 2-celled; stigmas linear to capitate; fruit a capsule.

☛ This genus of ca. 145 species includes a number of problematic parasitic weeds which can seriously reduce the yield of some crops. Other common names are ANGEL'S-HAIR, TANGLEGUT, WITCHES'-SHOELACES, DEVIL'S-GUT, STRANGLEVINE, and SCALD. In the Sinhalese language of Sri Lanka, the name of a *Cuscuta* species means “plant without beginning or end” (Austin 1979a). According to Austin (1979a), the name DODDER, “... is an ancient one, having come from its Frisian (Middle English) [Frisian (Low German tongue closely related to Anglo-Saxon)] origin without change. The word dodder is said to signify a ‘tangle of threads’ in reference to the intertwined stems of the plant.” The species are often difficult to identify, especially in spring when just beginning to flower. (Arabic: *kushkut* or *kusat*, a tangled wisp of hair—Austin 1979a)

REFERENCES: Yuncker 1932, 1961; Austin 1979a, 1979b, 1980.

1. Styles partly or completely united; capsules very large, 5–7(–10) mm long; typically parasitizing woody plants; stems coarse \_\_\_\_\_ **C. exaltata**
1. Styles completely separate; capsules usually smaller, usually much < 5 mm long; typically parasitizing herbaceous or woody plants; stems fine to coarse.
  2. Flowers closely subtended by enlarged bracts which resemble the sepals (usually at least 1 bract per flower); calyces of separate or nearly separate sepals; flowers ca. 4–5 mm long.
    3. Flowers on pedicels (bracts along the pedicels), in loose paniculate clusters \_\_\_\_\_ **C. cuspidata**
    3. Flowers sessile, in dense clusters.
      4. Bracts with acute, recurved tips; stems disappearing early in the season (other than those portions bearing flowers); flowers in very thick, rope-like clusters \_\_\_\_\_ **C. glomerata**
      4. Bracts with obtuse, erect tips; stems persisting; flowers clustered, sometimes densely so, but the clusters not rope-like \_\_\_\_\_ **C. compacta**
  2. Flowers with only minute scale-like bracts not resembling the sepals (an enlarged bract can sometimes subtend a group of flowers); calyces of at least partly fused sepals (at base); flowers 1.5–4 mm long.

5. Calyces and corollas of most flowers 3–4-lobed, rarely 5-lobed; rare in nc TX, reported from only 2 counties.
6. Sepals reaching the sinuses of corolla; corolla lobes acute with inflexed tips \_\_\_\_\_ **C. coryli**
6. Sepals shorter than the corolla tube, not reaching the sinuses; corolla lobes obtuse, not inflexed \_\_\_\_\_ **C. cephalanthi**
5. Calyces and corollas of most flowers 5-lobed, rarely 4-lobed; including species widespread in nc TX.
7. Calyx lobes subacute to acute or acuminate, triangular-ovate to triangular-lanceolate in shape \_\_\_\_\_ **C. indecora**
7. Calyx lobes obtuse, ovate in shape.
8. Corolla lobes acute to acuminate, with the tips inflexed \_\_\_\_\_ **C. pentagona**
8. Corolla lobes obtuse to acute, the tips not inflexed.
9. Flowers 2–4 mm long, without granular or glandular coating; calyx lobes overlapping at base; styles 0.8–1.8 mm long when fully extended, slender; capsules often slightly longer than wide; widespread in e half of nc TX \_\_\_\_\_ **C. gronovii**
9. Flowers ca. 1.5–2 mm long, with granular or glandular coating; calyx lobes not or scarcely overlapping at base; styles 0.3–0.7 mm long, rather thick; capsules not longer than wide; rare in nc TX, reported only from Dallas Co. \_\_\_\_\_ **C. obtusiflora**

**Cuscuta cephalanthi** Engelm., (of *Cephalanthus*—buttonbush), BUTTONBUSH DODDER. Flowers ca. 2 mm long; calyx lobes obtuse. Found at Dallas by Reverchon (Yuncker 1961); not collected recently in nc TX, Jul–Oct.

**Cuscuta compacta** Juss. ex Choisy, (compact, dense), COMPACT DODDER. Flowers 4–5 mm long; calyces subtended by 3–5 bracts; corolla lobes obtuse. Stream bottoms; Dallas Co. (Reverchon); also e TX, Jul–Oct.

**Cuscuta coryli** Engelm., (of *Corylus*—hazel or filbert; often found on members of that genus), HAZEL DODDER. Flowers ca. 2 mm long; calyx lobes acute; scales inside corolla (below stamens) rudimentary, unfringed, bifid (with a wing on either side of filament). Related to and similar to *C. indecora*; differs in usually 4(-5)-parted flowers and the rudimentary bifid scale. Williamson Co. (Yuncker 1961); also Robertson Co. in Post Oak Savannah (Yuncker 1961); Hatch et al. (1990) reported only vegetational areas 3 and 4 (Fig. 2) for TX, Aug–Sep.

**Cuscuta cuspidata** Engelm., (cuspidate, with a sharp stiff point), CUSP DODDER, CUSPIDATE DODDER. Pedicels distinctive, with 1 or more bracts just below the calyces; flowers ca. 4 mm long; calyx lobes obtuse or acute; corolla lobes obtuse to acute. Parasitic on a number of herbaceous species, but according to Yuncker (1961), it seems to prefer members of the Asteraceae including *Ambrosia*, *Baccharis*, *Helianthus*, *Iva* and *Liatris*. Chiefly low open ground; Dallas, Denton, Grayson, and Limestone cos; widespread in TX, Aug–Oct.

**Cuscuta exaltata** Engelm., (exalted, very tall), TREE DODDER. Flowers 4–5 mm long, sessile or subsessile; calyx and corolla lobes obtuse; capsules circumscissile. Limestone areas; typically parasitizing woody plants, often oaks; Dallas and Johnson (Cleburne State Park) cos., also Bell (Yuncker 1961) and Coryell (Fort Hood—Sanchez 1997) cos.; also se TX and Edwards Plateau. Sep–Oct. This species is the only member of its subgenus in North America (Yuncker 1932).

**Cuscuta glomerata** Choisy, (with glomerules, clustered into ± rounded heads), CLUSTER DODDER, GLOMERATE DODDER. Stems disappearing leaving thick, yellow, rope-like masses of flowers around the host stems and thus easily recognized by growth form; flowers 4–5 mm long; calyx and corolla lobes acute or obtuse. Stream bottoms; Hunt and Lamar cos., also Dallas Co. (Yuncker 1961); also Edwards Plateau and Panhandle. Jul–Sep.

**Cuscuta gronovii** Willd. ex Schult., (for Jan Frederick Gronovius, 1690–1762, teacher of Linnaeus

and author of "Flora Virginica"), GRONOVIVUS' DODDER, COMMON DODDER. Flowers ca. 2–4 mm long; calyx lobes overlapping; corolla lobes obtuse. Stream bottoms, low ground; Hunt, Lamar, and Rockwall cos., also Dallas and Milam cos. (Yuncker 1961); se and e TX w to nc TX. Aug–Nov. [*C. gronovii* var. *latiflora* Engelm.]

**Cuscuta indecora** Choisy, (not ornamental). Flowers 2–2.5 mm long; calyx lobes shorter or longer than corolla tube; corolla lobes acute with inflexed tips; scales inside corollas (below stamens) fringed, not bifid. Prairies, roadsides, and stream bottoms. Jun–Oct.

1. Calyx lobes triangular-ovate, subacute, shorter than the corolla tube \_\_\_\_\_ var. **indecora**

1. Calyx lobes narrowly triangular-lanceolate, acute or acuminate, equaling or exceeding the corolla tube \_\_\_\_\_ var. **longisepala**

var. **indecora**, SHOWY DODDER, PRETTY DODDER, LARGE-SEED DODDER. Widespread in TX.

var. **longisepala** Yunck., (long-sepaled), LONG-SEPAL DODDER. Dallas, Ellis, Grayson, and Hill cos.; scattered in e 1/2 of TX.

**Cuscuta obtusiflora** Kunth var. **glandulosa** Engelm., (sp.: obtuse- or blunt-flowered; var.: glandular), RED DODDER. Flowers 1.5–2 mm long, often with granular or glandular coating; calyx lobes obtuse, not overlapping; corolla lobes acute to obtusish; capsules depressed globose, not longer than wide. Sandy or rocky ground, often growing on *Polygonum* species (Yuncker 1961); Dallas Co. (Yuncker 1961); Hatch et al. (1990) cited regions 1–10 (throughout TX), but this is possibly an error. May–Sep. [*C. glandulosa* (Engelm.) Small]

**Cuscuta pentagona** Engelm., (five-angled). Flowers 1.5–3 mm long. May–Oct. According to Austin (1986b), parasitizing a variety of hosts including cultivated Fabaceae (e.g., CLOVER and ALFALFA). Daniel Austin (pers. comm.) questions the recognition of varieties indicating that even specific determination is often difficult.

1. Calyx lobes slightly auricled and overlapping at base, sometimes forming angles giving the calyces an angulate appearance; withered corollas often only at base of capsules \_\_\_\_\_ var. **pentagona**

1. Calyx lobes not auricled or overlapping at base, the calyces not angulate; withered corollas enveloping the capsules.

2. Flower parts and pedicels usually not papillate or only slightly so \_\_\_\_\_ var. **glabrior**

2. All flower parts (including ovaries and capsules) and pedicels ± densely papillate \_\_\_\_\_ var. **pubescens**

var. **glabrior** (Engelm.) Gandhi, R.D. Thomas & S.L. Hatch, (smooth, without hairs). Widespread in TX. [*C. glabrior* (Engelm.) Yunck.]

var. **pentagona**, FIELD DODDER, FIVE-ANGLED DODDER. Bell, Coryell, Dallas, Denton, Hunt, and Limestone cos.; se and e TX w to Lampasas Cut Plain and Edwards Plateau. [*C. campestris* Yunck.]

var. **pubescens** (Engelm.) Yunck., (downy, pubescent). Bell, Burnet, and Dallas cos. (Yuncker 1961); also Edwards Plateau and Trans-Pecos. [*C. glabrior* (Engelm.) Yunck. var. *pubescens* (Engelm.) Yunck.]

## DIPSACACEAE TEASEL FAMILY

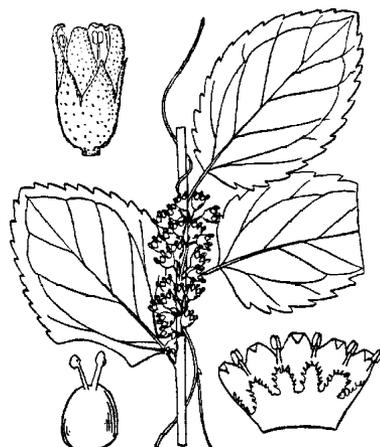
☛ A small (290 species in 11 genera), Old World (Eurasia and Africa, especially Mediterranean) family of herbs or subshrubs including a number of ornamentals. Teasels, formerly used in raising nap on cloth, are obtained from *Dipsacus*. The Dipsacaceae are closely related to the Caprifoliaceae and appear to represent an herbaceous clade within that mainly woody family. From a cladistic standpoint they should be lumped to form a more inclusive monophyletic



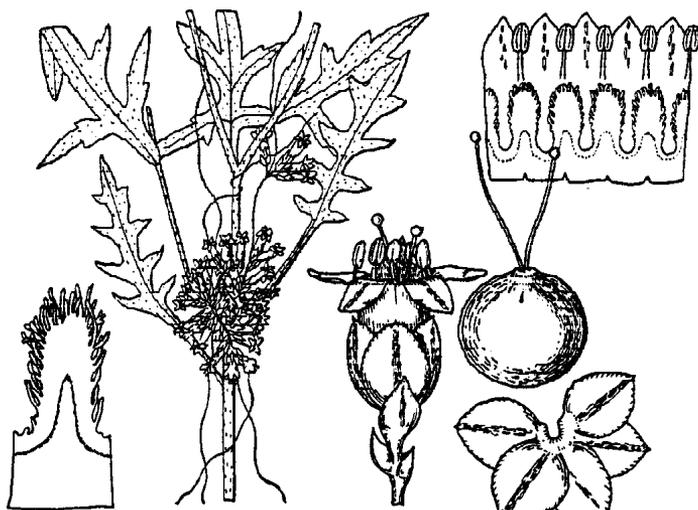
*Cuscuta cephalanthi* [BB2]



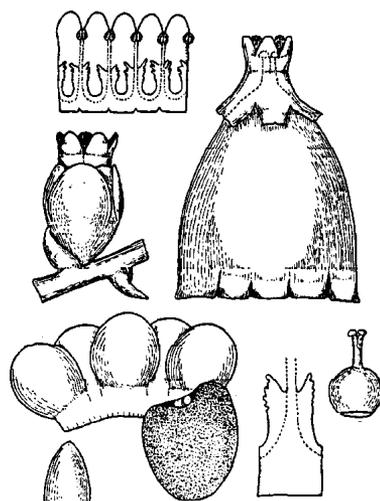
*Cuscuta compacta* [GLE]



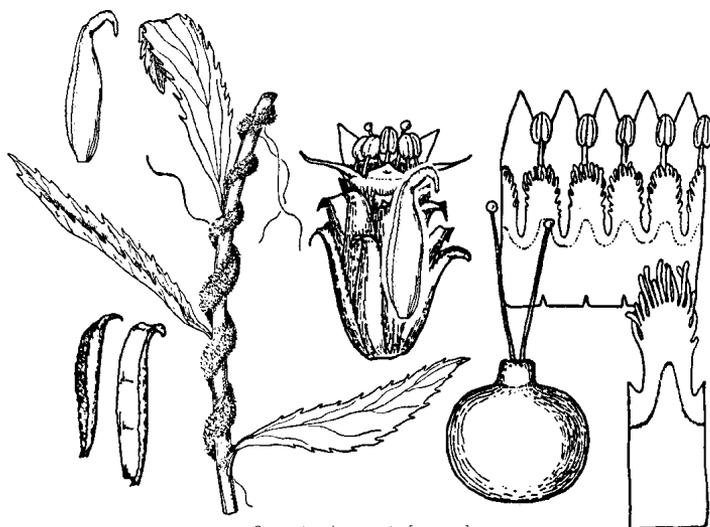
*Cuscuta coryli* [BB2, GLE]



*Cuscuta cuspidata* [BB2, LUN]



*Cuscuta exaltata* [LUN]



*Cuscuta glomerata* [GLE, LUN]



*Cuscuta gronovii* [BB2]

Caprifoliaceae (Judd et al. 1994). Family name from *Dipsacus*, TEASAL, a genus of 15 species of Eurasia, the Mediterranean, and tropical African mountains; the rigid-bracted heads of *D. sativus* (L.) Honck. were long used to raise the nap on cloth—hence the name TEASEL. (Greek: *dipsakos*, the classical name for teasel) (subclass Asteridae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is an introduced annual herb with opposite leaves and small flowers in *involucrate heads* (resembling Asteraceae); corollas sympetalous, bilaterally symmetrical, with 4 separate epipetalous stamens; ovary inferior. Superficially similar to Asteraceae; however, Asteraceae can be distinguished by their flowers with 5 stamens fused by their anthers.

REFERENCES: Ferguson 1965; Donoghue et al. 1992; Judd et al. 1994.

## SCABIOSA

☛ A genus of 80 species native to temperate Eurasia, the Mediterranean region, mountains of e Africa, and s Africa; herbs usually with an umbrella-like epicalyx functioning in wind dispersal of the fruit. (Latin: *scabies*, itch; the rough leaves were used medicinally to treat skin complaints)

**Scabiosa atropurpurea** L., (dark purple), PINCUSHIONS, SWEET SCABIOUS. Annual herb 20–60 cm tall; leaves opposite; basal leaves simple, dentate; upper leaves pinnately parted, the lobes entire to dentate; stipules absent; flowers in peduncled involucre heads resembling some in the Asteraceae; involucre bracts narrowly lanceolate, herbaceous, distinct; involucre subtending each flower; corollas white to rose, lilac, or dark purple, bilaterally symmetrical; calyces papus-like, of 5 bristles; corollas 5-lobed, the lobes unequal; stamens 4, distinct, epipetalous; ovary inferior; achenes with 5 persistent conspicuous calyx bristles. Garden escape currently rapidly spreading and becoming a problematic invasive weed in fields, roadsides, and prairies; Collin, Dallas, Fannin, Grayson, Hopkins, Hunt, and Lamar cos.; apparently at present in TX only in nc part of the state. Jun–Sep. Native of Europe. ☞

## DROSERACEAE SUNDEW FAMILY

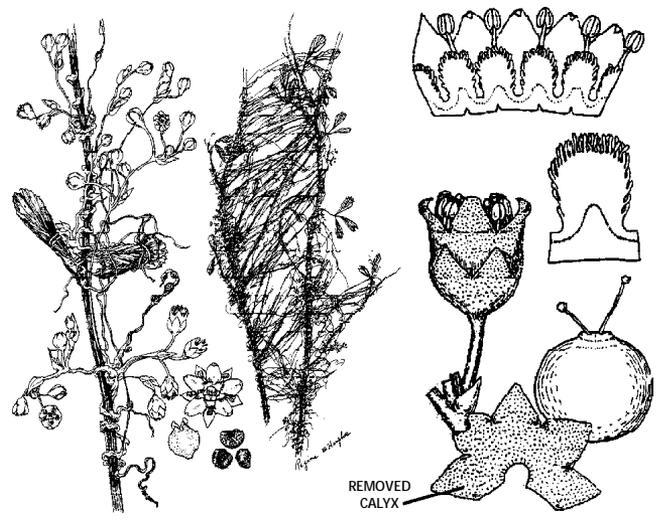
☛ A small (ca. 113 species in 4 genera) cosmopolitan family of insectivorous herbs including *Dionaea muscipula* J. Ellis, (fly-catching), (VENUS' FLYTRAP), from the se U.S. *Aldrovanda*, *Dionaea*, and *Drosophyllum* are all monotypic with *Drosera* having most of the species in the family. In *Drosera* the hairs are motile, and entrap and digest insects using secreted proteolytic enzymes and ribonucleases; in *Dionaea* the 2 halves of the leaves swing together trapping the victim; *Aldrovanda* is a rootless aquatic with insect-trapping leaves like *Dionaea*. Most species are found in nitrogen poor habitats such as bogs or wet sandy areas. As with most carnivorous plants, nutrients (especially nitrogen), rather than calories, are gained through carnivory. A molecular study using 18S ribosomal DNA sequences suggested that Droseraceae and Nepenthaceae (an Old World carnivorous family) are the sister group to the Caryophyllidae (Soltis et al. 1997). (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: the only nc TX species is an herb with small *rosettes* of leaves; leaves conspicuously broader towards tip, with *tentacle-like hairs* secreting glistening droplets of sticky fluid which trap insects; flowers on a scape.

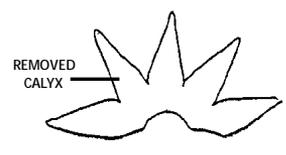
REFERENCE: Wood 1960.

## DROSERA SUNDEW

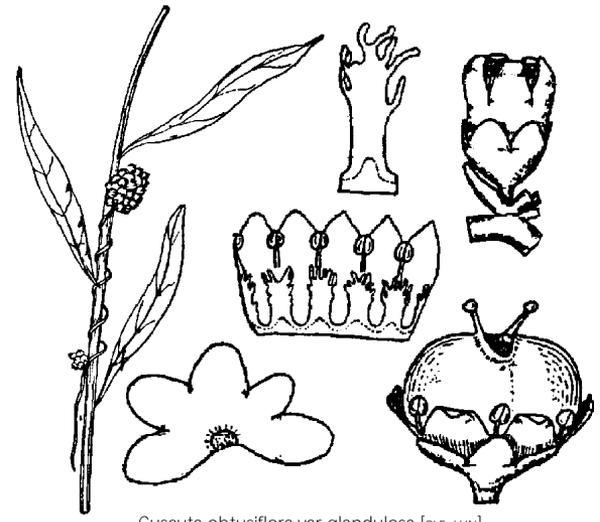
☛ A cosmopolitan genus (especially s hemisphere) of ca. 110 species of insectivorous herbs typically found in wet areas. (Greek: *droseros*, dewy; the glands of the leaves exude drops of a clear glutinous fluid, glittering like dew drops and giving rise to both the generic and common names) REFERENCES: Wynne 1944; Shinners 1962d; Wood 1966; Pietropaolo & Pietropaolo 1986.



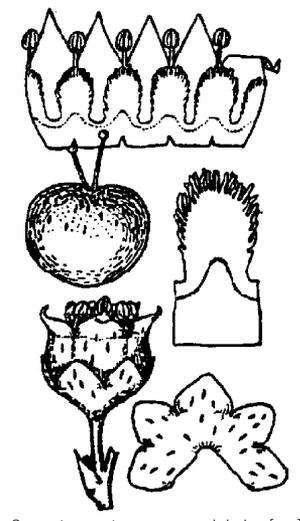
*Cuscuta indecora* var. *indecora* [LUN, REE]



*Cuscuta indecora* var. *longisepala* [MRB]



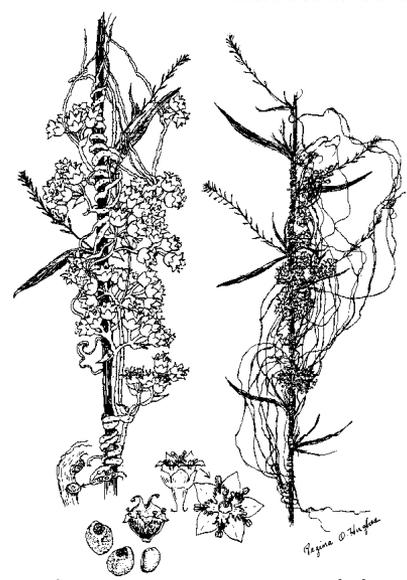
*Cuscuta obtusiflora* var. *glandulosa* [GLE, LUN]



*Cuscuta pentagona* var. *glabrior* [LUN]



*Drosera brevifolia* [GWO]



*Cuscuta pentagona* var. *pentagona* [REE]



*Scabiosa atropurpurea* [BL1]

***Drosera brevifolia*** Pursh, (short-leaved), ANNUAL SUNDEW. Small insectivorous herb; leaves in a basal rosette, fiddle-head-like in bud, suborbicular (with petiole longer than blade) to nearly spatulate with enlarged terminal portion, to 15 mm long, with conspicuous, red, gland-tipped, motile hairs which secrete a clear sticky fluid used in trapping insects; stipules absent or vestigial; scape to 12 cm tall, with gland-tipped hairs except at base; flowers up to 6 per scape, radially symmetrical, usually 5-merous, hypogynous; sepals ovate, 2.5–4 mm long; petals pink or roseate, 2.5–8 mm long; ovary superior; capsules 3.5–4 mm long; seeds black, with pits in 10–12 rows. Deep sand in woods or in open bogs; included based on citation of vegetational area 4 (Fig. 2) by Hatch et al. (1990); se and e TX w to at least c Henderson Co. (s of Athens) near e margin of nc TX. Feb–Jun. [*D. annua* E.L. Reed, *D. leucantha* Shinnery] This *Drosera* species, 2 *Utricularia* species (BLADDERWORTS—Lentibulariaceae), and *Sarracenia alata* A.W. Wood (PITCHERPLANT or YELLOW-TRUMPETS—Sarraceniaceae) are the only carnivorous plants in nc TX.

## EBENACEAE PERSIMMON OR EBONY FAMILY

☛ The Ebenaceae is a medium-sized (485 species in 2 genera) family of the tropics and warm areas with a few temperate species; most are trees; some have edible fruits (e.g., *Diospyros*—PERSIMMONS, JAPANESE PERSIMMONS, DATE-PLUMS, VELVET-APPLES), while others are valuable for timber including EBONY, a black, hard, heavy wood obtained from species of *Diospyros*. Family name conserved from *Ebenum*, a genus now treated as *Diospyros* (the name *Diospyros* was published earlier and thus has priority in terms of nomenclature) (Derivation either from Greek: *ebenos*, name used by Hippocrates for a leguminous plant or possibly the ebony tree, or from Latin: *ebenus*, ebony or black; the heartwood of some species is strikingly black in color) (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: shrubs or small trees with alternate, simple, entire, exstipulate leaves; milky juice absent; flowers small, axillary, usually of a single sex, with connate petals and superior ovaries; fruit a berry with several large seeds.

REFERENCES: Wood & Channell 1960; Spongberg 1977; Morton et al. 1996 [1997].

### DIOSPYROS PERSIMMON, EBONY

Shrubs or small trees; leaves alternate, nearly sessile to short-petioled; leaf blades simple, oblong or elliptic, entire; flowers rather small, axillary, solitary or few together, short-pedicelled, drooping, imperfectly unisexual, the pistillate larger, with 8 empty filaments, the staminate smaller, with 16 stamens; calyces subrotate, deeply 4-lobed, enlarging in age; corollas urceolate to campanulate or salverform, creamy or yellowish white, somewhat fleshy, with 4, short, auricled, laterally overlapping lobes; stamens attached to corolla near its base, with wide, pilose filaments; pistil 1; ovary superior; style divided half way or more into 4 branches; fruit a berry with several large seeds.

☛ A mainly tropical genus of ca. 475 species including a number important for fruit and timber. The common name is derived from *pasimenan*, the Native America Lenape word for the tree (Peattie 1948). *Diospyros ebenum* J. König ex Retz., native of India and Sri Lanka, is the EBONY of commerce; its wood is black and extremely hard; it is used in inlays, for piano keys, and in other uses where its color and density are important. EBONY is so dense that it is one of relatively few woods that will not float in water. *Diospyros kaki* L.f., (JAPANESE PERSIMMON, KAKI), of e Asia, produces large fruits that are widely available in U.S. supermarkets. (Greek: *dios*, of Zeus or Jove, and *pyros*, grain, alluding to the edible fruits)

REFERENCE: Hiern 1873.

1. Ovaries and fruits pubescent; fruits black; leaves 2–5 cm long, subsessile; s part of nc TX; bark ± smooth, peeling in thin layers, grayish \_\_\_\_\_

**D. texana**

1. Ovaries and fruits glabrous; fruits yellowish to orangish; leaves 7–15 cm long, with distinct petioles (ca. 7–10 mm long); widespread in nc TX; bark deeply divided into small blocks or plates, dark brown or blackish \_\_\_\_\_ **D. virginiana**

**Diospyros texana** Scheele, (of Texas), TEXAS PERSIMMON, MEXICAN PERSIMMON, BLACK PERSIMMON, CHAPOTE PERSIMMON. Tree to ca. 30 m tall; leaves permanently pubescent; fruits ca. 2 cm in diam., sweet and edible when ripe. Rocky woods, slopes, open areas, and along streams; s part of nc TX in Bell, Brown, and McLennan cos., also Milam Co. (Little 1976); widespread in TX, especially w 2/3. Feb–Jun. The black juice of the fruits was used during frontier days to dye buckskin or leather black (Crosswhite 1980).

**Diospyros virginiana** L., (of Virginia), COMMON PERSIMMON, EASTERN PERSIMMON. Shrub or small tree to ca. 16 m tall; heartwood hard and dark brown; leaves glabrous or nearly so at maturity; fruits to 5 cm in diam., ripening in fall and some often long persistent on the tree (numerous fruits have been observed in January), sweet and edible when ripe. Woods, old fields, and clearings; se and e TX w to Rolling Plains and Edwards Plateau. Apr–Jun. The tough hard wood has been used for such things as billard balls, golf-club heads, and textile weaving shuttles (Cox & Leslie 1991). The unripe fruits are notoriously astringent; however, despite anecdotes to the contrary, a frost is not necessary for ripening. The fruits are an important wildlife food; they were reportedly used to make a beer by Native Americans in the e U.S. (Hedrick in Heiser 1993).

## ELAEAGNACEAE OLEASTER FAMILY

☛ A small (45 species in 3 genera) family mainly native to temperate and warm areas of the n hemisphere to tropical Asia and Australia; most are shrubs to small trees with silvery or golden scales; they are typically armed and usually have nitrogen-fixing root nodules; several genera are used as ornamentals including *Elaeagnus* and *Hippophae* (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: alternate-leaved, usually spiny, introduced shrubs with very distinct, peltate or stellate, *silvery scales* conspicuously covering the leaves and young twigs; flowers 4-merous.

REFERENCE: Graham 1964.

### ELAEAGNUS SILVER-BERRY OLEASTER

☛ A genus of ca. 40 species native to Europe, Asia, and North America including cultivated ornamental shrubs; some species are important for their edible fruits. (Greek: *elaia*, olive, and *agnos*, the name of the CHASTE-TREE, *Vitex agnus-castus*, from *hag nos*, pure; the name was originally applied to a willow with massed white fruit)

**Elaeagnus pungens** Thunb., (piercing, sharp-pointed), THORNY ELAEAGNUS. Spreading shrub to ca. 4 m tall, usually spiny; branchlets brown; leaves evergreen, alternate, simple, elliptic to nearly ovate, 4–10 cm long, 2–3.5 cm wide, the lower surface densely covered with silvery, lobed, peltate scales and dotted with a few reddish brown scales giving the surface a striking dirty silver appearance, the margins entire, undulate; petioles 6–12 mm long; flowers usually 1–3 in the leaf axils, fragrant, with a tubular hypanthium 7–10 mm long; sepal lobes 4, petal-like, shorter than the hypanthium; petals absent; stamens 4, on short filaments attached in throat of hypanthium; carpel 1; ovary superior but hypanthium persistent and making it seem inferior; fruits drupe-like, 10–15 mm long, covered with scales and tipped with the persistent hypanthium, initially brown, eventually red. Widely cultivated and escapes; Dallas (spreading along White Rock Creek) and Tarrant cos.; we are not aware of other TX localities. Late fall. Native of Japan and China. ☛

*Elaeagnus angustifolia* L., (narrow-leaved), OLEASTER, RUSSIAN-OLIVE, a Eurasian species with deciduous leaves, silvery-white or silvery-gray branchlets, and flowering in spring, is also cultivated in nc TX. 🌿

## ELATINACEAE WATERWORT FAMILY

Ours small annual herbs of wet areas; leaves simple, opposite, entire, with paired membranous stipules between them; flowers 1–few in the leaf axils, small, radially symmetrical, 2–5-merous; sepals and petals both present; stamens 1 or 2 times as many as the petals; pistil 1; ovary superior, 2–5 celled; fruit a subglobose capsule; seeds pitted.

☞ A small (34 species in 2 genera), temperate and especially tropical family including a number of aquatics. (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: small wet area herbs with opposite, simple, stipulate leaves and inconspicuous flowers.

REFERENCE: Tucker 1986.

1. Plants erect to ascending, 10–40 cm tall; stems with short glandular pubescence; sepals and petals usually 5 each; sepals with thick green midrib and scarious margins, with a small sharp tooth at tip \_\_\_\_\_ **Bergia**
1. Plants creeping and mat-forming (some stems can be ascending to erect), 10 cm or less tall; stems glabrous; sepals and petals 2–3 each; sepals without distinct midrib, obtuse \_\_\_\_\_ **Elatine**

### BERGIA

☞ A genus of 24 species native to warm areas of the world. (Named for Peter Bergius, 1723–1817, Swedish botanist and student of Linnaeus)

**Bergia texana** (Hook.) Walp., (of Texas), TEXAS BERGIA. Annual, usually branched at base, the whole plant ± glandular-puberulent; leaves to 30 mm long, elliptic to oblong, acute, serrulate; flowers 1–3 in the leaf axils, on short pedicels ca. 1 mm long; sepals 5, 2–4 mm long; petals 5, white, not exceeding the sepals; stamens 5 or 10; fruits to ca. 3 cm wide. Muddy pond margins, along creeks; Cooke, Dallas, Denton, Falls, and Parker cos., also locally abundant around stock tanks in Brown Co. (Stanford 1976); widespread in TX. May–Oct.

### ELATINE WATERWORT

Low, creeping, mat-forming, almost moss-like annuals, often rooting at the nodes; flowers 1–2 per node.

☞ A genus of 10 species native to tropical and temperate areas; some are used as aquarium plants. (Greek: *elatino*, fir-like, from a European species that suggests such a plant in miniature)

REFERENCES: Duncan 1964; Kaul 1986c.

1. Leaves without a notch at tip, usually obovate to narrowly oblong-ovate (rarely linear-spatulate); largest seeds with 9–15 pits in each row \_\_\_\_\_ **E. brachysperma**
1. Leaves often with a slight notch at tip, linear to narrowly spatulate; largest seeds with 16–25 pits in each row \_\_\_\_\_ **E. triandra**

**Elatine brachysperma** A. Gray, (short-seeded), SHORT-SEED WATERWORT. Forming small mats to ca. 5 cm across, the branches ascending; leaves to 6 mm long and 2 mm wide; sepals 2 or with a third reduced; petals 3, pinkish. On mud or in shallow water; Comanche Co. (Correll & Correll 1972), also cited for vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990); also se and c TX to Rolling Plains. Mar–Oct. [*E. triandra* Schkuhr var. *brachysperma* (A. Gray) Fassett]

**Elatine triandra** Schkuhr, (with three anthers or stamens), AMERICAN WATERWORT. Forming mats, the branches can be ascending to erect; leaves 3–6(–12) mm long, 1–3 mm wide; perianth greenish or pinkish, usually with 3 sepals and 3 petals. On mud or in shallow water; found at Dallas by Reverchon in Mar 1874, apparently not collected there since; se and c TX to nc TX and Rolling Plains. Mar–Oct. We are following Kaul (1986c) and Hatch et al. (1990) in lumping [*E. americana* (Pursh) Arn., *E. triandra* var. *americana* (Pursh) Fassett].

## ERICACEAE HEATH OR BLUEBERRY FAMILY

Ours shrubs, trees, or mycoparasitic herbs; leaves simple, alternate; petals united (separate in *Monotropa*); stamens twice as many as corolla lobes; anthers awned or awnless, opening by terminal pores; pollen grains in tetrads (singly in *Monotropa*); ovary superior or inferior; fruit a capsule or berry.

☛ A large (4,500 species in 160 genera (Stevens 1995)), cosmopolitan family of usually shrubs with some herbs and trees; the majority of tropical taxa are montane. Most species are found in nutrient-poor, acidic habitats and have a relationship with mycorrhizal fungi. The family includes many important ornamentals (e.g., AZALEAS and RHODODENDRONS in the genus *Rhododendron*, HEATHS in the genus *Erica*, *Artostaphylos* (BEARBERRY and MANZANITA), and *Kalmia* (MOUNTAIN-LAUREL), as well as edible *Vaccinium* species (BLUEBERRIES and CRANBERRIES) and *Gaylussacia* species (HUCKLEBERRIES). ☛ The leaves of other species (e.g., *Kalmia*—LAMBKILL, SHEEPKILL, *Leucothoe*—FETTERBUSH, and *Lyonia*) are poisonous; *Kalmia* species can be the source of poison honey, when visited by bees (Hardin & Brownie 1993). The family has sometimes been split with groups such as the mycoparasitic *Monotropa* and its relatives raised to family rank (e.g., Kartesz 1994; Jones et al. 1997). However, molecular studies and cladistic analyses (Judd & Kron 1993; Kron & Chase 1993; Kron 1996) support the inclusion of the Monotropaceae, Pyrolaceae, Epacridaceae, and Empetraceae to form a monophyletic Ericaceae. We are therefore treating the Ericaceae in the broad inclusive sense. Family name from *Erica*, HEATH or HEATHER, a genus of ca. 665 species of shrubs and small trees native primarily to s Africa (650 species there with 520 endemic to the Cape region), and also in tropical African mountains, the Mediterranean, Macaronesia, and Europe; *Erica* species cover large areas of moorlands in Europe. (Greek: *ereike*, heather, from *ereiko*, to break; an infusion from the leaves was supposed to break bladder stones) (subclass Dilleniidae)

FAMILY RECOGNITION IN THE FIELD: usually shrubs or trees (1 genus of reduced mycoparasitic herbs) with alternate, simple, rather leathery, often evergreen leaves and usually *urn-shaped*, cylindrical, or campanulate corollas (many funnel-shaped in species outside nc TX); anthers opening by terminal pores.

REFERENCES: Small 1914a, 1914b; Wood 1961; Judd & Kron 1993; Kron & Chase 1993; Luteyn 1995; Stevens 1995.

1. Plants mycoparasitic herbs lacking chlorophyll (plant white to tinged with rose), 5–30 cm tall; leaves reduced to scale-like bracts \_\_\_\_\_ **Monotropa**
1. Plants shrubs or trees with green photosynthetic leaves with well-developed blades.
  2. Flowers in panicles; fruit a berry with a distinctive roughened-tuberculate surface; ovary superior; plant a small tree or rarely arborescent shrub, 4–6(–10 m or more) tall; leaves evergreen \_\_\_\_\_ **Arbutus**
  2. Flowers in racemes or umbel-like clusters; fruit a dry capsule OR a berry with a smooth surface; ovary superior and developing into a capsule OR inferior and developing into a berry; plants varying from shrubs < 2 m tall to small trees to 8 m tall; leaves essentially evergreen OR deciduous.
  3. Fruit a berry (blueberry-like) crowned by the small persistent calyx teeth; corollas 4–6 mm long, open campanulate; ovary inferior; shrubs or small trees to 8 m tall; leaves essentially evergreen \_\_\_\_\_ **Vaccinium**

3. Fruit a dry capsule; corollas 8–13 mm long, urceolate-cylindric; ovary superior; shrubs < 1(–2) m tall; leaves deciduous \_\_\_\_\_

**Lyonia**

### ARBUTUS MADRONE, MADROÑO

☛ A genus of 10 species, with 3 in Europe, the Middle East, and North Africa, 1 on the Canary Islands, and 6 in the New World (Sørensen 1995). (Latin name for strawberry tree, probably originally applied to *A. unedo* L., strawberry tree)

REFERENCE: Sørensen 1995.

**Arbutus xalapensis** Kunth, (for its type locality near Jalapa or Xalapa, in the Mexican state of Veracruz), TEXAS MADRONE, MADROÑO, LADY'S-LEG, NAKED-INDIAN. Small tree or rarely arborescent shrub, 4–6(–10 m or more) tall; bark pinkish to brick red, peeling off in large smooth flakes, the naked branches distinctive; leaves alternate, evergreen, coriaceous, ovate to oval or oblong-elliptic, to 10 cm long and 45 mm wide, entire to serrate, glabrate with age; inflorescence a panicle; flowers perfect; calyx lobes 5, pinkish white; corollas ovoid-urceolate, white, often pink-tinged, ca. 7 mm long; stamens included, 10; anthers ca. 1.5 mm long, with a pair of slender reflexed spurs on the back, opening by terminal pores; ovary superior; fruit a ± spherical berry, red to yellowish red, 7.5–9 mm in diam., fleshy, with ovules 2–several per locule, the fruit surface roughened-tuberculate. Wooded rocky hills, slopes, canyons, plains; three occurrences are known n of the Colorado River in Travis Co. (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.) just s of the nc TX border; included because of possibility of occurrence in extreme s part of nc TX; Edwards Plateau to Trans-Pecos. Feb–Apr. [*A. texana* Buckley, *A. xalapensis* var. *texana* (Buckley) A. Gray] According to Sørensen (1995), the TX plants with small glabrous leaves are part of a north-south cline involving a gradual change from plants with large pubescent leaves found in s Mexico and n Central America. The TX plants have often been recognized as a distinct species or variety, but we are following Sørensen (1995) in lumping them into *A. xalapensis* despite their morphological distinctiveness. Fruits edible (Correll & Johnston 1970).

### LYONIA

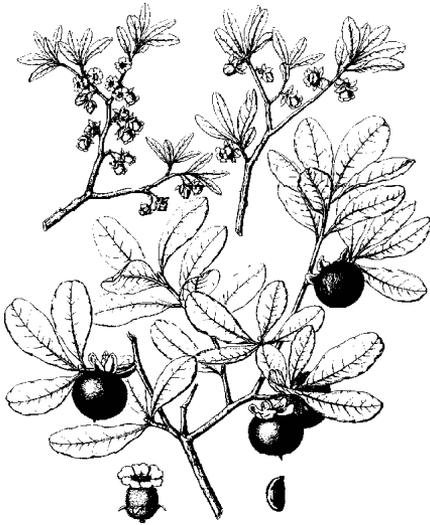
☛ A genus of 36 species native to e and se Asia, e North America including Mexico, and the Greater Antilles (Judd 1995); some are cultivated as ornamental shrubs. (Named for John Lyon, 17??–1818, early American botanist and explorer of the s Alleghenies)

REFERENCES: Judd 1995; Kron & Judd 1997 [1998].

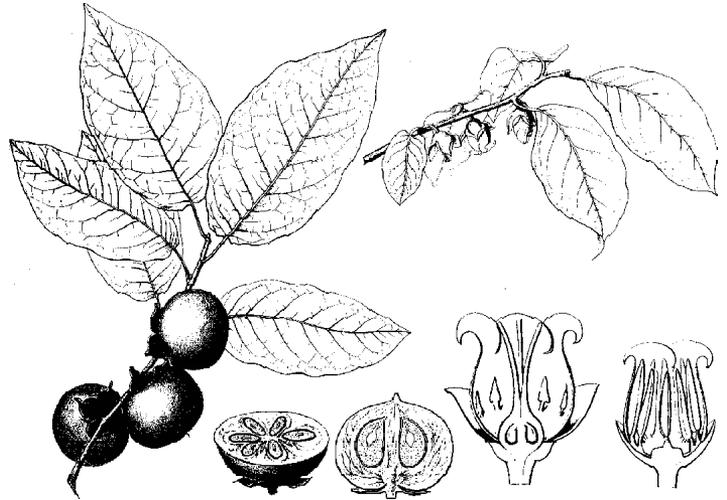
**Lyonia mariana** (L.) D. Don, (of Maryland), STAGGERBUSH. Shrub usually < 1 m tall (rarely to 2 m); leaves elliptic-oblong to elliptic-lanceolate or narrowly obovate, entire, to 11 cm long and 5 cm wide, deciduous; flowers in umbel-like fascicles (= clusters) along leafless old branches; corollas 8–13 mm long, white or pinkish; ovary superior; capsules ca. 7 mm long. Usually moist, sandy, wooded areas; se and e TX w to nc TX and Edwards Plateau; included based on citation of vegetational areas 4 and 5 (Fig. 2) by Hatch et al. (1990). Mar–Jun. The leaves are thought to be poisonous to young grazing animals; the poisonous principle is apparently andromedotoxin, a resinoid, or arbutin, a glycoside (Hardin & Brownie 1993). ☛

### MONOTROPA

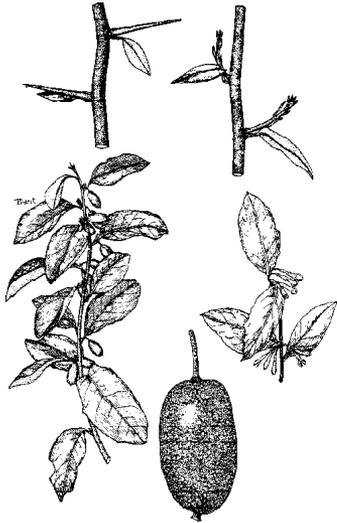
Obligately mycoparasitic (= indirectly parasitize plants via fungi) fleshy herbs lacking chlorophyll; plants waxy white or yellow or reddish, becoming tinged with pink or red, and eventually drying dark; leaves reduced to scale-like bracts; inflorescences nodding in flower, becoming erect in fruit; flowers (3–)5(–6)-merous; calyces similar to or different from corollas or occasionally absent; corollas cylindric or slightly flared distally, of separate petals; stamens 8 or 10; pollen grains shed singly (usually in tetrads in the Ericaceae); fruit a capsule.



*Diospyros texana* [SA3]



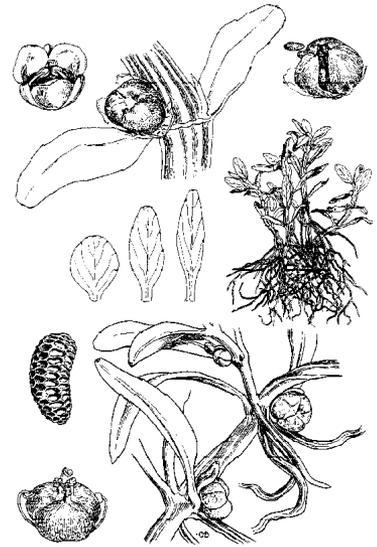
*Diospyros virginiana* [SA3]



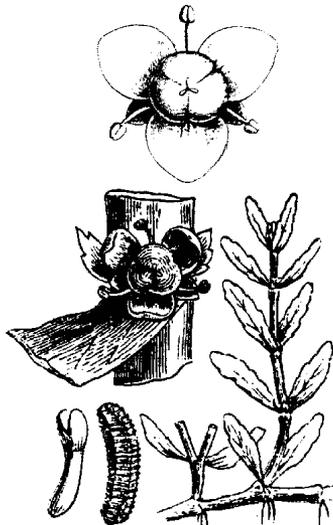
*Eleagnus pungens* [RKG]



*Bergia texana* [MAS]



*Elatine brachysperma* [MAS]



*Elatine triandra* [EN2, KAR]



*Arbutus xalapensis* [SA3]



*Lyonia mariana* [ROE]

☛ A widespread n temperate genus (Europe, Himalayas, Japan, North and Central America) of 2 species with disjunct populations in the tropics (Wallace 1995). While Kartesz (1994) and Jones et al. (1997) placed *Monotropa* in the Monotropaceae, we are following Stevens (1995) and Wallace (1995) in treating the Monotropoideae as a subfamily of the Ericaceae. (Greek: *monos* one, and *tropos* turn, from the summit of the flowering stem nodding, turned to one side)

REFERENCES: Correll 1965; Stevens 1995; Wallace 1975, 1993, 1995.

1. Flowers several (rarely reduced to only 1) per inflorescence; inflorescences (as well as rest of plant) at flowering time ranging in color from light yellow to reddish, drying brownish; plants often downy or finely pubescent; stigma often subtended by a ring of stiff hairs \_\_\_\_\_ **M. hypopithys**
1. Flower solitary per inflorescence, never more; inflorescences (as well as rest of plant) at flowering time usually waxy white or rarely tinged pink or orange-red or combinations of these, drying black; plants glabrous; stigma not subtended by a ring of stiff hairs. \_\_\_\_\_ **M. uniflora**

**Monotropa hypopithys** L., (old generic name from Greek, *hypo*, under, and *pitys*, pine), AMERICAN PINESAP. Plant 5–30 cm tall; leaves scale-like, 5–12 mm long; inflorescence usually a several-flowered raceme; pedicels slender, 2–20 mm long, to 30 mm in fruit; sepals ± unlike petals, sometimes absent; petals 8–17(–20) mm long; styles 1–2 mm wide; capsules 6–10 mm long. Humus in woods; included based on citation (Correll 1965) of Lamar Co. specimen (Correll & Correll 27488); mainly e TX, also disjunct to Trans-Pecos. Apr–Jul. [*M. latisquamata* Rydb.]

**Monotropa uniflora** L., (one-flowered), INDIAN-PIPE. Plant 5–30 cm tall; leaves scale-like, 5–12(–15) mm long; sepals ± like petals; petals 10–20 mm long; styles 2–5 mm wide; capsules 7–11 mm long. Forest floor humus, under pines and hardwoods; Fannin Co. (Talbot property) in Red River drainage, also Lamar Co. (Carr 1994); mainly e TX. Apr–Jul. ☒/100

## VACCINIUM BLUEBERRY

☛ A large genus (ca. 450 species) native to circumpolar areas, Europe, North America, tropical areas of the Americas, c and se African mountains, Madagascar, Japan, and tropical Asia to Malaysia. It includes deciduous or evergreen shrubs, small trees, and lianas, many of which have edible fruits including BLUEBERRY, BUCKBERRY, HUCKLE-BERRY, BLUETS, BILBERRY, WHORTLE-BERRY, BLAEBERRY, CRANBERRY, COWBERRY, LINGBERRY, LINGENBERRY, and FOXBERRY; ☛ at least several Latin American species have toxic fruits. The CRANBERRY is *V. macrocarpon* Aiton, native to e North America. Edible BLUEBERRIES are cultivated in the sandy soils of n Fannin Co. by the Walker family. (Latin name variously applied to *Vaccinium myrtillus* L. or *Hyacinthus*, origin obscure, possibly from *bacca*, berry, or *vaccinus*, of cows)

REFERENCES: Camp 1945; Vander Kloet 1988.

**Vaccinium arboreum** Marshall, (tree-like), FARKLE-BERRY, SPARKLE-BERRY. Shrub or small tree to 8 m tall; leaves obovate to oblong-elliptic, entire or with some teeth, to ca. 7 cm long and 3.5 cm wide, essentially evergreen; flowers in loose leafy-bracted racemes, the bracts much smaller than the leaves; corollas 4–6 mm long, white; ovary inferior; berries black or reddish black, often dryish and mealy to moist. Sandy soils, open woods, thickets, fields; Henderson and Limestone cos. on e margin of nc TX, also w in Red River drainage through Lamar to Fannin and Grayson cos.; the Grayson population (Preston Bend Park) is isolated on an outcrop of Trinity sand ca. 30 miles west of any other known TX site; mainly se and e TX. Mar–May. [*V. arboreum* var. *glaucescens*(Greene) Sarg.]

## EUPHORBIACEAE SPURGE FAMILY

Ours annual or perennial herbs, shrubs, or small trees with watery or milky juice; leaves alternate or less often opposite, simple (sometimes so deeply lobed as to appear compound, occa-

sionally some leaves divided into palmate leaflets), entire, toothed, or lobed, with or without stipules; flowers axillary or terminal, solitary, in racemes, spikes, or heads, various in structure, unisexual or bisexual; perianth absent, or present and of 1 type of part only, or of both sepals and petals; stamens 1-many; pistil 1, usually 3-celled and forming a 3-angled or 3-lobed ovary (a few species with these parts reduced to 2 or 1); ovary superior; fruit a capsule (sometimes considered a capsular-schizocarp), usually 3-seeded, or in 1 species of *Croton*, an achene.

☛ A huge (8,100 species in 313 genera), cosmopolitan, but especially tropical family; vegetatively they vary from herbs to shrubs, lianas, large trees, or succulents; often there are specialized cells or tubes with milky or colored latex. A number are economically important including *Aleurites* species (TUNG-OIL), *Euphorbia pulcherrima* Willd. ex Klotzsch (POINSETTIA), *Hevea brasiliensis* (Juss.) Müll.Arg. (RUBBER, PARÁ RUBBER), *Manihot esculenta* Crantz (MANIOC, CASSAVA, or TAPIOCA), and *Ricinus communis* L. (CASTOR-BEAN); many other species are used as ornamentals. The latex of *Hevea brasiliensis*, a native of the Amazon Basin, is obtained (“rubber tapping”) by making sloping incisions in the bark and collecting the white liquid in cups attached below the incisions; upon drying in the air or when coagulated by acid, the latex takes on its well known elastic properties. ☛ A number of species are poisonous due to the presence of alkaloids and cyanogenic glycosides; others have diterpenoids that can cause irritant dermatitis and may act as co-carcinogens (= promote the action of “sub”-carcinogenic doses of known carcinogens) (Kinghorn 1979; Lampe 1986). In dry areas of the Old World, a number of *Euphorbia* species are xerophytically adapted and convergent vegetatively with Cactaceae. The common name SPURGE is apparently derived from the Latin word *purgare*, to purge or cleanse; a number of members of the family are regarded as having cathartic or purgative properties (Tveten & Tveten 1993). (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: ours mostly herbs (a few small shrubs and 1 tree) often with *milky sap* and leaves usually alternate or less often opposite (mostly in *Chamaesyce*); *ovary 3-celled*, superior, typically developing into a capsule with 3 lobes or sections; flowers of ten unisexual, sometimes highly reduced.

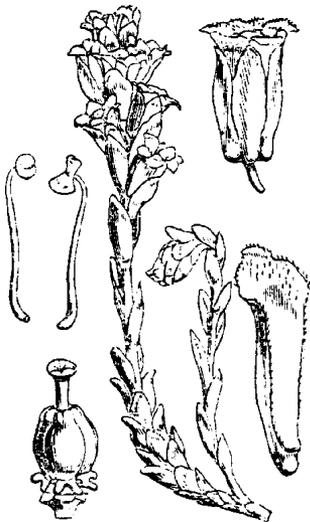
REFERENCES: Wheeler 1943; Punt 1962; Webster 1967, 1994a, 1994b; Jensen et al. 1994; Kapil & Bhatnagar 1994; Nowicke 1994; Seigler 1994; Steinmann & Felger 1997.

1. Trees 3–10 m tall; leaf blades rhombic-ovate, 3–7(–10) cm long, with petioles usually longer than blades, with 2 glands at juncture of blade and petiole; rarely escaped introduced species \_\_\_\_\_ **Sapium**
1. Herbs or small shrubs, usually 1 m or less tall, often much less, rarely to ca. 2 m or more tall (*Croton alabamensis*); leaves not as above; mostly native species.
  2. Leaf blades palmately lobed, 6–60 cm wide.
    3. Plants with extremely painful stinging hairs; leaf blades with petioles attached basally, 6–15 cm wide; perianth white \_\_\_\_\_ **Cnidoscolus**
    3. Plants without stinging hairs; leaf blades peltate, 10–60 cm wide; perianth greenish or purplish \_\_\_\_\_ **Ricinus**
  2. Leaf blades entire to toothed, not palmately lobed, usually < 6 cm wide.
    4. Flowers with scaly or green perianth parts, borne in various sorts of inflorescences, but not in cup-like involucre; sap usually not milky (milky only in *Stillingia*).
    5. Plants with stellate hairs or lepidote scales on at least some parts, these often giving the foliage a distinctive silvery to yellowish or brownish color (the hairs and scales, while visible to the naked eye, are striking with a hand lens) \_\_\_\_\_ **Croton**
    5. Plants with simple (unbranched) or malpighiaceae (attached at middle) hairs or glabrous; foliage green.
    6. Flowers or inflorescences axillary or at least appearing so (uppermost sometimes subtended only by very reduced leaves); sap not milky.

7. Flowers solitary or in small umbel-like clusters; leaves 5–30 mm long (to 45 mm in the rare *Reverchonia* restricted to deep sand); seeds 2 per locule.
8. Plants of deep sand; calyx lobes conspicuous, purplish or pinkish, with a central greenish strip, 1.5–2.9 mm long; capsules 7–9.8 mm wide; extremely rare if present in w part of nc TX \_\_\_\_\_ **Reverchonia**
8. Plants of various soils including sand and limestone; calyx lobes not as above; capsules 1.7–3.2(–7.5) mm wide (3.2 mm or less except in the rare *Andrachne*); widespread in nc TX.
9. Herbs (*P. polygonoides* becoming lignified at base) to ca. 0.5 m tall; leaf blades elliptic to narrowly oblanceolate, 2–8(–11) mm wide; pedicels absent or up to 7 mm long; male and female flowers usually, but not always, on the same plant; flowers apetalous; capsules 1.7–3.2 mm wide; including species widespread in nc TX \_\_\_\_\_ **Phyllanthus**
9. Shrubs up to ca. 1 m tall; leaf blades elliptic-oblong to orbicular, 6–15 mm wide; pedicels 5–12(–22) mm long; male and female flowers on separate plants; flowers with petals; capsules 7–7.5 mm wide; one species rare in nc TX \_\_\_\_\_ **Leptopus**
7. Flowers few to many in spikes or spike-like racemes; leaves 10–112 mm long; seeds 1 per locule.
10. Leaf blades often but not always rather triangular (sometimes narrowly so) in shape, truncate to cordate or hastate basally; plants with stinging hairs mixed with soft spreading hairs \_\_\_\_\_ **Tragia**
10. Leaf blades variously shaped but not triangular, usually not truncate, cordate, or hastate basally (except cordate in *Acalypha ostylifolia*); plants without stinging hairs.
11. Leaf blades entire; female flowers not surrounded by conspicuous folded bract; stipules absent; some malpighian (= attached at center) hairs usually present \_\_\_\_\_ **Ditaxis**
11. Leaf blades toothed; female flowers surrounded by a conspicuous, toothed or lobed, folded bract; stipules present; hairs not malpighian \_\_\_\_\_ **Acalypha**
6. Inflorescences terminating the stems (may be over-topped by leaves or leafy bracts); sap milky or not so.
12. Sap milky; female flowers exposed \_\_\_\_\_ **Stillingia**
12. Sap not milky; female flowers ± concealed by a conspicuous, toothed or lobed, folded bract \_\_\_\_\_ **Acalypha**
4. Flowers lacking a perianth; staminate flowers and a single central pistillate flower together congested within small cup-like involucre (= cyathia) which simulate flowers, the cyathia with prominent glands and often petal-like appendages on the rim; sap milky.
13. Leaf bases asymmetrical; leaves all opposite; stems often (but not always) prostrate; main stem short, shorter than branches (stems branching basally) \_\_\_\_\_ **Chamaesyce**
13. Leaf bases symmetrical; leaves opposite or alternate, but at least some usually alternate; stems erect or ascending, not prostrate; main stem prominent, usually longer than branches (stem often branching apically) \_\_\_\_\_ **Euphorbia**

### ACALYPHA COPPERLEAF, THREE-SEEDED MERCURY

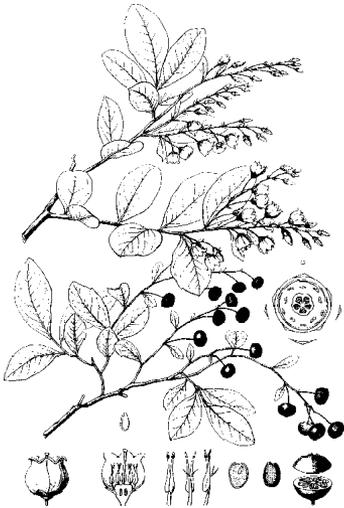
Ours annual or perennial herbs; sap not milky; leaves alternate, petioled; blades entire or toothed, often turning reddish in fall; stipules minute; inflorescences spicate; staminate and pistillate flowers on the same or separate plants; staminate flowers: subtended by a small bract; calyces 4-parted; petals absent; stamens 4–8, united basally; pistillate flowers: each surrounded by a conspicuous folded bract that is variously toothed or lobed; calyces 3-parted; petals absent; ovary 3-carpellate; style branches often highly divided; seeds carunculate.



*Monotropa hypopithys* [BEN]



*Monotropa uniflora* [ST2]



*Vaccinium arboreum* [SA3]



*Acalypha gracilens* [ST1]



*Acalypha monococca* [ST1]



*Acalypha ostryifolia* [BB2]



*Acalypha phleoides* [HEA]

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☛ A genus of ca. 430 species of tropical and warm areas; most species are shrubs with some trees and herbs. (Greek: *acelephe*, nettle, alluding to the similarity of the leaves to those of stinging nettle, *Urtica dioica* L.)

1. Leaf blades deeply divided, small, 5–12 mm long; staminate and pistillate flowers on different plants; extreme s part of nc TX \_\_\_\_\_ **A. radians**
1. Leaf blades variously toothed but not divided, > 12 mm long (usually much greater); staminate and pistillate flowers on the same plant, either on the same OR on separate spikes; widespread in nc TX.
  2. Base of leaf blades slightly cordate; leaf blades ovate; staminate and pistillate flowers borne on separate spikes \_\_\_\_\_ **A. ostryifolia**
  2. Base of leaf blades not cordate; leaf blades linear-lanceolate to ovate or rhombic; staminate and pistillate flowers borne on the same spike.
    3. Spikes terminal; plants perennial \_\_\_\_\_ **A. phleoides**
    3. Spikes axillary; plants annual.
      4. Fruits 1-seeded \_\_\_\_\_ **A. monococca**
      4. Fruits 3-seeded.
        5. Leaf blades linear to lanceolate or narrowly ovate, the margins entire to slightly crenate; petiole usually < 1/4 as long as blade \_\_\_\_\_ **A. gracilens**
        5. Leaf blades lanceolate, elliptic, narrowly ovate, or broadly rhombic, the margins crenate to serrate; petiole 1/4 the length of blade to as long as blade.
          6. Pistillate bracts (5–)7- to 9-(–11) lobed, the lobes oblong-lanceolate, usually sparsely pubescent (long glandular hairs may be present, but without long, non-glandular hairs); leaf blades ovate or elliptic to broadly rhombic; \_\_\_\_\_ **A. rhomboidea**
          6. Pistillate bracts with (8–)10–14(–16) lanceolate lobes, usually with dense long-spreading hairs; leaf blades narrowly rhombic to broadly lanceolate \_\_\_\_\_ **A. virginica**

**Acalypha gracilens** A. Gray, (graceful), SLENDER COPPERLEAF. Erect annual 10–60 cm tall, simple or freely branched, usually at base; leaf blades linear to lanceolate or narrowly ovate, 4–21 mm wide; styles 1–2 mm long, white or pinkish. This species is similar to *A. monococca* but usually occurs on deeper soils under more mesic conditions, typically in areas with more vegetation, usually in sandy soils; Bell and Grayson cos., also Hunt and Lamar cos. (M. Mayfield, pers. comm.); se and e TX w to ne part of nc TX. Jun–Oct. [*A. gracilens* A. Gray var. *delzii* Lill. W. Mill.]

**Acalypha monococca** (Engelm. ex A. Gray) Lill. W. Mill. & Gandhi, (one-berried), SLENDER ONE-SEED COPPERLEAF. Erect annual similar to *A. gracilens*, leaf blades linear to lanceolate, 3–13 mm wide; fruits with only 1 seed. This species is similar to *A. gracilens* but usually occurs in areas with more sun and shallower soils, typically in sandy soils; Grayson and Jack cos.; se and e TX w to West Cross Timbers and Edwards Plateau. Jun–Oct. [*A. gracilens* subsp. *monococca* (Engelm. ex A. Gray) G.L. Webster, *A. gracilens* var. *monococca* Engelm. ex A. Gray] We are following G. Levin (pers. comm.), who is treating *Acalypha* for the *Flora of North America* in recognizing this taxon at the specific level; he indicated that there is no evidence of hybridization with *A. gracilens*.

**Acalypha ostryifolia** Riddell, (with leaves resembling *Ostrya*—hop-hornbeam), HOP-HORNBEAM COPPERLEAF. Erect annual to 50 cm tall, usually freely branched; leaves long-petioled, nearly glabrous, 1.5–5.3 cm wide; pistillate spikes terminal; staminate spikes axillary. Stream banks or bottoms, disturbed areas, roadsides; widespread in TX, but mainly nc TX s and w to w TX. Late May–Oct.

**Acalypha phleoides** Cav., (resembling *Phleum*—timothy or cat-tail grass), LINDHEIMER'S COPPERLEAF. Perennial; stems several to many from a woody root, branched, spreading to erect, to 60 cm long, pilose with long, wide-spreading hairs or short-pubescent with curled hairs or glabrous; leaf blades lanceolate or ovate-lanceolate, sharply and evenly toothed; styles con-

spicuously reddish. Rocky slopes, chiefly limestone; Trans-Pecos and Edwards Plateau e and n to Bell and Somervell cos. (Mahler 1988). May–Oct. [*A. lindheimeri* Müll.Arg.] We are following G. Levin (pers. comm.) for nomenclature of this species. He indicated that it will be treated as *A. phleoides* in the forthcoming treatment of *Acalypha* for *Flora of North America*

***Acalypha radicans*** Torr., (radiating outward), ROUND-CROTON, YERBA DE LA RABIA. Perennial; stems ± decumbent, 20–40 cm tall, densely pubescent with short stiff and long-spreading hairs; leaf blades reniform to orbicular, 8–12 mm wide; petioles 4–16 mm long, usually as long as or longer than blades; bracts 3.5–10 mm long, with 7–13 lobes; capsules with 3 seeds. Dry sandy or gravelly areas; Burnet Co. (Correll & Johnston 1970), also cited by Hatch et al. (1990) for vegetational areas 4 and 5 (Fig. 2); extreme s part of nc TX e and s to s TX. Summer–fall.

***Acalypha rhomboidea*** Raf., (rhomboidal, ± diamond-shaped with unequal sides), RHOMBOID COPPERLEAF. Erect annual 10–60 cm tall; stems simple or freely branched, densely pubescent above with recurved hairs, sparsely pubescent below; petioles usually 1/2 to as long as blades; pistillate bracts cut about half way into lobes. Sandy soils; Dallas Co., also Tarrant Co. (Mahler 1988); mainly se TX. Jul–Oct. [*A. virginica* L. var. *rhomboidea* (Raf.) Cooperr.] While this species is cited for vegetational areas 1 through 5 (Fig. 2) by Hatch et al. (1990), according to M. Mayfield (pers. comm.), it occurs mainly in se TX; however, the identification of the Dallas specimen was confirmed by G. Levin. This taxon is sometimes treated as a variety of *A. virginica* (e.g., Kartesz 1994; Jones et al. 1997). However, we are following G. Levin (pers. comm.), who is treating *Acalypha* for *Flora of North America* in recognizing it at the specific level. According to M. Mayfield (pers. comm.), *A. rhomboidea* and *A. virginica* grow together without intergradation and are “very distinct species.”

***Acalypha virginica*** L., VIRGINIA COPPERLEAF. Erect annual 10–50 cm tall; stems simple or sparsely branched; sparsely to densely pubescent with recurved and long, soft, spreading hairs; petioles usually 1/4–1/2 as long as blades; pistillate bracts cut half or more their length into lobes; styles white. Sandy open woods or low areas; se and e TX w to West Cross Timbers, also Edwards Plateau. Jul–Oct.

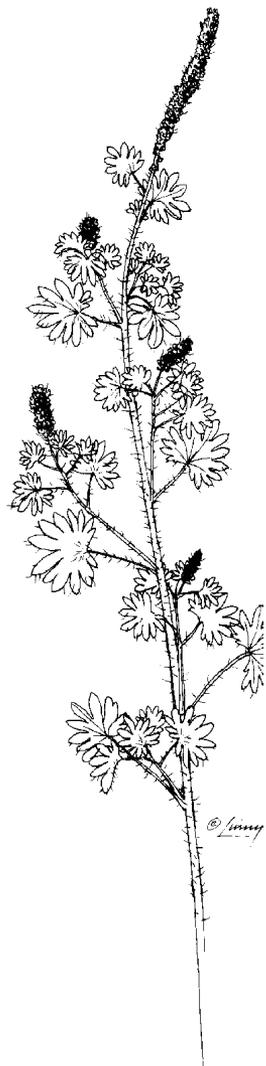
## CHAMAESYCE CREEPING SPURGE

Annual or perennial herbs; sap milky; leaves opposite, 2-ranked, folding together at night or in bad weather; leaf blades entire or toothed, usually asymmetrical at base, nearly sessile or short-petioled; stipules ± scarious or papery, connected or united; cyathia and fruits as in *Euphorbia*—flowers greatly reduced, minute, unisexual (consisting only of a single pistil or a single stamen on a short pedicel), in small cup-like involucre (= cyathia); each cyathium containing one pistillate and several staminate flowers mixed with minute bracts; the cyathia also have fleshy glands on their rims; these glands in some species have small, petal-like gland-appendages—the cyanthium is then termed a pseudanthium because of the resemblance to standard flowers; pistillate pedicel elongating in age, the 3-locular capsule exserted from the involucre. In the past there has not always been clarity in the terms used for the measurement of glands and gland-appendages. We are following terminology suggested by M. Mayfield (pers. comm.)—in the key and descriptions the width of the gland signifies the measurement in the tangential dimension relative to the cyathium—in our species this is typically the longest dimension of the gland; the length of the gland signifies the measurement in the radial dimension relative to the cyathium; the length of the gland-appendage signifies the measurement in the radial dimension relative to the cyathium—this means from attachment at the gland to the apex of the gland-appendage.

☛ A ± cosmopolitan segregate of *Euphorbia*; often included in that genus as a subgenus; some Hawaiian species are arborescent (Wheeler 1941); the genus is estimated to have 300+ species

(M. Mayfield, pers. comm.). As in *Euphorbia*, the latex of some species is apparently toxic and can cause dermatitis or other reactions in sensitive individuals; inflammation and large blisters can develop; the eyes are particularly sensitive. While livestock are supposedly sometimes accidentally poisoned by eating *Chamaesyce* species mixed with other species, animals generally will not eat the plants (Wheeler 1941; Muenscher 1951; Kingsbury 1964; Lampe 1986). Because pubescence, stipule, fruit, and seed characters are critical in determining species of *Chamaesyce*, a hand lens is essential. While Jones et al. (1997) lumped *Chamaesyce* with *Euphorbia*, we are following Kartesz (1994), Webster (1994b), J. Kartesz (pers. comm. 1997), and G. Webster (pers. comm. 1997) in maintaining it as a separate genus. (Ancient Greek name for a kind of prostrate plant; presumably involving the root *chamai*, on the ground or low growing)  
REFERENCES: Wheeler 1941; Burch 1966.

1. Capsules, ovaries, underside of leaf blades, and usually stems glabrous.
  2. Larger leaf blades linear or narrowly oblong, 4.5–10 times as long as wide \_\_\_\_\_ **C. missurica**
  2. Larger leaf blades oblong or elliptic to triangular or orbicular, less than 4.5 times as long as wide.
  3. Larger leaves 13–35(–rarely more) mm long (including petioles); plants ascending, 15–75 cm tall.
    4. Capsules 1.9–2.3 mm long; branches off main stem 1–4 mm thick; cyathia in small clusters or solitary; leaf blades often with a central reddish or purplish splotch; stems pubescent in lines; native species widespread and abundant in nc TX \_\_\_\_\_ **C. nutans**
    4. Capsules ca. 1.3 mm long; branches off main stem ca. 1 mm thick; cyathia mostly strongly and densely clustered in glomerules; leaf blades usually without reddish or purplish splotch; stems glabrous; in nc TX known only as introduced weed in Tarrant Co. \_\_\_\_ **C. hypericifolia**
3. Larger leaves 4–13 mm long; plants usually prostrate or nearly so (except sometimes ascending in *C. fendleri* and *C. glyptosperma*), usually 1–10 cm tall.
  5. Stipules united into a single, triangular, entire or ragged-margined, white scale on each side of the stem; stems often rooting at nodes.
    6. Cyathial glands 0.5–1 mm wide (tangential dimension; oblong in shape, the length or radial dimension much less); gland-appendages usually conspicuous, 0.8–1.5 mm long (radial dimension), 1–3 times wider than glands are wide (tangential dimension); plants perennial; staminate flowers 12–30 per cyathia; capsules 1.3–2.3 mm long \_\_\_\_\_ **C. albomarginata**
    6. Cyathial glands < 0.4 mm wide (oblong in shape, the length or radial dimension much less); gland-appendages usually inconspicuous, 0.2–0.6 mm long, about as wide as the glands; plants annual; staminate flowers 3–8(–10) per cyathia; capsules 1–1.2 mm long \_\_\_\_\_ **C. serpens**
  5. Stipules cut into linear segments, or reduced to a linear-lanceolate, not noticeably white segment; stems not rooting at nodes.
    7. Plants annual from a taproot; gland-appendages white or pink; stems usually prostrate or nearly so.
      8. Leaf blades oblong-ovate to orbicular, less than twice as long as wide; petioles absent or very short, usually less than 1 mm long; gland-appendages 0.75–1.2 mm long (radial dimension), showy \_\_\_\_\_ **C. cordifolia**
      8. Leaf blades oblong or oblong-elliptic, twice as long as wide or longer; petioles of larger leaves up to 1.3 mm long; gland-appendages 0.5–0.75 mm long, not particularly showy.
        9. Seeds transversely ridged; leaves usually minutely toothed at least near apex (under a hand lens); gland-appendages usually wider than long (tangential dimension greater than radial dimension) \_\_\_\_\_ **C. glyptosperma**
        9. Seeds smooth; leaves usually entire; gland-appendages usually longer than wide \_\_\_\_ **C. geyeri**



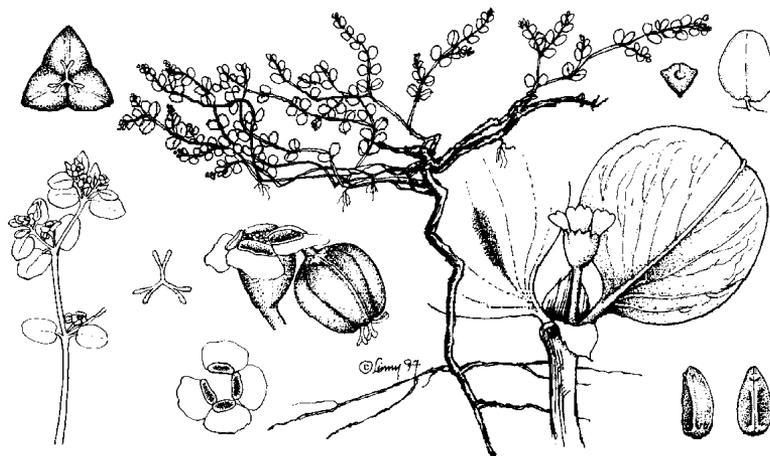
*Acalypha radians* [HEA]



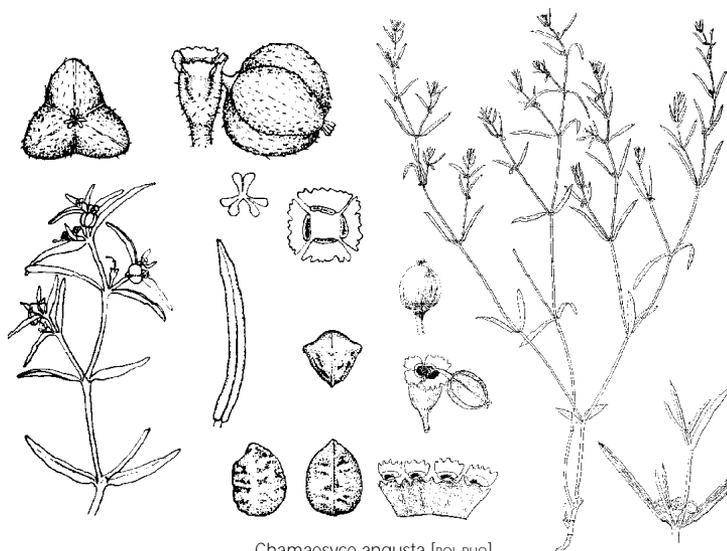
*Acalypha rhomboidea* [S11]



*Acalypha virginica* [BB2]



*Chamaesyce albomarginata* [HEA, RHO]

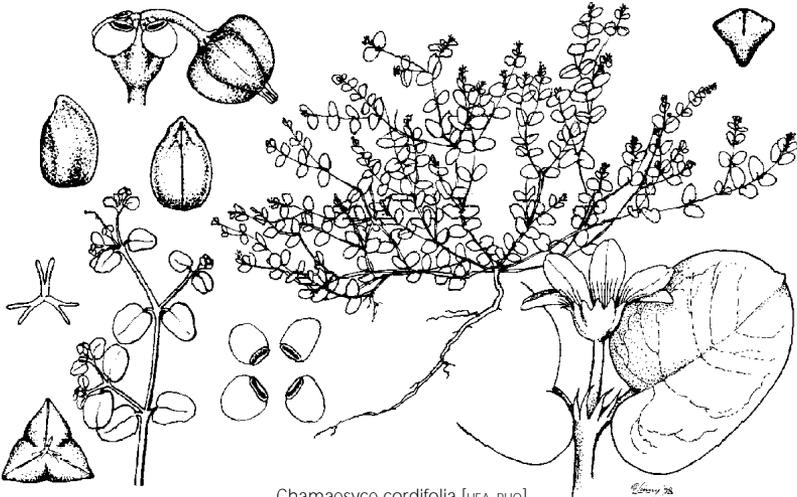


*Chamaesyce angusta* [BOI, RHO]

7. Plants perennial from branching roots; gland-appendages absent or yellow-green to red-brown (rarely white); stems prostrate to spreading or ascending \_\_\_\_\_ **C. fendleri**
1. Capsules, ovaries, underside of leaf blades, and stems sparsely to densely pubescent.
10. Upper leaf blades linear or nearly so, > 9 times as long as wide; plants erect perennials from woody taproots; rare in nc TX, known locally only from the Lampasas Cut Plain \_\_\_\_\_ **C. angusta**
10. Upper leaf blades variously shaped but not linear, ca. 1–6 times as long as wide; plants annual or perennial, prostrate to erect; including species common and widespread in nc TX.
11. Larger leaf blades oblong to oblong-elliptic or oblong-obovate; stems prostrate to erect; including species common and widespread in nc TX.
12. Leaf blades ca. 3 cm long or longer \_\_\_\_\_ **C. hirta**
12. Leaf blades 1 cm long or less.
13. Styles bifid for from 1/4 to nearly their entire length; leaf blades usually toothed, but neither prominently nor sharply, glabrous on upper surface or sparsely pubescent with hairs up to 0.5 mm long; seeds transversely rugose; stem hairs 0.2–0.7 mm long, sometimes with a few scattered longer ones.
14. Capsules loosely appressed-pubescent, the hairs rather uniformly scattered over the surface; leaf blades often with reddish or purplish central splotch; pubescence of terminal internodes loosely upwardly appressed \_\_\_\_\_ **C. maculata**
14. Capsules spreading-pubescent, the hairs mainly on the angles of the capsules; leaf blades without reddish or purplish central splotch; pubescence of terminal internodes widely spreading or reflexed \_\_\_\_\_ **C. prostrata**
13. Styles unbranched; leaf blades prominently and sharply toothed, at least near apex, sparsely to densely pubescent above with hairs 0.5–1.3 mm long; seeds punctately pitted and mottled; stem hairs 0.4–1.5 mm long \_\_\_\_\_ **C. stictospora**
11. Larger leaf blades broadly or narrowly triangular; stems spreading to erect; rare, only in s part of nc TX.
15. Stems and leaf blades with long (ca. 0.8–1.5 mm), conspicuous, soft hairs visible to the naked eye; leaf blades broadly triangular, thin, reddish or brownish beneath, with margins flat; styles bifid, the divisions terete, not reddish; capsules 1.3–1.9(–2.1) mm long; seeds 1–1.3 mm long \_\_\_\_\_ **C. villifera**
15. Stems and leaf blades with very short (< 0.2 mm long), stiff hairs invisible to the naked eye; leaf blades narrowly triangular, thick, gray-green or blue-green, with margins inrolled downward; styles bifid, the divisions clavate, deep red; capsules 1.9–2.3 mm long; seeds 1.5–1.8 mm long \_\_\_\_\_ **C. lata**

**Chamaesyce albomarginata** (Torr. & A. Gray) Small, (white-margined), WHITE-MARGIN EUPHORBIA. Prostrate, mat-forming perennial; leaf blades orbicular to oblong, entire; styles bifid nearly to base. Stream bottoms, roadsides, disturbed areas; Callahan, Coleman, Cooke, Shackelford, and Young cos.; nc TX s and w to w TX. Late Apr–Oct. [*Euphorbia albomarginata* Torr. & A. Gray] According to M. Mayfield (pers. comm.), this species is found almost exclusively w of the West Cross Timbers; the Cooke Co. specimen, identified by M. Mayfield, is the easternmost record of which we are aware.

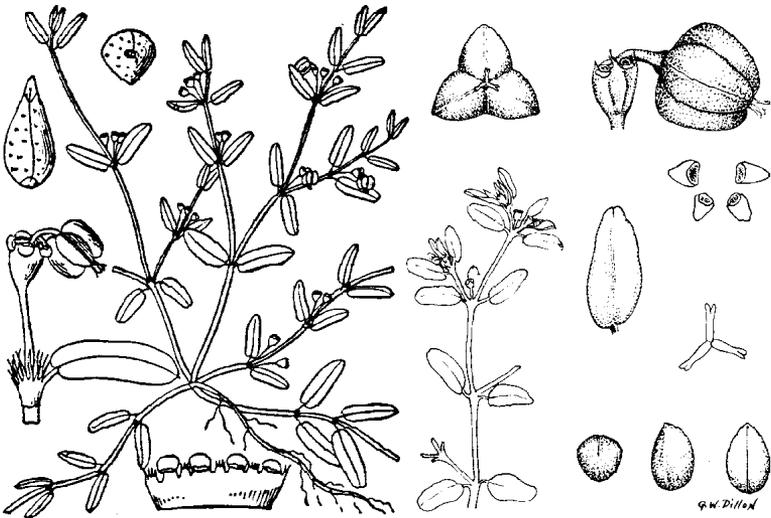
**Chamaesyce angusta** (Engelm.) Small, (narrow), BLACK-FOOT EUPHORBIA. Perennial; stems erect, 6–50 from a woody crown, 10–45 cm tall; leaf blades entire; lower leaf blades elliptic to linear-oblong, 7–25(–38) mm long; higher leaf blades narrower, linear, > 9 times as long as wide; stipules minute, distinct; cyathia at the upper nodes, solitary; gland-appendages white, 2–3 times as wide as gland width; styles bifid only at apex or 1/3 the distance to the base. Comanche Co. (Wheeler 1941), also Burnet Co. on the s margin of nc TX (Balcones Canyonlands Nat. Wildlife Refuge, C. Sexton, pers. comm.); also Travis Co. just s of nc TX



*Chamaesyce cordifolia* [HEA, RHO]



*Chamaesyce fendleri* [BB2, RHO]



*Chamaesyce geyeri* [BB2, RHO]

G.W. Dillond

(Correll & Johnston 1970); mainly Edwards Plateau to Trans-Pecos; endemic to TX. Spring–fall. [*Euphorbia angusta* Engelm.] 🌿

**Chamaesyce cordifolia** (Elliott) Small, (with heart-shaped leaves), HEART-LEAF SPURGE, HEART-LEAF EUPHORBIA. Usually prostrate annual; stems to 65 cm long; leaf blades entire; styles bifid to base. Loose sandy soils, open woods; Denton, Henderson, Limestone, and Tarrant cos.; se and e TX w to East Cross Timbers. Jun–Oct. [*Euphorbia cordifolia* Elliott]

**Chamaesyce fendleri** (Torr. & A. Gray) Small, (for August Fendler, 1813–1883, one of the first botanists to collect in New Mexico and Venezuela). Perennial; stems rather wiry, prostrate to spreading or ascending, to 20 cm long; roots becoming woody; leaf blades orbicular-ovate to oblong, entire, acute; styles bifid at least 1/2 their length. Rocky or sandy soils; Bell, Bosque, and Tarrant cos., also Brown and Hamilton cos. (HPC); w part of nc TX s and w to Edwards Plateau and Trans-Pecos. Apr–Jun, sporadically later. [*Euphorbia fendleri* Torr. & A. Gray]

**Chamaesyce geyeri** (Engelm.) Small, (for its discoverer Carl Andreas Geyer, 1809–1853, Austrian botanist), GEYER'S EUPHORBIA. Annual; stems prostrate; gland-appendages usually longer than wide, 0.5–0.75 mm long, acute or obtuse, usually entire; styles bifid 1/3–1/2 their length. Sandy open woods, disturbed areas; Hood and Parker cos. in West Cross Timbers; mainly Plains Country and Trans-Pecos. Jun–Oct. [*Euphorbia geyeri* Engelm.]

**Chamaesyce glyptosperma** (Engelm.) Small, (carved seed), RIDGE-SEED EUPHORBIA. Annual; stems ascending to decumbent, rarely prostrate, to 50 cm long; leaf blades finely toothed towards apex; gland-appendages usually wider than long, 0.1–0.6 mm long, usually with uneven or shallowly toothed or lobed margin; styles bifid ca. 1/3–1/2 their length. Mostly sandy soils, stream bottoms, open woods, and disturbed areas; widespread in TX, in nc TX mainly East Cross Timbers westward, locally to the e in Dallas Co. (Mahler 1988). Late May–Oct. [*Euphorbia glyptosperma* Engelm.]

**Chamaesyce hirta** (L.) Millsp., (hairy), PILL-POD EUPHORBIA. Pubescent annual with flowering stems erect; stems with long, yellowish, jointed hairs; leaves ca. 3 cm long, elliptic-oblong; petioles 1–2 mm long; styles bifid 1/2–2/3 their length. Weed in flower bed; Dallas Co., also coastal Texas. Reported as new for TX by Lipscomb (1984). Jun. [*Euphorbia hirta* L.] Native to Africa. Used as an arrow poison ingredient in Zaire and medicinally in many countries in Africa (Neuwinger 1996); reportedly causes cardiac and respiratory depression (Burlage 1968). 🌿 🌿

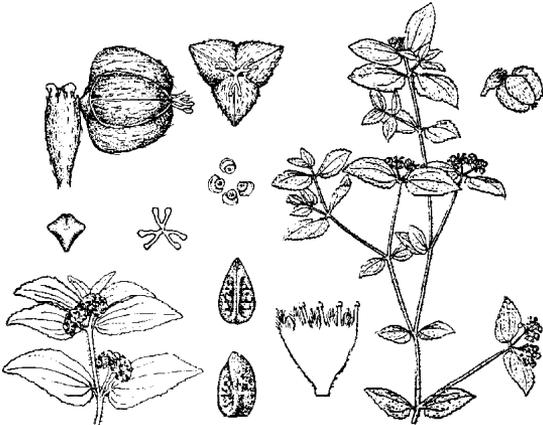
**Chamaesyce hypericifolia** (L.) Millsp., (with leaves like *Hypericum*—St. John's wort), TROPICAL EUPHORBIA. Plant to ca. 50 cm; main stem erect, the plant thus resembling *C. nutans*; branches erect to ascending; leaves usually without a central reddish or purplish splotch; glomerules of cyathia conspicuous, the gland-appendages white to pinkish; styles bifid to about the middle. Weed along sidewalks, and in flower gardens, nurseries, and landscapes; Tarrant Co. (introduced weed in Ft. Worth); first seen in Tarrant Co. in 1994 and now spreading; mainly s TX. Summer. Native to extreme s TX. [*Euphorbia hypericifolia* L.]

**Chamaesyce lata** (Engelm.) Small, (broad, wide), HOARY EUPHORBIA. Perennial < 20 cm tall, rhizomatous, the rhizomes slender; plant mostly glabrous or stems and leaves with pubescence; stems subdecumbent or spreading, to 35 cm long; leaf blades minutely pubescent, entire, less than 12 mm long; styles bifid nearly to base. Sandy or rocky soils; Coleman, Coryell (Wheeler 1941), Erath, and Hamilton (Stanford 1976) cos.; mainly Plains Country and Edwards Plateau w to Trans-Pecos. [*Euphorbia lata* Engelm.] According to M. Mayfield (pers. comm.), this species is found almost exclusively w of the West Cross Timbers.

**Chamaesyce maculata** (L.) Small, (spotted, from the spot on the leaf), SPOTTED EUPHORBIA, SPOTTED SPURGE. Prostrate or rarely suberect annual, not rooting at the nodes; stems to 50 cm long;



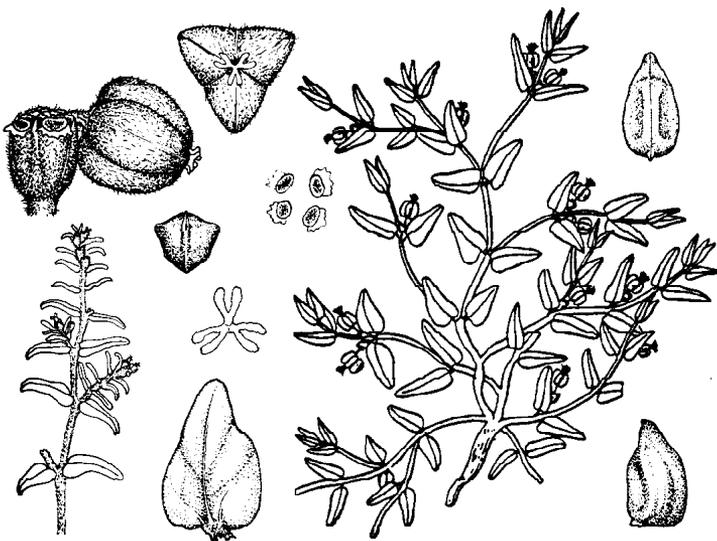
*Chamaesyce glyptosperma* [BB2, RHO]



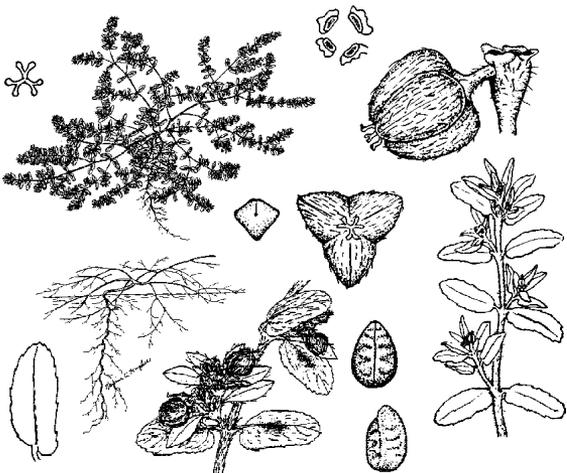
*Chamaesyce hirta* [BB2, RHO]



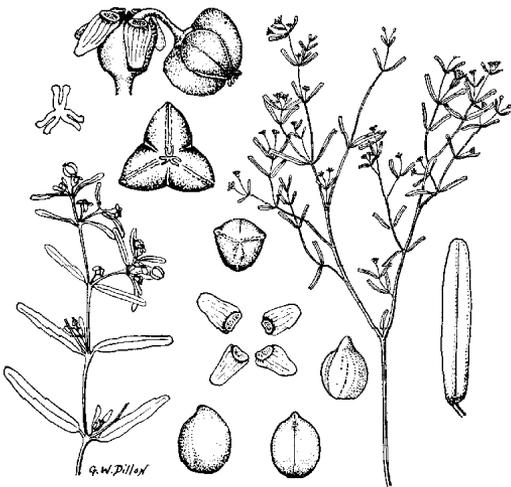
*Chamaesyce hypericifolia* [BR2]



*Chamaesyce lata* [BB2, RHO]



*Chamaesyce maculata* [REE, RHO]



*Chamaesyce missurica* [GLE, RHO]

leaf blades finely toothed, oblong, often with a reddish or purplish central splotch; gland-appendages white to red; styles bifid 1/4–1/3 their length. Sandy soils, stream banks, woods, disturbed sites; throughout most of TX. [*C. supina* (Raf.) Moldenke, *Euphorbia maculata* L., *Euphorbia supina* Raf.] Reported to be toxic to livestock; when injected by sheep, photosensitization, swelling of the head, and emaciation can result (Burlage 1968). ☠

**Chamaesyce missurica** (Raf.) Shinnars, (of Missouri), PRAIRIE SPURGE, MISSOURI SPURGE. Annual with erect main stem to 1 m tall and wide-spreading branches to 50 cm or more long; leaves with short petioles 1–3.2 mm long; leaf blades linear to oblong, 1–5 mm wide, 4.7–14 times as long as wide, symmetrical or slightly asymmetrical at base, entire; gland-appendages white (rarely pinkish), prominent, ca. 0.5–2.5 mm long; styles bifid 1/2 their length. Loose sandy soils, limestone outcrops; throughout TX e of Trans-Pecos. Late May–Oct. [*C. missurica* (Raf.) Shinnars var. *callicola* Shinnars, *Euphorbia missurica* Raf.]

**Chamaesyce nutans** (Lag.) Small, (nodding), EYEBANE. Annual with (1)–several low-spreading to erect stems to 1 m long; stems pubescent in lines; gland-appendages white to red; leaf blades asymmetrically oblong, often with a central reddish or purplish splotch; styles bifid ca. 1/2 their length. Stream bottoms, roadsides, and disturbed soils; throughout TX. May–Oct. The name *C. maculata* has often been incorrectly applied to this species. [*C. maculata* of authors, not (L.) Small, *Euphorbia maculata* of authors, not L., *E. nutans* Lag.] Toxic and has caused death in lambs through photosensitization (Kingsbury 1964); the common name also suggests that care should be taken with this species. ☠

**Chamaesyce prostrata** (Aiton) Small, (prostrate, flat to the ground), PROSTRATE EUPHORBIA. Annual similar to *C. maculata*; leaf blades varying to broadly elliptic, without central reddish or purplish splotch; styles bifid to base or nearly so. Stream banks, prairies, disturbed sites, chiefly clay soils; throughout most of TX. Jun–Oct, sporadically earlier. [*Euphorbia prostrata* Aiton, *Euphorbia chamaesyce* of authors, not L.] Can be toxic to cattle (Kingsbury 1964). ☠

**Chamaesyce serpens** (Kunth) Small, (crawling), MAT EUPHORBIA, HERBA DE GOLONDRINA. Annual resembling *C. albomarginata*; stems slender, almost thread-like, often rooting at the nodes; styles notched. Stream bottoms, prairies, clay flats, disturbed sites; throughout TX. Jul–Oct. [*Euphorbia serpens* Kunth]

**Chamaesyce stictospora** (Engelm.) Small, (straight seed), SLIM-SEED EUPHORBIA. Annual; stems prostrate, to 30 cm long; leaf blades varying to broadly elliptic, without central red spot; styles unbranched. Limestone slopes, prairies, disturbed sites, clay soils; mainly East Cross Timbers s and w to w TX, locally e to Dallas Co. Jun–Oct. [*Euphorbia stictospora* Engelm.]

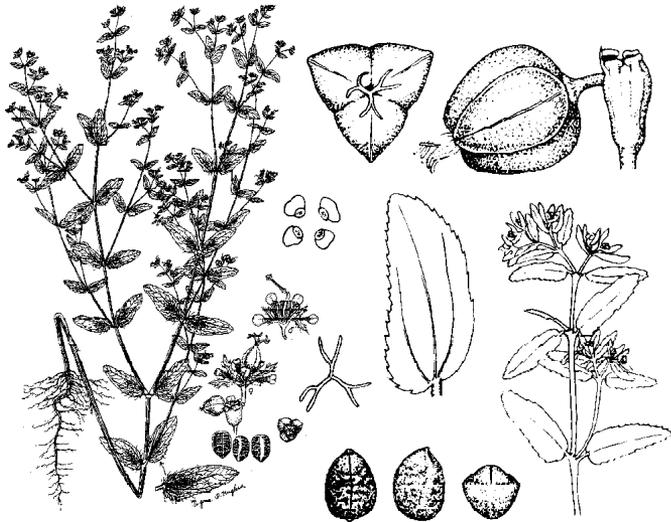
**Chamaesyce villifera** (Scheele) Small, (bearing soft hairs), HAIRY EUPHORBIA. Perennial but flowering the first year, commonly behaving as an annual; stems ascending to erect, to 40 cm tall; leaf blades entire or very minutely toothed, 3–10 mm long; styles bifid 1/2–2/3 their length. Limestone slopes, dry uplands; Bell Co.; s part of nc TX s to Edwards Plateau, also Trans-Pecos. Late May–Oct. [*Euphorbia villifera* Scheele]

## CNIDOSCOLUS BULL-NETTLE, MALA MUJER

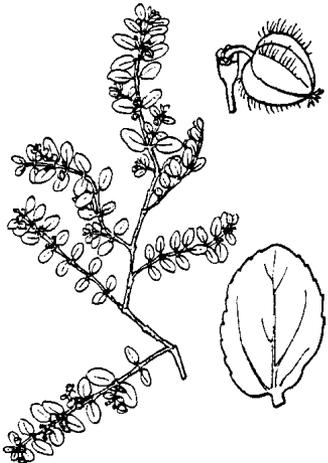
☞ A mainly tropical American genus of ca. 75 species, often with stinging hairs. The leaves of some species are eaten as greens. (Greek: *cnide*, nettle, and *scolopes* prickle or sting, alluding to the stinging hairs)

REFERENCE: McVaugh 1944.

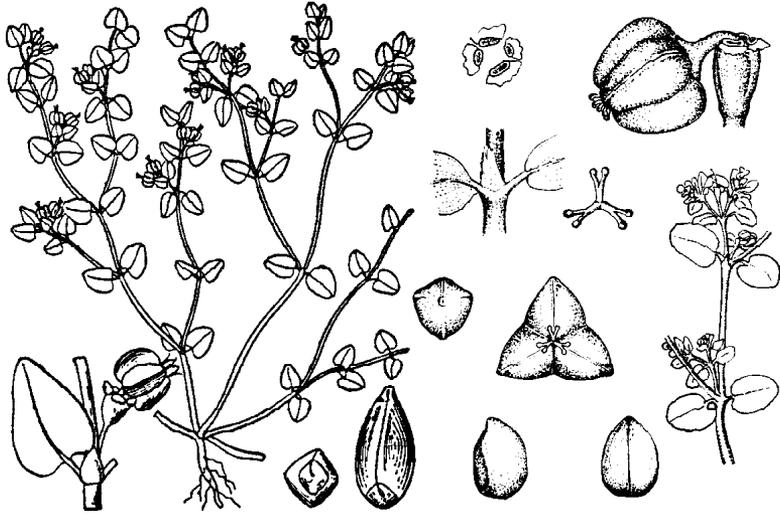
**Cnidocolus texanus** (Müll.Arg.) Small, (of Texas), TEXAS BULL-NETTLE, MALA MUJER, TREAD-SOFTLY. Perennial with milky sap, to 80(–100) cm tall from a large (to 20 cm thick), deep,



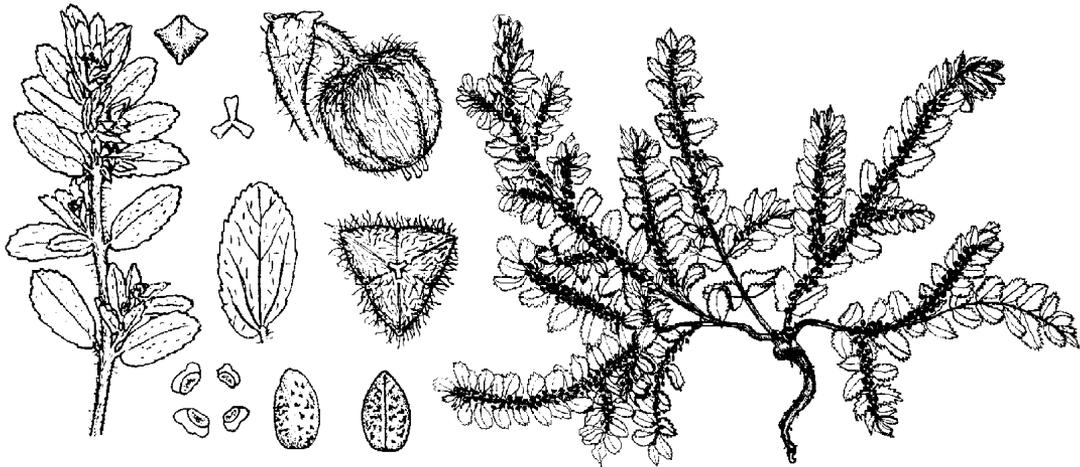
*Chamaesyce nutans* [REE, RHO]



*Chamaesyce prostrata* [BR2]



*Chamaesyce serpens* [BB2, RHO]



*Chamaesyce stictospora* [BT3, RHO]

branching root; stems densely and leaves more sparsely hispid with pale, extremely painful, stinging hairs; leaves alternate, long-petioled; leaf blades ca. 6–15 cm wide, cordate, palmately deeply 3–5-lobed, the lobes coarsely toothed or again lobed; stipules inconspicuous, narrow, toothed; flowers in terminal, cymose, pedunculate inflorescences slightly shorter to slightly longer than the leaves; male and female flowers in the same inflorescence; perianth large, white, showy, sweet-scented, of a single whorl of parts; perianth of male flowers with subcylindrical tube 15–20 mm long, slightly longer than the (4–)5 subrotate lobes; perianth of female flowers 10–17 mm long, 5-parted essentially to base; capsules 15–20 mm long, hispid, with 3 large seeds, 14–18 mm long. Sandy open woods, fields, disturbed areas; nearly throughout TX. Apr–Jul, less freely to Sep. [*Jatropha texana* Müll.Arg.] The seeds are reported to be edible; however, there are reports that they may contain some cyanide. If the foliage is touched, glass-like hairs break off in the skin and act like hypodermic needles; they release a toxin which causes an intense burning sensation; this type of effect is known as contact urticaria; the stinging hairs can penetrate even heavy clothing such as jeans; subsequent to the sting, the affected skin can be red, swollen, and irritated for a number of days. According to Lampe (1986), only four families (Euphorbiaceae, Hydrophyllaceae, Loasaceae, and Urticaceae) have stinging hairs—nc TX has stinging representatives of all of these except the Hydrophyllaceae. ☠ ☒/85

## CROTON

Ours annual or perennial, often aromatic herbs or shrubs with stellate hairs or peltate scales on the epidermis of at least some parts; sap not milky; leaves alternate or subopposite, or those under the flowers apparently whorled, entire or toothed; stipules small, usually falling early; flowers solitary or in spike-like racemes or head-like clusters, unisexual, the sexes on the same or separate plants; staminate flowers with (4–)5(–6) sepals united at base; petals as many or none; stamens 5–20; pistillate flowers with 5–6(–9) sepals united at or near base; petals minute or none; pistil 1, usually 3-carpellate; fruit a 1- to usually 3-seeded, globose or subglobose capsule, or in *C. michauxii* an achene.

☞ A huge genus (ca. 750 species) of tropical and warm areas ranging from temperate herbs to tropical rain forest trees. Oil of croton, one of the most purgative substances known, is obtained from an Old World species, *C. tiglium* L. Many contain alkaloids and are used medicinally; an Ecuadorian species is currently being investigated for medicinal uses. *Croton* species are distasteful and rarely eaten by livestock; they thus increase under overgrazing; ☠ some species are toxic. The widely cultivated horticultural “crotons” with variegated foliage belong to the Euphorbiaceae genus *Codiaeum*, a group of 15 species native from Malesia to the Pacific. (Greek: *croton*, a tick; the Greek name of the CASTOR-OIL-PLANT of this family, from similarity of the seed to a tick)

REFERENCES: Ferguson 1901; Johnston 1959; Ginzburg 1992; Webster 1992, 1993; Aplet et al. 1994.

1. Leaf blades serrate; small, distinctive, whitish, saucer-shaped gland present on each side of the undersurface of the base of the leaf blade where the petiole attaches (use hand lens) \_\_\_\_\_ **C. glandulosus**
1. Leaf blades usually entire or rarely minutely serrate; leaf glands not present.
  2. Plants shrubby, the stems woody; in nc TX known only from Coryell, Bell, and Johnson cos.
    3. Upper and lower surfaces of mature leaf blades strikingly different in appearance, the upper green and essentially glabrous (rarely a few scales present), the lower silvery-white with reddish brown tinge due to it being covered with silvery-white peltate scales (some reddish brown), the actual leaf surface not visible; leaf blades obtuse \_\_\_\_\_ **C. alabamensis**
    3. Upper and lower surfaces of mature leaf blades with stellate pubescence, more dense on lower surface, the upper surface green, the lower grayish green; leaf blades acute \_\_\_\_\_ **C. fruticosus**
  2. Plants herbaceous, the stems not woody; widespread in nc TX.
    4. Leaf blades with markedly different types of indumentum above and below, stellate-pu-

bescent above, stellate-scaly beneath (scales silvery or brownish); leaf blades 8 mm wide or less (often considerably less); calyces ca. 1 mm long; fruit an achene to ca. 3 mm long; not collected in nc TX since 1882 \_\_\_\_\_

**C. michauxii**

4. Leaf blades with similarly coated upper and lower surfaces, both pubescent or both scaly (upper sometimes much less so than lower); leaf blades variable, often > 8 mm wide; calyces usually > 1 mm long; fruit a capsule 4–9 mm long; widespread in nc TX.

5. Plants dioecious; all flowers without petals; leaf blades 15–35 mm long, to only 10(–12) mm wide, usually 4–5 times as long as wide \_\_\_\_\_

**C. texensis**

5. Plants monoecious; at least the staminate flowers with petals; leaf blades usually either longer, wider, or < 4 times as long as wide.

6. Styles 2, the ultimate branches 4; mature capsules 1-seeded; leaf blades 10–25 mm long \_\_\_\_\_

**C. monanthogynus**

6. Styles 3, the ultimate branches 6 or more; mature capsules 3-seeded; leaf blades 10–80(–100) mm long.

7. Ultimate style branches 6; pistillate sepals subtending mature fruits 4–5 mm long; leaf blades suborbicular (typically) to oblong-lanceolate, often obtuse at apex \_\_\_\_\_

**C. lindheimerianus**

7. Ultimate style branches ca. 10 or more; pistillate sepals subtending mature fruits 5–10 mm long; leaf blades ovate to lance-elliptic, often acute at apex \_\_\_\_\_

**C. capitatus**

 **Croton alabamensis** E.A. Sm. ex Chapm. var. **texensis** Ginzburg, (sp.: of Alabama; var.: of Texas), TEXABAMA CROTON. Monoecious shrub to ca. 2 m or more tall; younger leaves and young twigs more reddish brown due to greater number of pigmented scales; inflorescence a terminal 6–14-flowered raceme. Limestone canyon slopes, in understory of forests or in full sun; endemic to Coryell and Travis cos. (narrowly endemic to nc TX and immediately adjacent area); first discovered in 1989; recently described by Ginzburg (1992). Aplet et al. (1994) gave additional information. Feb–Mar. The only other variety, variety *alabamensis*, is known only from 3 cos. in Alabama and Tennessee. (TOES 1993: V)  

**Croton capitatus** Michx., (capitate, headed), WOOLLY CROTON, HOGWORT. Monoecious annual herb to 0.2–1(–1.5) m tall, densely stellate tomentose; leaf blades usually acute to obtuse; flowers in terminal spike-like racemes; styles 3, two or three times 2-parted. Sandy or calcareous prairies, pastures, roadsides. Jun–Oct. While generally avoided, cattle can be poisoned by eating the plant fresh or in hay (Boughton 1931; Muenscher 1951). 

1. Petioles of middle and upper leaves ca. equal; leaf blades often blunt, not strongly tapered from base; seeds uniform in color \_\_\_\_\_ var. **capitatus**

1. Petioles decreasing in length from middle of stem upward; leaf blades mostly acute, strongly tapered from base; seeds mottled \_\_\_\_\_ var. **lindheimeri**

var. **capitatus**. Dallas, Grayson, and Tarrant cos., also Denton (J. Quayle, pers. comm.), Fannin, and Clay cos. (Johnston 1959); also ne TX and Rolling Plains.

var. **lindheimeri** (Engelm. & A. Gray) Müll.Arg., (for Ferdinand Jacob Lindheimer, 1801–1879, German born TX botanist). Hunt and Denton cos., also Johnson, Kaufman, Hill, Limestone, and McLennan cos. (Johnston 1959); se and e TX w to nc TX and Edwards Plateau.

**Croton fruticosus** Torr., (shrubby and dwarf), ENCINILLA, HIERBA LOCA. Monoecious shrub to ca. 1 m tall; flowers in terminal racemes. In brush on limestone uplands; Bell Co., also Johnson (R. O'Kennon, pers. obs.) and Williamson (Johnston 1959) cos. and Fort Hood (Bell or Coryell cos.–Sanchez 1997); w part of nc TX s to Edwards Plateau, also Trans-Pecos. May–fall.

**Croton glandulosus** L., (glandular), TROPIC CROTON. Monoecious annual, normally erect, to 60 cm tall, widely branched, stellate-pubescent; gland present on each side of the undersurface of

the base of the leaf blade where the petiole attaches; capsules 4.5–5.5 mm long. Stream bottoms or disturbed habitats. Jun–Oct.

1. Plants ca. 10–20 cm tall; stellate hairs on stem with central branch usually shorter than radials; larger leaves about 2.5 cm long; glands at base of leaf blade 0.1–0.4 mm thick apically \_\_\_\_\_ var. **lindheimeri**

1. Plants usually > 25 cm tall; stellate hairs on stem with a long, erect, central branch usually longer than radials; larger leaves over 3 cm long; glands at base of leaf blade 0.5–0.8 mm thick apically

\_\_\_\_\_ var. **septentrionalis**

var. **lindheimeri** Müll.Arg., (for Ferdinand Jacob Lindheimer, 1801–1879, German born TX botanist), LINDHEIMER'S CROTON. Clay and Tarrant cos., also Bell, Erath, and Parker cos. (Johnston 1959); widespread in TX.

var. **septentrionalis** Müll.Arg., (northern), NORTHERN CROTON. Se and e TX w to Rolling Plains and e Edwards Plateau.

**Croton lindheimerianus** Scheele, (for Ferdinand Jacob Lindheimer, 1801–1879, German born TX botanist), THREE-SEED CROTON. Monoecious annual; leaf blades densely stellate pubescent, thick, usually obtuse to acute; the 3 styles bifid to base. Sandy ground; widespread but local over much of TX, in nc TX mainly in West Cross Timbers (Archer, Clay, Eastland, Jack, Palo Pinto, and Young cos.), also to the e in Grayson Co. (RR yard). Jul–Oct.

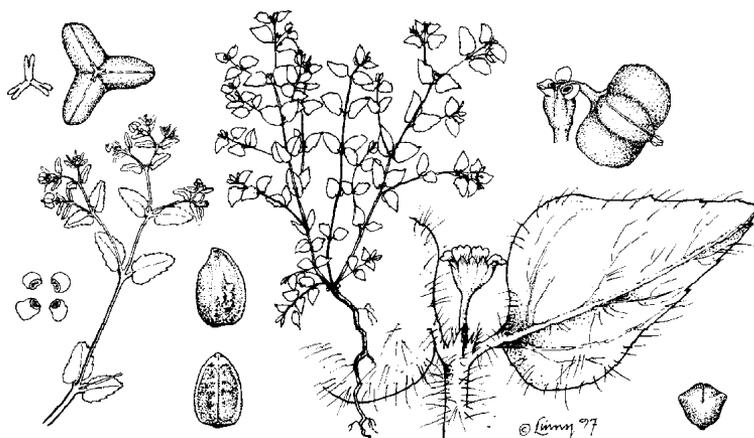
**Croton michauxii** G.L. Webster, (for André Michaux, 1746–1803, French botanist and explorer of North America), NARROW-LEAF RUSHFOIL. Erect, slender, loosely branched, monoecious annual to 60(–90) cm tall; stems coated with stellate hairs, the rays of which are united at the base and therefore scale-like, silvery or brownish; leaves alternate or subopposite, very short-petioled; leaf blades linear-lanceolate to oblong-elliptic; flowers minute, unisexual, both sexes on the same plant; staminate flowers: in slender, short, terminal, minutely bracted spikes; sepals 3–5; petals as many, narrower, white; pistillate flowers: mostly solitary at base of staminate spikes; calyces unequally 3–5-lobed; petals absent; style branches 3, inconspicuously bifurcate near apex; fruit an achene 2.5–3 mm long. Sandy open areas; collected at Dallas by Reverchon in 1882; mainly e TX. Jun–Oct. This taxon, previously treated as [*Crotonopsis linearis* Michx.], was recently lumped into the genus *Croton* (Webster 1992). According to Webster (1992), "... the main generic character of *Crotonopsis*—unicarpellate gynoeceium and indehiscent fruit—represents merely the end-point in a reduction series from the 3-carpellate gynoeceium of most *Croton* species through the 2-carpellate gynoeceium of *Croton monanthogynus* Michx. to the 1-carpellate gynoeceium of *Crotonopsis*. Consequently, there appears to be a much stronger case for treating *Crotonopsis* as a section of *Croton* than as an independent genus." [not *C. linearis* Jacq.]

**Croton monanthogynus** Michx., (one female flower), DOVEWEED, PRAIRIE-TEA, ONE-SEED CROTON. Closely stellate pubescent monoecious annual to 50 cm tall, widely branched; leaf blades rhombic-ovate to elliptic or lanceolate; capsules ca. 4 mm long. Rocky or eroding ground, roadsides and waste places, particularly calcareous soils; throughout most of TX. Jun–Nov.

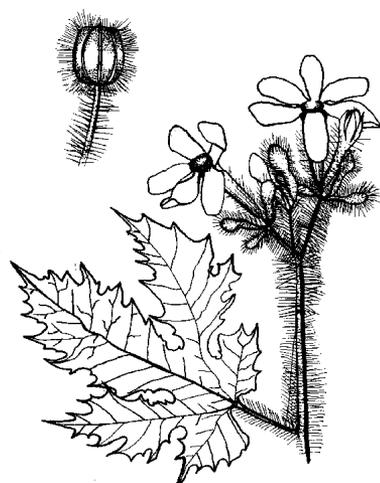
**Croton texensis** (Klotzsch) Müll.Arg., (of Texas), TEXAS CROTON, SKUNKWEED. Dioecious annual herb 20–80 cm tall; leaf blades linear-lanceolate to nearly ovate-oblong, usually 15–35 mm long, (3–)4–5(–6) times as long as wide, to ca. 10(–12) mm wide, densely stellate pubescent, more so below; calyces 2–4 mm across; capsules 4–6 mm long, globose to globose-ovoid, often slightly warty, stellate-tomentose. Sand or sandy loam; widespread in TX. Jun–Oct. While generally avoided, cattle can be poisoned by eating the plant fresh or in hay (Muenscher 1951). ☞

## DITAXIS WILD MERCURY

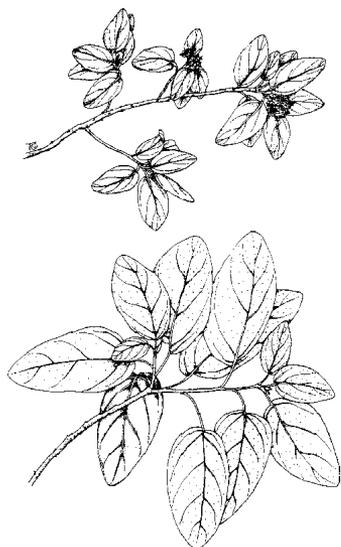
Perennials, herbaceous from a woody crown, with pubescence of hairs attached at the middle (= malpighian); sap not milky; foliage sometimes darkening upon drying; leaves alternate; leaf



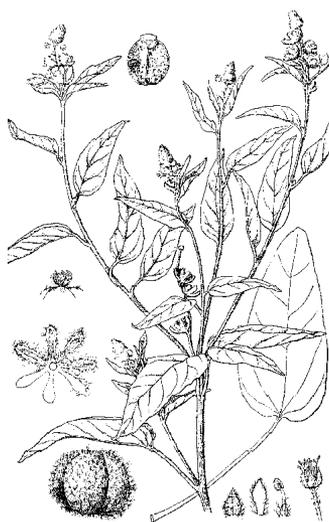
*Chamaesyce villifera* [HEA]



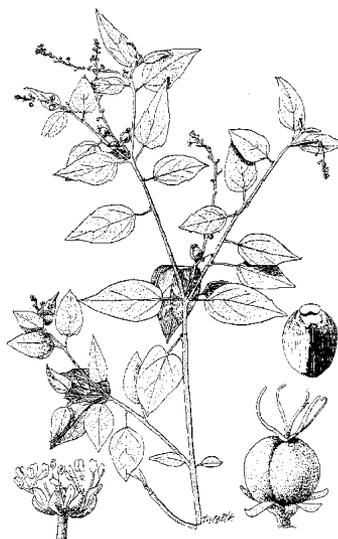
*Cnidoscolus texanus* [B73]



*Croton alabamensis* var. *texensis* [SD]



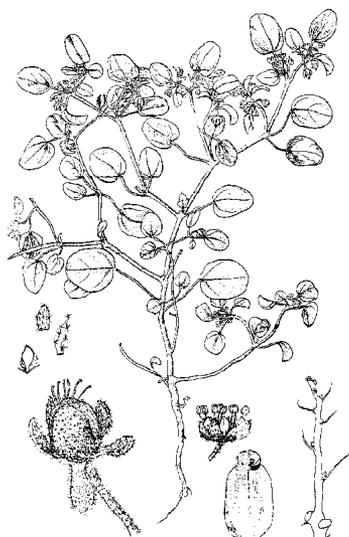
*Croton capitatus* var. *lindheimeri* [ARM]



*Croton fruticosus* [ARM]



*Croton glandulosus* var. *septentrionalis* [ARM]



*Croton lindheimerianus* [ARM]



*Croton michauxii* [MIC]

blades entire; inflorescences racemose, axillary; flowers unisexual; staminate flowers: sepals 5; petals 5; glands 5; stamens 7-10, the filaments coherent; pistillate flowers: sepals 5; petals 5 or absent; glands 5, ovary 3-carpellate; ovules 1 per cell; styles 3, bifid; capsules 3-seeded; seeds ecarunculate.

☛ An American genus of 40-50 species ranging from the U.S. to Argentina (Webster 1994a). The species have often been treated in a broadly circumscribed *Argythamnia* (e.g., Correll & Johnston 1970; Ingram 1980; Hatch et al. 1990; Kartesz 1994). However, we are following Webster (1994b) who considered *Ditaxis* a distinct genus, as did Takahashi et al. (1995) and Steinmann and Felger (1997). According to Takahashi et al. (1995), *Ditaxis* "... has pollen that can be easily distinguished from all remaining Euphorbiaceae (and probably from all dicotyledons) by the unusual aperture configuration and the shape of the grain." If treated broadly to include *Chiroptalum* and *Ditaxis*, *Argythamnia* is an American, mainly tropical genus of 78-88 species. (Greek: *di*, two, separate, and *taxis*, arrangement, presumably in reference to the separate male and female flowers)

REFERENCES: Shinners 1956c; Ingram 1967, 1980; Waterfall 1971 [1972]; Webster 1994b; Takahashi et al. 1995.

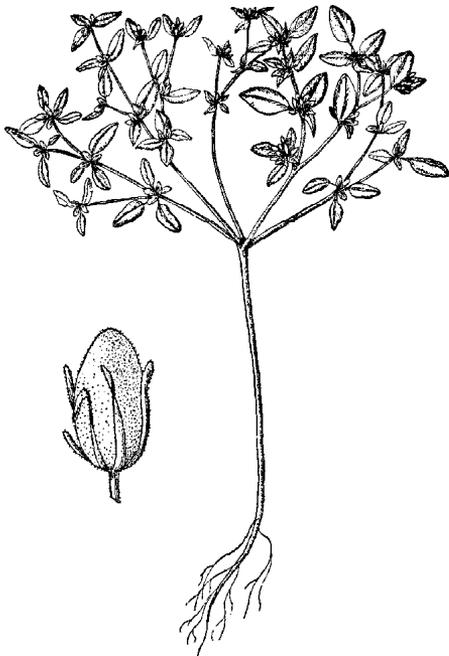
1. Inflorescences shorter than leaves; plants with much-branched, trailing or spreading stems \_\_\_\_\_ **D. humilis**
1. Inflorescences longer than leaves; plants with several, unbranched, erect to ascending stems.
  2. Glands of pistillate and staminate flowers truncate, square to rectangular \_\_\_\_\_ **D. aphoroides**
  2. Glands of pistillate and staminate flowers acute, linear \_\_\_\_\_ **D. mercurialina**

**Ditaxis aphoroides** (Müll.Arg.) Pax, (resembling *Aphora*, a generic synonym used by Nuttall), HILL COUNTRY WILD MERCURY, SHRUBBY DITAXIS. Plant densely villous; stems usually erect; leaves elliptic to ovate, sessile above, veins prominent below; usually dioecious; staminate flowers: petals obovate to cuneate, ca. 4-5 mm long; glands wider than long, truncate; stamens 8-10; pistillate flowers: petals absent or rudimentary; glands thick, squarish, truncate; styles erect, bifid half the free length. Sandy or rocky limestone soils; Brown Co., also Mills Co. (TOES 1993); also on Edwards Plateau in Blanco, Gillespie and Kerr cos., also Bandera, Kimble (HPC), Hays, Kendall (Mahler 1988), Comal, and Uvalde (R. Roberts, pers. comm.) cos.; current populations not known from Brown, Hays, or Kendall cos. (Mahler 1988); Reverchon's collection from Williams Ranch (reportedly in Brown Co.—Apr 1882) represents the most n collection; narrowly endemic to Edwards Plateau and the sw part of nc TX. Mar-Apr. [*Argythamnia aphoroides* Müll.Arg.] (TOES 1993: V) ⚠ 📍

**Ditaxis humilis** (Engelm. & A. Gray) Pax var. **humilis**, (low-growing, dwarf), LOW WILD MERCURY, LOW DITAXIS. Stems usually trailing or spreading; leaves sparsely to densely villous, elliptic to narrowly obovate, sessile or nearly so above, with veins prominent on lower surface; monoecious; staminate flowers: petals narrowly lanceolate to oblanceolate; glands linear; stamens 8 or 9; pistillate flowers: petals to 0.5 mm long or absent; glands linear; styles erect and bifid half the free length. Rocky or disturbed calcareous clay soils; throughout much of TX, mainly Blackland Prairie s and w to w TX. Apr-Oct. [*Argythamnia humilis* (Engelm. & A. Gray) Müll.Arg.]

var. *leiosperma* Waterfall, (smooth-seeded), was named in the genus *Argythamnia* by Waterfall (1971 [1972]) apparently based on a single seed character (the name has apparently not been recognized in *Ditaxis*). It seems better lumped with var. *humilis*. Kartesz (1994) recognized the variety but it was not recognized by Jones et al. (1997) nor more recently by Kartesz (pers. comm., 1997). The two can be separated as follows:

1. Seeds with distinctly rugose-roughened areas \_\_\_\_\_ var. *humilis*
  1. Seeds basically smooth, with several whitish slightly roughened encircling bands \_\_\_\_\_ var. *leiosperma*
- var. *laevis* (Torr.) A. Heller, (smooth), SMOOTH WILD MERCURY, SMOOTH DITAXIS, with foliage en-



*Croton monanthogynus* [GLE]



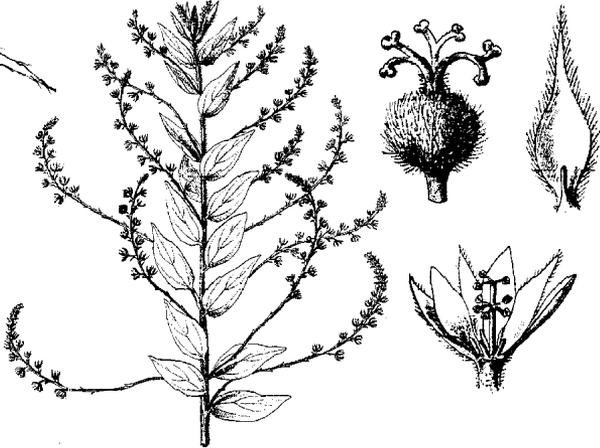
*Croton texensis* [ARM]



*Ditaxis aphoroides* [HEA]



*Ditaxis humilis* var. *humilis* [BB1, BT3]



*Ditaxis mercurialina* [EN1]

tirely glabrous, rather succulent, and becoming brittle upon drying, is known from the Edwards Plateau and Trans-Pecos. [*Argythamnia humilis* var. *laevis* (Torr.) Shinners]

**Ditaxis mercurialina** (Nutt.) J.M.Coult., (Mercury, messenger of the gods), TALL WILD MERCURY, TALL DITAXIS. Plant dark green, villous; monoecious; staminate flowers: petals oblanceolate to broadly so, ca. 3 mm long; glands linear; stamens usually 8; pistillate flowers: petals usually absent; glands linear; styles spreading, bifid near apex only. Sandy or rocky limestone soils, prairies; Bell, Collin, Dallas, Grayson, and Tarrant cos.; nc TX w to Rolling Plains and sw to Edwards Plateau and Trans-Pecos. Apr–Jun. [*Aphora mercurialina* Nutt., *Argythamnia mercurialina* (Nutt.) Müll.Arg.]

## EUPHORBIA SPURGE

Annuals or perennials with milky sap; leaves alternate or opposite; stipules absent, or represented by minute glands; inflorescences dichotomously or trichotomously branched, with alternate or whorled leafy bracts; cyathia and fruits as in *Chamaesyce*—flowers greatly reduced, minute, unisexual (consisting only of a single pistil or a single stamen on a short pedicel), in small cup-like involucre (= cyathia); each cyathium containing one pistillate and several staminate flowers mixed with minute bracts; the cyathia also have fleshy glands on their rims; these glands in some species have small, petal-like gland-appendages—the cyathium is then termed a pseudanthium because of the resemblance to standard flowers; pistillate pedicel elongating in age, the 3-locular capsule exerted from the involucre. In the past there has not always been clarity in the terms used for the measurement of glands and gland-appendages. We are following terminology suggested by M. Mayfield (pers. comm.)—in the key and descriptions the width of the gland signifies the measurement in the tangential dimension relative to the cyathium; the length of the gland signifies the measurement in the radial dimension relative to the cyathium; the length of the gland-appendage signifies the measurement in the radial dimension relative to the cyathium—this means from attachment at the gland to the apex of the gland-appendage.

☛ When considered broadly, *Euphorbia* is a huge, cosmopolitan, especially warm area genus of ca. 2,000 species—the second largest genus of flowering plants; we are treating the segregate, *Chamaesyce*, with 300+ species, as a distinct genus. Euphorbias are basically monoecious or dioecious herbs, succulents, shrubs, or trees with milky latex. Many are important ornamentals including *E. pulcherrima* Willd. ex Klotzsch (POINSETTIA, named for Joel Poinsett, the first U.S. minister to Mexico, who imported the plant into the U.S. in 1829—Spoerke & Smolinske 1990); the inflorescences are sometimes surrounded by colorful bracts (these often large and photosynthetic and possibly better referred to as leaves). Some Old World species superficially resemble Cactaceae and function there as ecological equivalents of that family. ☛ As in *Chamaesyce*, the latex of all species is apparently toxic and can cause dermatitis or other reactions in sensitive individuals; inflammation and large blisters can develop; the eyes are particularly sensitive. While livestock are sometimes accidentally poisoned, animals generally will not eat the plants; the toxins are complex terpenes such as euphorbol; some are suspected of acting as co-carcinogens (= promote the action of “sub”-carcinogenic doses of known carcinogens); ingestion of euphorbias can produce severe gastric distress; e.g., POINSETTIA has caused death in children (Wheeler 1941; Muenscher 1951; Kingsbury 1964, 1965; Kinghorn 1979; Lampe & McCann 1985; Lampe 1986). *Euphorbia antisyphilitica* Zucc., CANDELILLA, of the Trans-Pecos, is the source of Candelilla wax, one of the the highest quality waxes known. The wax is obtained by boiling the stems in water and dilute acid and then scooping off the floating wax. Unfortunately, in some areas populations of this species have been greatly reduced (Powell 1988). (Named for Euphorbus, 1st century AD physician to King Juba of Mauritania, who used latex from some species for medicinal purposes)

There is no general agreement on whether *Euphorbia* should be recognized as one large genus or divided into a number of segregates. Subgenus *Chamaesyce* is now frequently treated as a separate genus—as done here following Kartesz (1994), Webster (1994b), G. Webster (pers. comm. 1997), and M. Mayfield (pers. comm.). Four nc TX species, *E. longicuris*, *E. wemeriana*, *E. spathulata*, and *E. tetrapora*, are sometimes treated in the genus *Tithymalus*. They have flat or convex involucre glands and bracts forming a whorl beneath the umbelliform, 3–5 rayed, symmetrical inflorescence (= pleiochasium). *Euphorbia cyathophora*, *E. davidii*, and *E. dentata* are segregated by some authors into the genus *Poinsettia*, and are characterized by usually having a solitary involucre gland without appendages. The four nc TX species with usually petal-like gland-appendages, *E. bicolor*, *E. corollata*, *E. hexagona*, and *E. marginata*, are in subgenus *Agaloma* which could likewise be recognized at the generic level.

REFERENCES: Norton 1900; Wheeler 1936, 1941; Krochmal 1952; Richardson 1968; Johnston 1975; Subils 1984; Park 1998.

1. Leaves sessile or with narrowed, winged, petiolar base (leaves sometimes absent from flowering plants).
  2. Involucres with yellow-green to brownish glands but without conspicuous gland-appendages; stem leaves widest near apex.
    3. Leaves entire; fruits not warty; involucre glands with 2 pointed, horn-like appendages.
      4. Uppermost leafy floral bracts partially fused, sometimes to nearly half their length (thus appearing perfoliate) \_\_\_\_\_ **E. roemeriana**
      4. Uppermost leafy floral bracts essentially free to their base.
        5. Uppermost leafy floral bracts bluntly triangular, nearly as long as wide or longer; inflorescences usually appearing relatively open; seeds with relatively few pits in rows to nearly smooth; plants at maturity usually green in color; growing in sandy soil \_\_\_\_\_ **E. tetrapora**
        5. Uppermost leafy floral bracts suborbicular or reniform, wider than long; inflorescences usually appearing very crowded; seeds with numerous small pits ± evenly distributed over the seed surface; plants at maturity tannish or coppery in color; growing in limestone areas \_\_\_\_\_ **E. longicuris**
    3. Leaves finely toothed, at least around apex; fruits warty; involucre glands rounded, entire \_\_\_\_\_ **E. spathulata**
  2. Involucres with white gland-appendages, these usually conspicuous and petal-like (but very small and whitish to greenish white in *E. hexagona*); stem leaves mostly widest near middle or of uniform width.
    6. Stem leaves opposite, 1–6 mm wide; bracts never white-margined; gland-appendages small, 0.5 mm or less long (in radial dimension—see genus description) \_\_\_\_\_ **E. hexagona**
    6. Stem leaves alternate (can be opposite or whorled just below inflorescence), usually > 6 mm wide; bracts white-margined OR not so; gland-appendages conspicuous, petal-like, 1.5–4 mm long.
      7. Floral bracts and upper leaves not white-margined (leaves sometimes absent from flowering plants); middle and upper stem leaves usually 12 mm wide or less; capsules glabrous \_\_\_\_\_ **E. corollata**
      7. Floral bracts and upper leaves prominently white-margined; middle and upper stem leaves usually > 12 mm wide; capsules pubescent.
        8. Uppermost (just below inflorescence), white-margined, leaf-like bracts linear, usually 5–10 times as long as broad; main stem leaves lanceolate to narrowly elliptic, usually 3–5 times as long as wide, pubescent \_\_\_\_\_ **E. bicolor**
        8. Uppermost, white-margined, leaf-like bracts narrowly lanceolate to ovate, < 4 times as long as broad; main stem leaves elliptic, oblong, or ovate, usually < 2.5 times as long as wide, often glabrous \_\_\_\_\_ **E. marginata**

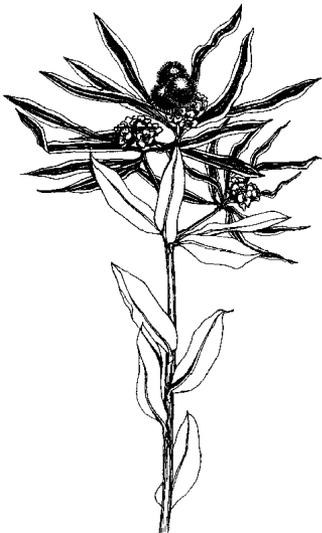
1. Leaves with distinct petioles 1–25 mm long.
9. Involucral glands usually solitary, lacking appendages; larger leaf blades usually toothed or lobed: upper stem leaves with linear to narrowly lanceolate, elliptic, or broadly ovate blades usually (2–)4–45 mm wide; petioles 2–25 mm long.
10. Main stem leaves all or mostly alternate, essentially glabrous above: upper leaves sometimes fiddle-shaped \_\_\_\_\_ **E. cyathophora**
10. Main stem leaves all or mostly opposite, pubescent above: upper leaves not fiddle-shaped.
11. Leaf blades usually widest at the middle, linear-elliptic to broadly elliptic; petioles often nearly as long as the blades at midstem; trichomes of the lower leaf surfaces stiff, strongly tapered with a broad basal cell; seeds angular in cross-section, unevenly tuberculate, 2.0–2.7 mm long \_\_\_\_\_ **E. davidii**
11. Leaf blades usually widest below the middle, lanceolate to trullate (= trowel-shaped); petioles not usually more than a third as long as the blade at midstem; trichomes of the lower leaf surfaces weak, filiform, lacking a broad basal cell; seeds rounded in cross-section, evenly tuberculate, 1.7–2.0(–2.2) mm long \_\_\_\_\_ **E. dentata**
9. Involucral glands 4 or 5, with conspicuous or inconspicuous, white or pinkish gland-appendages; larger leaf blades entire: upper stem leaves with linear to lanceolate or narrowly oblong blades 1–6 mm wide; petioles 1–3.5 mm long
12. Involucres with 4 glands; gland-appendages often conspicuous, white or pinkish, 0.5–2.5 mm long (in radial dimension—see genus description); capsules 2–2.5 mm long; stipules 1–1.5 mm long; stems several from at or near base (this *Chamaesyce* species often has the leaf blades symmetrical basally and is thus included in the *Euphorbia* key to prevent confusion) \_\_\_\_\_ see **Chamaesyce missurica**
12. Involucres with 5 glands; gland-appendages very small and inconspicuous, 0.5 mm or less long, whitish or greenish white; capsules 3–5 mm long; stipules absent or represented by minute glands; stem 1 from base \_\_\_\_\_ **E. hexagona**

**Euphorbia bicolor** Engelm. & A. Gray, (two-colored), SNOW-ON-THE-PRAIRIE. Erect, softly pilose annual to 130 cm tall; middle stem leaves 3–5 times as long as wide; involucral glands usually 5; gland-appendages petal-like, 2–3 mm long. Prairies, roadsides, and waste ground; mainly Grand Prairie and Blackland Prairie e to e TX, also Montague Co., in nc TX sw to Johnson Co. While generally quite distinct, in the vicinity of Johnson Co. (and probably other areas as well) where the ranges of *E. bicolor* and *E. marginata* overlap, intermediate individuals can be found. Jul–Oct. The fruits are ballistic (= seeds thrown catapult-like from the fruits). The milky sap is caustic and can cause a skin rash (M. Mayfield, pers. comm.). ☠

**Euphorbia corollata** L., (corolla-like), FLOWERING SPURGE, TRAMP'S SPURGE. Perennial with solitary or few stems to 90 cm tall; leaves alternate, linear to elliptic-oblong; involucral glands 5, cupped; gland-appendages petal-like, 1.5–4 mm long. Clay soils; Collin, Cooke, Dallas, Fannin, Grayson, Lamar, and Montague cos.; e TX w to n part of nc TX, May–Sep. The rootstock reportedly contains a poisonous substance, euphorbon (Burlage 1968). ☠

**Euphorbia cyathophora** Murray, (cup-bearing), WILD POINSETTIA, FIRE-ON-THE-MOUNTAIN, PAINTED EUPHORBIA, PAINTED SPURGE, PAINTEDLEAF. Nearly glabrous annual to 75 cm tall; leaf blades extremely variable in shape, elliptic to oblong-ovate or ovate, varying to linear-lanceolate or even linear, sometimes lobed and appearing fiddle-shaped, usually finely toothed to entire, the uppermost leaves and the floral bracts usually rosy or rosy and whitish at base; involucral glands usually solitary, cupped, without appendages. Stream banks, open areas; Bell, Dallas, Grayson, Hunt, and Kaufman cos., also Denton (Mahler 1988) and Tarrant (F. Norris, pers. comm.) cos.; widely scattered nearly throughout TX. May–Sep.

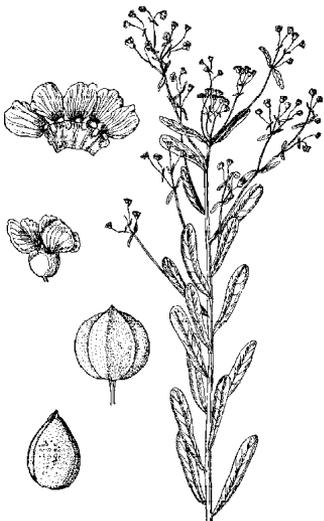
**Euphorbia davidii** Subils, (for David L. Anderson of Villa Mercedes, Argentina, who in 1984 col-



*Euphorbia bicolor* [B73]



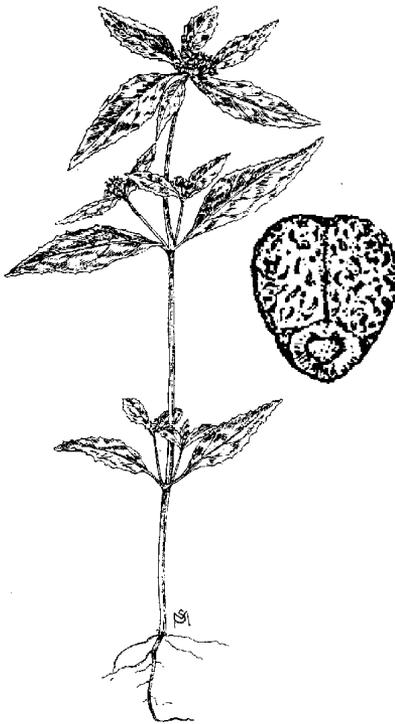
*Euphorbia cyathophora* [HEA]



*Euphorbia corollata* [GLE]



*Euphorbia davidii* [KUR]



*Euphorbia dentata* [MAG]



*Euphorbia hexagona* [B73]

lected one of the paratypes). Similar to *E. dentata* but more robust, with hairs on the upper stems and young growth coarse, slightly recurved, and stiff (not to the touch so much as to the eye); involucre glands usually solitary, cupped, without appendages; capsules somewhat ovoid or broader at the base, tapering to the apex; seeds angular-ovoid with unevenly and roughly sculptured surface, with a suggestion of 2 transverse ridges in well-formed seeds on the dorsal surface, 2.2–2.7 mm long, with caruncle 1.0–1.4 mm wide;  $n = 28$  (tetraploid). Disturbed sites; Eastland Co. (TEX—M. Mayfield, pers. comm.). Specimens of this species have long been misidentified as the rather similar and more common *E. dentata*. Consequently, its range within TX is unclear but it is probably more common in w TX; according to M. Mayfield (pers. comm.), it is to be expected as a weed in other parts of nc TX area. This description and the dichotomy in the key separating *E. davidii* and *E. dentata* are from M. Mayfield (pers. comm.).

***Euphorbia dentata*** Michx., (toothed), TOOTHED SPURGE. Rather sparsely pubescent annual to 75 cm tall, with long weak hairs on the young growth and abaxial leaf surfaces; leaf blades narrowly oblong-lanceolate to rhombic-ovate, rather coarsely and shallowly toothed; involucre glands usually solitary, cupped, without appendages; capsules smoothly rounded, depressed spherical; seeds very rounded to roundly ovoid, the dorsal surface evenly tuberculate with low sculpturing, 1.7–2.0(–2.2) mm long with caruncle ca. 0.8 mm or less wide;  $n = 14$  (diploid). Stream bottoms, fields, roadsides and disturbed sites; throughout TX. May–Oct, commonly two generations in one year.

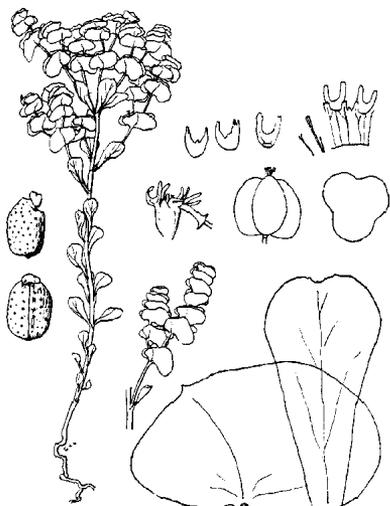
***Euphorbia hexagona*** Nutt. ex Spreng., (hexagonal, six-angled), GREEN SPURGE, SIX-ANGLE EUPHORBIA. Minutely and sparsely pubescent annual, normally erect, to 80 cm tall; leaves opposite, entire; involucre glands 5, with small, inconspicuous gland-appendages. Loose sandy open areas, stream banks or bottoms; Grayson, Somervell, and Tarrant cos.; nc TX and Plains Country. Jun–Oct.

***Euphorbia longicuris*** Scheele, (long-legged), WEDGE-LEAF EUPHORBIA. Plant to 25 cm tall; leaves obovate with long-tapering base; branches or their internodes mostly remaining short, usually not exceeding the very wide floral bracts until late fruiting stage (the floral bracts are upright or ascending and enclose the involucre); involucre glands 4, crescent-shaped, with an erect horn at each end, without appendages. Limestone outcrops; Bell, Brown, Coryell, Tarrant, Wise, and Young cos., also collected in 1880 in Navarro Co.; Edwards Plateau and e Plains Country n and e to nc TX. Late Mar–early Jun.

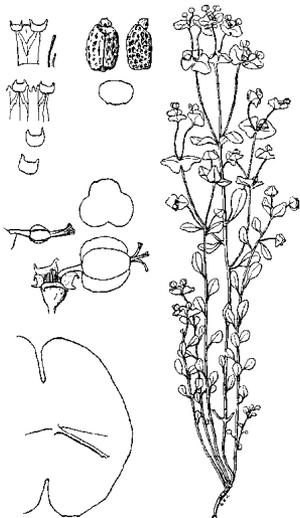
***Euphorbia marginata*** Pursh, (margined), SNOW-ON-THE-MOUNTAIN. Pilose to glabrous annual to ca. 200 cm tall; involucre glands usually 5, cupped; gland-appendages petal-like, 2–4 mm long. Calcareous uplands, stream bottoms, and low areas; w TX e to a line from Bell to Cooke cos., cultivated further e. Jul–Oct. Reported to produce evil-tasting poisonous honey and to be toxic to livestock; the sap causes skin eruptions and has been used to brand cattle in preference to a hot iron (Kingsbury 1964, 1965; Burlage 1968); care should thus be taken to avoid the sap. ☠ ☒/90

***Euphorbia roemeriana*** Scheele, (for Ferdinand Roemer, 1818–1891, geologist, paleontologist, and explorer of TX), ROEMER'S SPURGE, ROEMER'S EUPHORBIA. Annual to 30 cm tall; leafy bracts of the floral branches paired, opposite, semi-circular, partially fused—sometimes to nearly half their length; involucre glands with an erect horn at each end, without appendages. Calcareous soils; Bosque and Montague cos. (Mahler 1988), also Williamson Co. (M. Mayfield, pers. comm.); rare in nc TX, mainly Edwards Plateau; endemic to TX. Spring. Mark Mayfield (pers. comm.) indicated that this species occurs mainly to the s of nc TX and that the Montague Co. citation is probably erroneous. 📍

***Euphorbia spathulata*** Lam., (spoon-shaped), WARTY EUPHORBIA. Glabrous annual to 55 cm tall; leaves numerous, oblanceolate, obtuse; leafy floral bracts mostly broader than long; involucre



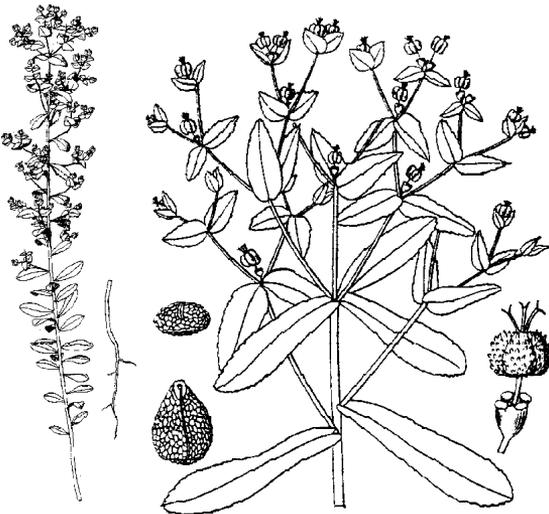
*Euphorbia longicuris* [ARM]



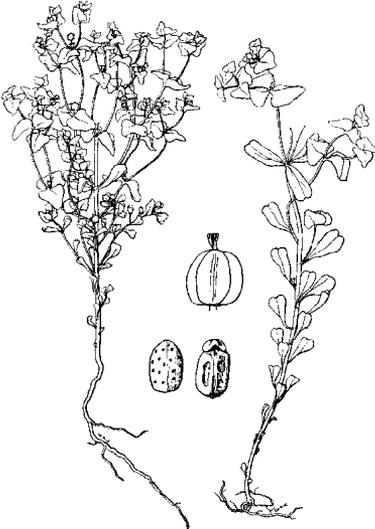
*Euphorbia roemeriana* [ARM]



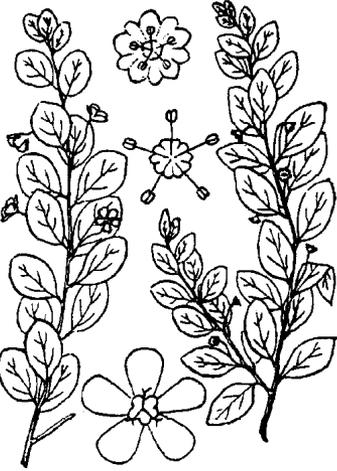
*Euphorbia marginata* [B73]



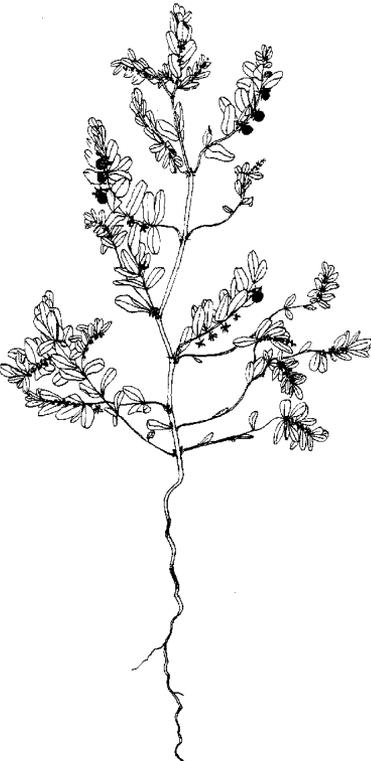
*Euphorbia spathulata* [BB1, STE]



*Euphorbia tetrapora* [ARM]



*Leptopus phyllanthoides* [BB2]



*Phyllanthus abnormis* [B73]

glands 4, minute, without horns or appendages; style branches about as long as the unbranched portion. Prairies, disturbed areas; nearly throughout TX. Late Mar–May.

**Euphorbia tetrapora** Engelm., (four-pored), WEAK EUPHORBIA. Slender, to 20 cm tall; leaves narrowly oblanceolate; branches of the inflorescence or their internodes longer than the floral bracts; involucre glands 4, with an erect horn at each end, without appendages. Sandy woods and fields; e TX w to West Cross Timbers. Late Mar–May.

## LEPTOPUS

☛ A genus of ca. 10 species widely scattered in the Old World and North America (Webster 1994b); previously submerged in *Andrachne* (e.g., Correll & Johnston 1970; Kartesz 1994; Jones et al. 1997). Webster (1994b) indicated that *Leptopus* differs from *Andrachne* (sensu stricto) in having anatropous ovules and that it represents a connecting link between *Andrachne* and the small tropical American genus *Astrocasia*. He assigned it to a separate subtribe in the tribe Phyllanthae. (Greek: *lepto*, fine or slender, and *pus*, foot, presumably meaning with slender or thin stalks)

REFERENCE: Webster 1994b.

**Leptopus phyllanthoides** (Nutt.) G.L. Webster, (resembling *Phyllanthus*—leaf flower), MAIDENBUSH. Woody-based perennial or small shrub to 1 m tall; sap not milky; leaves numerous, alternate, subsessile; leaf blades entire, sparsely pilose or glabrous; stipules oblong-lanceolate; staminate and pistillate flowers usually on separate plants; perianth with both sepals and petals; capsules 4–5 mm long, 7–7.5 mm across, with 2 seeds in each of the 3 cells. Ravines or stream banks on limestone; collected by Reverchon in Johnson Co., also McLennan Co. (Mahler 1988); nc TX s to Edwards Plateau. May–Jun. [*Andrachne phyllanthoides* (Nutt.) J.M. Coult., *Savia phyllanthoides* var. *reverchonii* (J.M. Coult.) Pax & K. Hoffm.] We are following Webster (1994b) in treating this species in *Leptopus*

## PHYLLANTHUS LEAF-FLOWER

Ours low, glabrous annuals or perennials; sap not milky; leaves many, rather crowded, alternate, short-petioled or subsessile, entire; stipules narrowly triangular-lanceolate; flowers unisexual, both sexes usually on the same plant; petals absent; fruit a usually ballistically dehiscent capsule; seeds usually 2 in each of the 3 locules.

☛ A genus of ca. 600 species of herbs, shrubs, and trees of tropical and warm areas; some are used ornamentally, others medicinally. (Greek: *phyllon*, leaf, and *anthos*, flower, because the flowers in a few species are borne upon leaf-like dilated branches)

REFERENCES: Webster 1956, 1970.

1. Leaves spirally arranged; plants perennial with base of plant and root becoming thickened and woody \_\_\_\_\_ **P. polygonoides**
1. Leaves distichous (= in 2 ranks); plants annual.
  2. Pedicels of female flowers (3–)4–7 mm long; stamens 5; introduced weed known in nc TX only from Tarrant Co. \_\_\_\_\_ **P. tenellus**
  2. Pedicels of female flowers < 0.5–3(–3.5) mm long; stamens 2–3; native, including species widespread in nc TX.
    3. Main stems with leaves and flowers; stamens 3; filaments free; seeds verruculose (= with extremely minute warts—use dissecting scope) \_\_\_\_\_ **P. caroliniensis**
    3. Main stems with leaves reduced to scales, the leaves and flowers only on specialized deciduous side branches; stamens 2 or 3; filaments entirely connate; seeds not verruculose.
    4. Leaves not minutely rough-scabrid beneath to the touch; female flowers with pedicels 1–3(–3.5) mm long, distal on the branches, the male flowers proximal; stamens usually 2

- (3 in largest flowers); seeds striatulate (= with very fine lines), not transversely ribbed; pistillate calyx lobes ovate to obovate; native species widespread in TX \_\_\_\_\_ **P. abnormis**
4. Leaves minutely rough-scabrid beneath to the touch; female flowers and capsules subsessile (pedicels 0.5 mm or less long), proximal on the branches, the male flowers distal; stamens 3; seeds conspicuously transversely ribbed (use lens); pistillate calyx lobes linear-oblong to lanceolate; introduced species known in nc TX only from Tarrant Co., mainly se and e TX \_\_\_\_\_ **P. urinaria**

**Phyllanthus abnormis** Baill., (abnormal), DRUMMOND'S LEAF-FLOWER. Annual but basal stem and root can sometimes be thickened and appear perennial; leaf blades not oblique at base; stems 10–50 cm tall; leaves 3–10 mm long, 1–4 mm wide; pedicels of female flowers 1–3(–3.5) mm long; fruiting calyx lobes scarcely over 1 mm long; stamens 2 in most flowers; filaments entirely connate; style branches not capitate; capsules 2.3–2.7 mm wide. Loose sandy soils; widespread in TX, in nc TX mainly East Cross Timbers w, once found in railroad gravel at Dallas. May–Oct. Reported to be poisonous to livestock; symptoms include listlessness, ceaseless walking, diarrhea, exhaustion, kidney degeneration, liver cirrhosis, and death (Kingsbury 1964; Burlage 1968). ☒

**Phyllanthus caroliniensis** Walter, (of Carolina), CAROLINA LEAF-FLOWER. Plant 10–40 cm tall; leaves 5–20(–30) mm long, 4–10(–16) mm wide; pedicels of female flowers 0.5–1(–1.5) mm long; pistillate calyx lobes linear-lanceolate or narrowly spatulate; capsules 1.5–2 mm wide. Weedy areas; Henderson Co., also Bosque, Erath, Hamilton (Stanford 1976), Lamar (Carr 1994), and Tarrant (Webster 1970) cos.; se and e TX w to nc TX and Edwards Plateau. Jun–Nov.

**Phyllanthus polygonoides** Nutt. ex Spreng., (resembling *Polygonum*—knotweed), KNOTWEED LEAF-FLOWER. Plant ca. 10–50 cm tall; leaves on the main stems and branches, usually 5–10 mm long, 1.5–5 mm wide; usually monoecious but sometimes dioecious; stamens 3, the filaments united about half way into a column; pedicels of female flowers 2.5–7 mm long; capsules 2.7–3.2 mm wide. Limestone outcrops, rarely in sandy clay; nearly throughout TX. Apr–Jul, Sep–Oct.

**Phyllanthus tenellus** Roxb., (tender, delicate). Plant 20–50 cm tall; main stems with leaves reduced to scales, the leaves and flowers on specialized deciduous side branches; leaves 6–25 mm long, 4–11 mm wide; filaments free; capsules 1.7–1.9 mm wide. Yard in Fort Worth (Tarrant Co.); otherwise known in TX only in se part of the state; a 20th century introduction to the se U.S. (Webster 1970). Throughout growing season. Native to the Mascarene Islands (Indian Ocean). ☒

**Phyllanthus urinaria** L., (presumably in reference to urine), PEEWATER LEAF-FLOWER. Plant 15–50 cm tall; leaves 6–25 mm long, 2–9 mm wide; monoecious; capsules ca. 2–2.2 mm wide. Yard weed; Tarrant Co.; mainly se and e TX. Flowering throughout the growing season. Native of tropical e Asia. Not detected in the continental U.S. until 1944 (Webster 1970). Reported to contain alkaloids and to be used as a fish poison (Burlage 1968). ☒ ☒

An additional species, *P. niruri* (Kunth) G.L. Webster, (derivation unknown), is reported by Hatch et al. (1990) for vegetational area 4 (Fig. 2) but apparently occurs only to the s of nc TX (Webster 1970). It differs from *P. abnormis* in having the leaf blades oblique at base, filaments connate half way or less, style branches capitate, and fruiting calyx lobes larger (3–3.5 mm long).

## REVERCHONIA

☒ A monotypic genus of sandy areas of the sw U.S. and adjacent Mexico. It is closely related to *Phyllanthus* (Webster 1994b). (This unusual genus was named in honor of Julien Reverchon, 1837–1905, a French-American immigrant to Dallas and important botanical collector of early TX. Many of his specimens are in the herbaria at BRIT and the Missouri Botanical Garden) REFERENCE: Webster & Miller 1963.

**Reverchonia arenaria** A. Gray, (of sand or sandy places), SAND REVERCHONIA. Annual monoecious herb to 0.5 m tall, glabrous; sap not milky; main stem glaucous-white; lateral branches prominent; leaf blades elliptic to narrowly oblong-elliptic or nearly linear (15-)20-40(-45) mm long, 1.8-9 mm wide, apiculate at apex; petioles 1-3 mm long; inflorescences small cymules in the axils of leaves of lateral branches (not occurring on main stem), the cymules usually with a single female flower and 4-6 male flowers; flowers conspicuous; male flowers: calyx lobes 4, purplish to pinkish with a central green strip, 1.5-2.5 mm long; disk with an I-beam-like outline; stamens 2; female flowers: pedicel 1.5-2 mm long in fruit, elongating up to 8.7 mm in fruit; calyx lobes 6(-5), purplish to pinkish with a central green strip, to 2.9 mm long; disk flat and roundish or 6-angled in outline; capsules ± spheroidal and flattened at the ends, conspicuous, 7-9.8 mm in diam.; seeds 4.4-6.6 mm long. Deep sand; Webster and Miller (1963) cited a Tarrant Co. collection (Fort Worth, Mar. 1890, *Bodin* (US)) as "very dubious"; Trans-Pecos and Plains Country e to Wichita Co. just to the w of the nw part of nc TX; included because of the Tarrant Co. specimen and because of the possibility of occurrence in sandy areas along the Red River in the nw part of nc TX. Summer-fall. Reported to be toxic to livestock (Kingsbury 1964) and in experimental animals to cause acute liver and kidney damage (Burlage 1968). ☠

### RICINUS CASTOR-BEAN

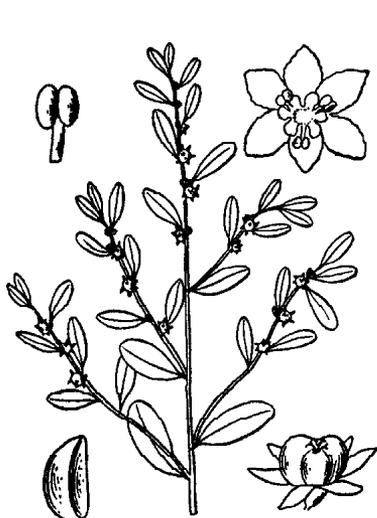
☞ A monotypic genus native from e and ne Africa to the Middle East, now naturalized throughout the tropics. (Latin: *ricinus*, tick, because of the resemblance of seed to a tick)

**Ricinus communis** L., (common, general), CASTOR-BEAN, CASTOR-OIL-PLANT, PALMA CHRISTI, HIGUERILLA. Large, coarse, herbaceous, monoecious annual (in nc TX) 1-5 m tall; sap watery; leaves alternate, with long petioles to 30 cm long; leaf blades peltate, with (5-)7-9(-11) palmate lobes, these serrate with the teeth gland-tipped; inflorescences terminal, raceme- or panicle-like, the staminate flowers usually near the base, the pistillate flowers near apex; sepals usually 5; petals 0; stamens numerous; styles 3, plumose, red; capsules round, 12-20 mm in diam., usually covered with soft, dark spines; seeds 8-11 mm long, glabrous, with mottled surface. Cultivated for its foliage and rarely escapes; roadfill, waste areas; Henderson Co. near e edge of nc TX, also Palo Pinto Co. (*Reverchon*) and Tarrant Co. along Trinity River (R. O'Kennon, pers. obs.); mainly s TX. Flowering throughout the growing season. Native to Africa and Middle East. CASTOR-BEAN has a very long history of cultivation; it has been found in 6000 year-old Egyptian tombs (Zohary 1982). All parts of the plant, but especially the seeds, contain many alkaloids and toxic principles including a lectin (type of phytotoxin or toxic protein), ricin, one of the most toxic compounds known. If eaten, 1-8 seeds are fatally poisonous; they are also the source of castor oil, used medicinally in the past; the toxins are not oil soluble. Castor oil is also used as an industrial lubricant. Livestock can be poisoned from eating the leaves or seeds (Muenscher 1951; Kingsbury 1964; Hardin & Arena 1974; Stephens 1980; Mabberley 1987). ☠ 🌿

### SAPIUM

☞ A genus of ca. 90-100 species (Webster 1994b) native to tropical and warm areas to Patagonia; the majority are neotropical. According to Webster (1994b), "*Triadica*, accepted by some Asian workers, is distinctively different from the neotropical species in such features as its non-arillate seeds; further investigation may show that it should be generically separate from *Sapium*." If *Triadica* is recognized, our single introduced species will have to be treated in that segregate genus. (Latin name used by Pliny for a resinous pine or fir, alluding to the greasy latex of these plants)

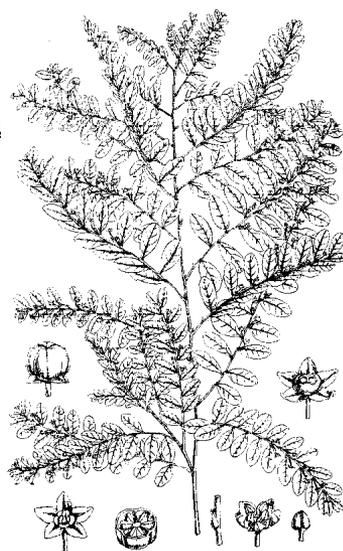
**Sapium sebiferum** (L.) Roxb., (tallow-bearing), CHINESE TALLOW TREE, VEGETABLE TALLOW TREE. Rapidly growing monoecious tree usually 3-10 m tall, unarmed, essentially glabrous, with milky sap; branches often slender and drooping; leaves alternate, the blades rhombic-ovate, 3-



*Phyllanthus caroliniensis* [BB2]



*Phyllanthus polygonoides* [SH1]



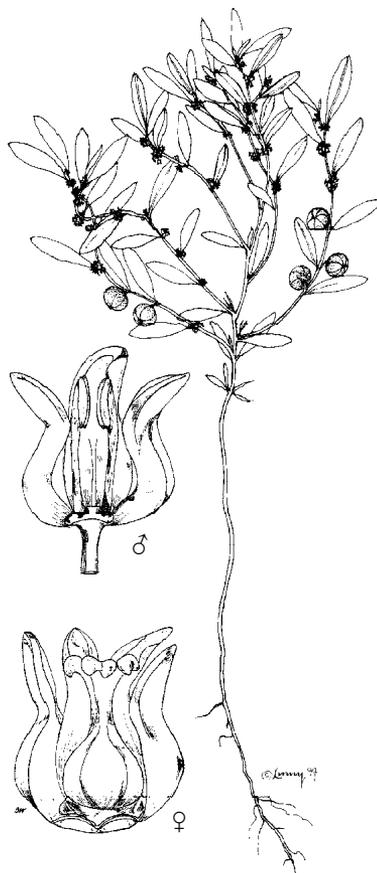
*Phyllanthus tenellus* [HO5]



*Phyllanthus urinaria* [LAM]



*Ricinus communis* [BL1, LAM]



*Reverchonia arenaria* [HEA, RHO]

7(-10) cm long, entire; petioles usually longer than blades, with 2 glands at juncture of blade and petiole; flowers in terminal spike-like inflorescences (3-)5-15 cm long; petals absent; staminate flowers in clusters at the upper nodes; pistillate flowers solitary at the nodes; fruit a 3-lobed capsule ca. 1-4 cm long and about as broad; seeds 7-8 mm long, long persistent on the placenta after the capsule walls have fallen, chalky-white. Widely cultivated as ornamental shade tree, rarely escapes in nc TX; Dallas-Fort Worth area is near limit of cold hardiness as cold damage is often observed; Grayson Co. (edge of Waterloo lake on sandy soil), also Dallas (H.S. Moss Park, Whiter Rock Lake) and Tarrant cos.; more commonly escapes in se TX where it can be a problematic invader of native prairies. Aug-Nov. Native of China and Japan. [*Triadica sebifera* (L.) Small] This species was introduced into the U.S. in South Carolina in the late 1770s and is now widespread; it displaces native vegetation and is considered one of the most serious invasive exotics in the U.S.; it apparently releases compounds that modify soil chemistry and affect the establishment of native species (Flack & Furlow 1996; Jubinsky & Anderson 1996). The fatty covering of the seed is used for candlewax and soap (Mabberley 1987). Burlage (1968) reported the milky sap as poisonous. ☠ 🌿

### STILLINGIA QUEEN'S-DELIGHT, QUEEN'S-ROOT

Glabrous unarmed perennial herbs usually with several to many stems from a woody root; sap milky; leaves numerous, crowded, alternate, subsessile, evenly and finely glandular-toothed; flowers in terminal, sessile, spike-like inflorescences (which become over-topped by whorls of leafy branches developed from beneath them), unisexual with both sexes in the same inflorescence, borne in the axils of minute triangular-ovate bracts, the bracts with fleshy, saucer- or cup-shaped, gland-like stipules at each side, the glands larger than the bracts; staminate flowers above, on a fleshy axis which falls after flowering; pistillate flowers few, at base; gynobase (= lower portion of ovary) becoming thick and hard, persistent after the seeds fall, triangular; fruit a shallowly 3-lobed, 3-seeded capsule; seeds with a prominent caruncle (outgrowth).

☞ A genus of ca. 30 species of tropical and warm America, Madagascar, e Malesia, and Fiji. ☠ Feeding experiments with *S. treculeana* (Müll. Arg.) I.M. Johnst., of s TX and the Edwards Plateau, indicated that the plant may be highly toxic due to hydrocyanic acid; small amounts of leaves and stems were lethal to sheep. (Named for Dr. Benjamin Stillingfleet, 1702-1771, English naturalist)

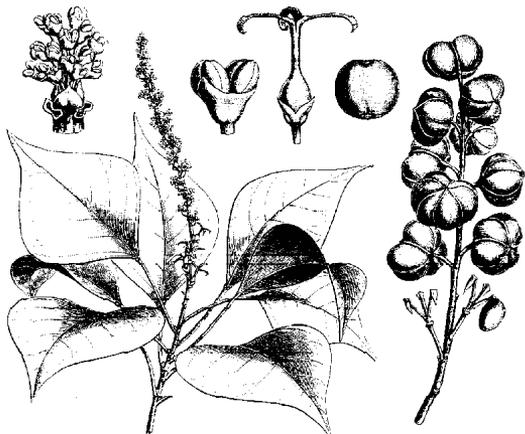
1. Stem leaves lanceolate or elliptic, 9-30 mm wide; capsules ca. 12 mm long and broad; plants of sandy soil \_\_\_\_\_ **S. sylvatica**
1. Stem leaves linear, 2-5 mm wide; capsules ca. 6 mm long and broad; plants of limestone habitats \_\_\_\_\_ **S. texana**

**Stillingia sylvatica** Garden ex L., (forest-loving), QUEEN'S-DELIGHT. Stems ascending to erect, to ca. 1 m tall; gynobase lobes 6 mm long; seeds ca. 8 mm long (not counting caruncle). Sandy prairies, open woods, or open ground; Grayson, Lamar, Montague, Parker, and Tarrant cos.; nearly throughout TX. May-Jun. Used medicinally, but overdoses cause toxic symptoms; the latex is reported to have vesicant (= blister-causing) properties (Duke 1985; Lampe 1986). ☠

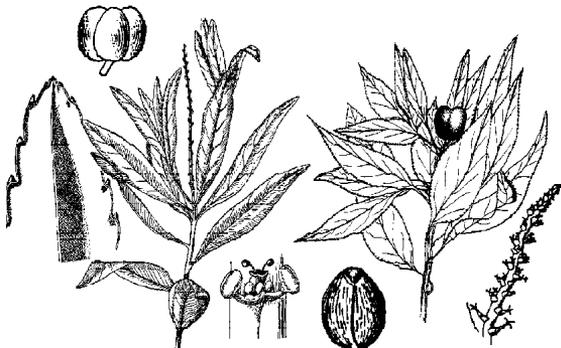
**Stillingia texana** I.M. Johnst., (of Texas), TEXAS STILLINGIA. Stems decumbent to erect, to 65 cm long; gynobase lobes 3-3.5 mm long; seeds ca. 5 mm long (not counting caruncle). Gravelly or rocky, calcareous soils; nc TX and the Edwards Plateau. Mid-May-Jun. The latex is reported to have vesicant (= blister-causing) properties (Lampe 1986). ☠

### TRAGIA NOSEBURN

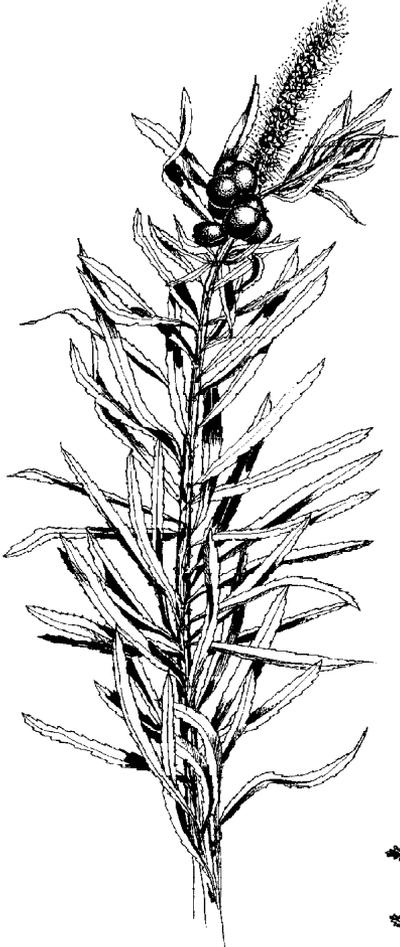
Perennial herbs, erect to trailing or twining, usually with stinging hairs; sap not milky; leaves alternate; leaf blades toothed; stipules foliaceous, lanceolate to ovate; flowers in peduncled, axil-



*Sapium sebiferum* [EN1]



*Stillingia sylvatica* [BB1, BT3, GLE]



*Stillingia texana* [BT3]



*Tragia betonicifolia* [RH0]



*Tragia brevispica* [RH0]



*Tragia ramosa* [SH1]



*Tragia urticifolia* [BT3]

lary (at least appearing so), spike-like, minutely bracted racemes, apetalous, unisexual, most often both sexes in the same inflorescence; staminate flowers above, minute; pistillate below, solitary or few, larger; staminate flowers with 3–4(–6) sepals; stamens usually equaling the number of calyx lobes; pistillate flowers usually with 5–6 narrow sepals; styles 3; fruit an explosively dehiscent capsule.

☞ A genus of 100 species of tropical and warm areas of the world; usually with stiff, nettle-like stinging hairs. ☞ All nc TX species have the stinging hairs which can be quite painful if allowed to come into contact with skin. According to Lampe (1986), only four families (Euphorbiaceae, Hydrophyllaceae, Loasaceae, and Urticaceae) have stinging hairs—nc TX has stinging representatives of all of these except the Hydrophyllaceae. (Name from *Tragus*, Latin name for early herbalist, Hieronymus Bock, 1498–1554)

REFERENCE: Miller & Webster 1967.

1. Persistent base of the staminate pedicel usually nearly as long as or longer than its subtending bract; stigmatic surfaces papillate; styles connate 1/3–1/2, with a slight constriction where they join the ovary \_\_\_\_\_ **T. urticifolia**
1. Persistent base of the staminate pedicel conspicuously shorter than its subtending bract; stigmatic surfaces smooth to papillate; styles free or connate, without a constriction where they join the ovary.
  2. Calyx lobes (pistillate) as long or longer than pistil at anthesis; staminate flowers 14–75 per raceme, compactly arranged on axis \_\_\_\_\_ **T. betonicifolia**
  2. Calyx lobes (pistillate) shorter than pistil at anthesis; staminate flowers 2–20 per raceme, not compactly arranged.
    3. Larger leaf blades usually broadly triangular, usually 1–2.5 times as long as wide; stigmatic surfaces papillate; styles connate basally to 1/3 their length \_\_\_\_\_ **T. brevispica**
    3. Larger leaf blades usually linear-lanceolate to ovate, usually 2–4 times as long as broad; stigmatic surfaces not papillate; styles connate 1/3–1/2 or more their length \_\_\_\_\_ **T. ramosa**

**Tragia betonicifolia** Nutt., (with leaves like *Betonica*—betony, now = *Stachys* in Lamiaceae), BETONY NOSEBURN. Stems to 50 cm tall, erect, decumbent, or trailing; leaves ovate to triangular-lanceolate, usually cordate to truncate at base; pistillate calyx lobes 6, 1.8–3 mm long at anthesis, 3–5 mm long in fruit; styles connate basally; stigmatic surfaces papillate. Sandy soils; se TX and Post Oak Savannah w to Rolling Plains, also Edwards Plateau. May–Jun, Sep–Oct. [*T. urticifolia* Michx. var. *texana* Shinnery] Stinging hairs present. ☞

**Tragia brevispica** Engelm. & A. Gray, (short-spiked), SHORT-SPIKE NOSEBURN. Stems to 100 cm long or longer, erect to trailing and twining; pistillate calyx lobes 6, 1.3–2 mm long at anthesis, 1.8–3.5 long in fruit. Calcareous soils, open woods and prairies; nc TX s and w to s TX and Edwards Plateau. Apr–Oct. Stinging hairs present. ☞

**Tragia ramosa** Torr., (branched), CATNIP NOSEBURN. Stems to 50 cm tall, erect, decumbent, trailing, with tendency toward twining; leaf blades usually truncate basally; pistillate calyx lobes 5–7, 0.8–2.5 mm long at anthesis, 1.5–3 mm long in fruit. Disturbed areas; Post Oak Savannah s and w through nc TX to w TX. Apr–Oct. [*T. nepetifolia* Cav. var. *leptophylla* (Torr.) Shinnery] Stinging hairs present. ☞

**Tragia urticifolia** Michx., (with leaves like *Urtica*—nettle), NETTLE-LEAF NOSEBURN. Stems to 65 cm tall, erect to decumbent; pistillate calyx lobes (5–)6, 1.3–2.2 mm long at anthesis, 2–3 mm long in fruit. Sandy soils, fields, and open woods; Henderson Co. near extreme e margin of nc TX; mainly se and e TX. Spring–fall. Jones et al. (1997) treated TX material as *T. urticifolia* var. *texana* Shinnery. We are following Kartesz (1994) who recognized *T. urticifolia* but put the var. *texana* into synonymy under *T. betonicifolia* According to M. Mayfield (pers. comm.), this species occurs only in sandy habitats to the e of nc TX. Stinging hairs present. ☞

*Tragia amblyodonta* (Müll. Arg.) Pax & K. Hoffm., (blunt-toothed), DOG-TOOTH NOSEBURN, was cited for vegetational area 5 (Fig. 2) by Hatch et al. (1990), but according to M. Mayfield (pers. comm.) it occurs in s and w TX and does not come close to nc TX. In the above key it would come out closest to *T. brevispica*. The two can be distinguished as follows:

1. Mature leaves usually densely pubescent with stinging hairs; plants grayish green in appearance; leaf blades usually truncate to sagittate (rarely cordate) basally; staminate flowers 3–60 per raceme \_\_\_\_\_ *T. amblyodonta*
1. Mature leaves usually only sparsely pubescent with stinging hairs; plants green in appearance; leaf blades truncate to cordate basally; staminate flowers 3–6(–10) per raceme \_\_\_\_\_ *T. brevispica*

## FABACEAE (LEGUMINOSAE) LEGUME, BEAN, OR PULSE FAMILY

Plants herbaceous or woody; leaves basal or alternate (sometimes crowded and appearing subopposite or whorled), compound or apparently simple (with only 1 leaflet); leaflets entire, or in a few genera toothed or lobed; stipules present (except *Lotus* and *Crotalaria*), falling early in many species; flowers solitary or in racemes, panicles, spikes, heads, or umbel-like clusters; sepals 5, separate or united; petals 1–5, equal or in most genera unequal; stamens 5 to many; pistil 1; fruit a legume, developed from a 1-celled superior ovary with 1–many ovules and parietal placentation, in general opening along both sutures.

☛ A huge (16,400 species in 657 genera), cosmopolitan, vegetatively variable family ranging from herbs to rain forest canopy trees; Ballenger et al. (1993) suggested there are ca. 20,000 species, while Cronquist (1993) indicated 18,000 species. Nearly a third of all species are in 6 large genera: *Acacia*, *Astragalus*, *Cassia*, *Crotalaria*, *Indigofera*, and *Mimosa*. The Fabaceae is the third largest angiosperm family in terms of numbers (after Asteraceae and Orchidaceae), and in importance to humans is second only to the Poaceae. It is also extremely important ecologically because of the symbiotic nitrogen-fixing *Rhizobium* bacteria associated with the roots of many species. The family includes many important timber trees, ornamentals, and particularly protein-rich food plants including *Arachis* (PEANUTS), *Cicer* (CHICK-PEAS), *Glycine* (SOY-BEANS), *Lens* (LENTILS), *Phaseolus* (BEANS), and *Pisum* (PEAS); in fact, seeds of legumes are the world's most important source of vegetable protein for man and animals (Isely 1990). ☛ There are often toxic, defensive, non-protein amino acids in the seeds or vegetative tissues as well as alkaloids. For example, the tropical *Abrus precatorius* L. (PRECATORY-BEAN or ROSARY-PEA) has striking red and black seeds sometimes used in necklaces; they contain abrin, a protein so toxic that a single chewed seed is enough to kill a human (Kingsbury 1964). The family, here recognized as having three subfamilies, is sometimes split into three questionably monophyletic families (e.g., Cronquist 1993). Recent evidence (Ballenger et al. 1993) suggested that the Caesalpinioideae is a basal paraphyletic assemblage from which the monophyletic Mimosoideae and Papilionoideae are derived. The tribal arrangement followed here is from Polhill and Raven (1981). The Fabaceae is the third largest family in the nc TX flora (after Asteraceae and Poaceae), with 176 species. Family name conserved from *Faba*, a genus of a single widely cultivated species, *F. vulgaris* Moench, BROAD BEAN, of the Mediterranean region; it is now usually lumped into *Vicia* as *V. faba* L. (Latin: *faba*, bean) (subclass Rosidae)

FAMILY RECOGNITION IN THE FIELD: characteristic most helpful in field recognition is the *legume* fruit—a 1-chambered, pod-like, often bean-like fruit; other helpful clues include leaves with 3 leaflets and pea-like flowers, pinnately compound leaves with flowers in heads with obviously exerted stamens, or stamens in a 9 (fused) + 1 (separate) arrangement.

REFERENCES: Rydberg 1919–1920, 1923–1929; Britton & Rose 1928, 1930; Turner 1959; Isely 1973,