

## CONVOLVULACEAE MORNING GLORY FAMILY

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Trees, shrubs, herbs, or vines, the sap milky in some species; rootstocks swollen and fleshy to fibrous. LEAVES simple, entire to pinnately lobed, pectinate, or palmately compound, exstipulate. INFLORESCENCES axillary cymes, racemes, panicles, or flowers solitary. FLOWERS perfect (in ours), actinomorphic, hypogynous, small and inconspicuous to large and showy, but mostly wilting quickly; sepals 5, distinct, imbricate, equal or unequal, persistent, occasionally accrescent in fruit; petals 5 united; stamens 5, distinct, epipetalous; pistil of 2-3(-6) carpels, the ovary 1-4-locular, the styles 1-2, the stigmas variable. FRUITS capsules, utracles, or baccate. SEEDS 1-4, glabrous or pubescent. --About 55 genera, 1200 spp.; most common in the tropics and sub-tropics. Includes sweet potato [*Ipomoea batatas* (L.) Lam.] and many ornamentals. Austin, D. F. 1986. Convolvulaceae. Pp 652-661. In: *Flora of the Great Plains*, Univ. of Kansas Press; Austin, D. F. 1990. *Sida* 14:273-286; Austin, D. F. 1990. *Madroño* 37:124-132; Austin, D. F. 1991. *Sida* 14:443-457; Austin, D. F. 1992. *Ann. Missouri Bot. Gard.* 79:8-16.

1. Leaf bases obtuse to acute.
  2. Styles 2; flowers white and salverform, or white to blue and rotate, funnelform, to broadly campanulate.
    3. Stigmas 2, capitate; leaves elliptic to lanceolate or ovate-lanceolate; flowers salverform, 5-6.5 mm long ..... *Cressa*
    - 3' Stigmas 4, linear to club-shaped; leaves ovate to almost linear; flowers rotate, campanulate or salverform, 5-22 mm wide ..... *Evolvulus*
  - 2' Styles 1; flowers purple and funnelform, or white and salverform.
    4. Flowers 12-17 cm long; leaves entire ..... *Ipomoea longifolia*
    - 4' Flowers 2.5-3.1 cm long; leaves toothed to lobed ..... *Ipomoea plummerae*
- 1' Leaf bases truncate, cordate to hastate.
  5. Leaves reniform; flowers mostly green, 6 mm or less long ..... *Dichondra*
  - 5' Leaves variable, but not reniform; flowers white or colored other than greenish, 6 mm or more long.
  6. Flower limb white, with or without tinges of lavender to pink, the throat white.
    7. Calyx enclosed by 2 foliaceous bracts; stigmas oblong, flattened ... *Calystegia macounii*
    - 7' Calyx not enclosed by bracts.
      8. Bracts linear-lanceolate, foliaceous; stigmas oblong, flattened .. *Calystegia longipes*
      - 8' Bracts minute, scale-like; stigmas subulate to globose.
        9. Stigmas subulate and cylindrical to filiform, the apices acute; leaf bases hastate to sagittate ..... *Convolvulus*
        - 9' Stigmas globose, the apices rounded; leaf bases cordate  
 ..... *Ipomoea xleucantha*
  - 6' Flower limb lavender, blue, red or white, the throat purple to purple-red.
    10. Stigma lobes oblong; corollas white or blue ..... *Jacquemontia*
    - 10' Stigma lobes globose; corolla color variable ..... *Ipomoea*

**Calystegia R. Brown Hedge Bindweed**

Herbs. STEMS twining to erect, glabrous or pubescent. LEAVES glabrous or pubescent, ovate, the bases sagittate to hastate. INFLORESCENCES axillary, of solitary flowers or few flowered cymes. FLOWERS: sepals equal, ovate, ovate-lanceolate to oblong, usually glabrous; corolla funnelform, white or pink, 3-6 cm long, glabrous or puberulent on the margins of the limb, especially the apices of lobes; stamens included, equal, the filaments sometimes with glandular trichomes basally; ovary ovoid, glabrous, 2-locular basally and 1-locular apically, 4-ovulate, the style 1, glabrous, the 2 stigma lobes oblong, flattened. FRUITS capsular, 4-valved, surrounded by enlarged sepals and sometimes by bracts. SEEDS 1-4, glabrous, black to dark brown, smooth to verrucose. --Ca. 12 spp.; U.S. and Eurasia. (Greek: *caly* = beautiful + *stegia* = roof in reference to the bracts). Brummitt, R. K. 1965. *Ann. Missouri Bot. Gard.* 52:214-216; 1981. *Kew Bull.* 35:327-334.

1. Leaves linear to lanceolate-hastate, the upper-most gradually reduced to bracts; bracts separate and not enclosing the calyx ..... *C. longipes*
- 1' Leaves ovate to ovate-lanceolate, often hastate, similar in shape and size throughout; bracts enveloping and obscuring the calyx ..... *C. macounii*

**Calystegia longipes** (S. Watson) Brummitt (long-footed, referring to the peduncles). --Herbs glabrous. STEMS woody basally, erect to ascending, branched, glabrous, slender, 3-10 dm long, sometimes twining, at least near tips. LEAVES remote, linear to lanceolate-hastate, 1-8 cm long, the lowermost with well-developed, spreading basal lobes, the lobes 1.3-8 cm long, the upper gradually reduced to linear bracts, the petioles 0.7-3.5 cm long. INFLORESCENCES 1-few-flowered cymes on slender peduncles, these 5-24 cm long; bracts lanceolate-linear, 0.5-3.5 cm long, near to or remote from the calyx. FLOWERS: sepals broadly oval, rounded and mucronate at the apex, unequal, the outer shorter, (6-)10-12 mm long; corolla campanulate, white or cream, often with lavender veins, 2.5-3.5 cm long; stamens 18-20 mm long, basally glandular, pubescent on the lower third, the anthers 4 mm long, basally sagittate; ovary ovoid, 2 mm long; style 15-18 mm long. FRUITS ovoid, tan. SEEDS dark brown, smooth or reticulate, 3-4 mm long. [*Convolvulus linearilobus* Eastw., *Convolvulus longipes* S. Watson]. --Dry slopes, chaparral: Coconino, Gila, Maricopa, Mohave, Yavapai cos.; 600-1700 m (2000-5600 ft); Mar-Oct; CA, NV, UT, WA.

**Calystegia macounii** (Greene) Brummitt (for J. Macoun). --Herbs with erect or sparsely twining stems, finely pubescent. STEMS simple or branched, usually from near base. LEAVES ovate to ovate-lanceolate, 2-6 cm long, 1-5 cm wide, basally cordate to sagittate, the lobes rounded, less often angled, apically obtuse to rarely acute, the margins entire; petioles 0.5-40 mm long. INFLORESCENCES of solitary flowers, frequently arising from the lower few axils; peduncles 3-5 cm long, rarely longer; bracts surrounding the calyx, ovate to ovate-mucronate, mostly obtuse, sometimes acute. FLOWERS: sepals elliptic to ovate, equal, 10-12 mm long, 5-7 mm wide, thin, transparent at least on margins, acute to acuminate, mucronate, glabrous to ciliate; corollas funnelform, white, 4-5 cm long; stamens 25-28 mm long, the filaments basally glandular pubescent, the anthers 4-5 mm long, basally sagittate; style 20-23 mm long. FRUITS globose to ovoid, brown. SEEDS not seen. [*Convolvulus interior* House; *C. sepium* of authors non L.; *Calystegia sepium* of authors non R. Brown]. --Moist habitats, near lakes and streams: Apache, Coconino, Navajo cos.; 1950-2150 m (6400-7000 ft); Jun-Jul; w MN, IA to nw MO and TX, w to MT, WY and CO.

**Convolvulus L. Bindweed**

Woody or herbaceous vines and shrubs. LEAVES membranous to coriaceous, linear to ovate or elliptic with truncate, cordate, sagittate or hastate bases, glabrous or pubescent, the margins usually undulate to crenate or irregularly lobed or lacinate, usually petiolate. INFLORESCENCES of solitary flowers or cymes; peduncles 0.3-10.5 cm long. FLOWERS: pedicels 1-3 cm long; bracts and bracteoles linear, elliptic or ovate; sepals orbicular, elliptic to ovate, pubescent or glabrous, obtuse to acute, usually mucronate, the inner 3 often somewhat longer; corolla white to rose or purple or blue on the limb and white or purplish within the tube, the limb 5-angulate to 5-lobed, the mid-petaline bands glabrous or pubescent; stamens included,

unequal, with glandular trichomes on filament bases, the anthers oblong, basally auriculate, introrse; ovary 2-locular, ovoid to subglobose, glabrous or pubescent; style 1 with 2 filiform, papillose stigmas. FRUITS capsular, 4-valved, mostly brown, chartaceous, ovoid to conical-ovoid, glabrous or pubescent. SEEDS 1-4, trigonous or rounded, smooth or verrucose, black to dark brown, glabrous. --Ca. 100 spp., mostly Mediterranean. A few spp. are native in the Americas, particularly in temperate latitudes or elevations. (Latin: *convolo* = to entwine or to roll together; *Convolvulus*, a name used by Pliny for bindweed). Sa'ad, F. 1967. Meded. Bot. Mus. Herb. Rijks. Univ. Utrecht 281:1-288.

1. Leaf blade almost as broad as long; calyx 3-5 mm long; perennials from deep, creeping root, forming large patches ..... *C. arvensis*
- 1' Leaf blade usually much longer than broad; calyx 6-12 mm long; perennials from taproot, sometimes divided at apex, but not forming large patches ..... *C. equitans*

***Convolvulus arvensis* L.** (of the field). Field Bindweed. --Wide-spreading rhizomatous herbs. STEMS branched, decumbent or twining. LEAVES variable, often ovate, ovate-lanceolate to elliptic, 1-10 cm long, 0.3-6 cm wide, entire or with the margins somewhat undulate, glabrous or inconspicuously puberulent, basally cordate to truncate, hastate or sagittate, the lobes obtuse or acute, entire or with 2-3 teeth, the petioles 3-40 mm long. INFLORESCENCES 1-3-flowered cymes; peduncles 3-3.5 mm long; bracts elliptic, linear or obovate, 2-3(-9) mm long. FLOWERS on pedicels 5-18(-35) mm long, erect or reflexed in fruit, usually glabrous, the bracteoles linear, 2-4 mm long; sepals obtuse, rarely truncate or emarginate, mucronate, ciliate, the outer sepals elliptic, 3-4.5 mm long, 2-3 mm wide, glabrous or tomentose, the inner sepals orbicular to obovate, 3.5-5 mm long, 3-5 mm wide; corolla campanulate, white or tinged with pink, 1.2-2.5 cm long; stamens 8-13 mm long, the anthers 2-3.5 mm long; ovary ovoid, glabrous, the style 7-10 mm long. FRUITS globose to ovoid, 5-7 mm wide. SEEDS 1-4, 3-4 mm long, black to dark brown, glabrous, tuberculate.  $2n = 48, 50$ . --Cultivated fields, roadsides: all cos. except La Paz; 350-2350 m (1100-7700 ft); Apr-Oct; throughout temperate U.S.; naturalized from Europe.

***Convolvulus equitans* Benth.** (overlapping in two ranks). Silver Bindweed. --Herbs with branched, prostrate or decumbent stems arising from a taproot, densely pubescent. LEAVES variable, ovate-elliptic to triangular-lanceolate or narrowly oblong with projecting basal lobes; 1-7 cm long, 0.2-4 cm wide, densely pubescent on both surfaces with loosely appressed hairs, the margins toothed or lobed or both, rarely entire; petioles 0.25-5 cm long. INFLORESCENCES 1-3-flowered cymes; peduncles 0.5-10.5 cm long; bracts and bracteoles scale-like, pubescent like leaves. FLOWERS on pedicels 5-24 mm long; sepals oblong to ovate, obtuse to weakly retuse apically, 6-12 mm long, 3-6 mm wide, appressed sericeous, the margins membranaceous; corolla broadly campanulate, white to pink, at times with a reddish center, (1.5-)2.5-3 cm long, sericeous on the petal lobes; ovary ovoid, glabrous. FRUITS globose, 7-8 mm wide, glabrous. SEEDS 1-4, 4-4.5 mm long, black, granulate, glabrous. [*Convolvulus hermannioides* A. Gray; *C. incanus* sensu Kearney & Peebles, non Vahl]. --Dry plains and hills: all cos. except La Paz and Yuma; 750-2000 m (2500-6500 ft); Mar-Nov; AL, CO, KS, NE, NM, OK, TX; Chih., Coah. to N.L., Mex.; and S Amer.

#### **Cressa L. Alkali Weed**

Perennial herbs with woody taproots. STEMS erect to decumbent, usually appressed pubescent, sometimes basally woody. LEAVES often sessile, the blades elliptic to ovate-lanceolate or reduced to scales, entire. INFLORESCENCES axillary, 1-few-flowered cymes, often clustered toward the ends of the branches. FLOWERS: sessile, the bracteoles 2, usually scale-like; sepals equal, elliptic to obovate, acute to obtuse, usually pubescent at least toward the tips; corollas less than 1 cm long, salverform, the short tube hidden by the calyx, mostly white, glabrous without, or pubescent on the lobes; stamens exerted, the filaments equal, fused into a ring where they are attached to the corolla, glandular-pubescent at the base, the anthers oblong; ovary ovoid, unilocular, or almost bilocular, 4-ovulate, apically hirsute, the styles 2 and free or united for a short distance basally, unequal; stigmas 2, capitate. FRUITS unilocular, 4-valvate. SEEDS 1(-2-4), ovoid, brown, glabrous to finely reticulate. --Perhaps 4 spp.; pantropical, also extending into the temperate regions

in some parts of the world. (Greek: *kris* = from Crete).

**Cressa truxillensis** Humboldt, Bonpland & Kunth (from Trujillo in Peru). --STEMS suffrutescent, erect to almost decumbent, usually branched, appressed-pubescent to hirsute to sericeous. LEAVES elliptic to lanceolate or ovate-lanceolate, entire, 3-10 mm long, 1-4 mm wide, usually acute on both ends, sometimes obtuse basally, with indumentum as on stems; petioles to 2 mm long. INFLORESCENCES usually of solitary flowers concentrated in upper leaf axils. FLOWERS: sepals 3-4.5 mm long, 2-3 mm wide, equal or the inner ones slightly longer, the margins scarious, the outer sepals pubescent throughout, the inner sepals pubescent only at apex; corolla white, 5-6.5 mm long. FRUITS ovoid, 5-6 mm long, brown, apically pubescent. SEEDS 3-4 mm long, glabrous.  $2n = 28$ . [*C. depressa* Goodd.]. --Alkaline ponds, marshes, lakes, and cultivated fields: Cochise, Coconino, Maricopa, Mohave, Navajo, Pinal, Yuma cos.; 50-1200 m (100-4000 ft); May-Nov; OK, TX; Baja C., Chih., N.L., Son., s to S.L.P., Mex. and S. Amer.

#### **Dichondra** G. Forst.

Perennial herbs. STEMS prostrate (stoloniferous or rhizomatous), branched, with dense or sparse appressed hairs; commonly with adventitious roots at nodes. LEAVES reniform to suborbicular, the base cordate to truncate, on petioles longer than the blade. INFLORESCENCES of solitary flowers on erect, nodding or recurved peduncles; bracteoles 2, scale-like. FLOWERS: calyx deeply parted into 5 lobes, rotate or campanulate; corollas rotate or broadly campanulate, with a short tube, white or greenish or greenish-yellow, 5-parted; stamens usually exserted, the filaments free, glabrous, the anthers orbicular to broadly ellipsoid; ovary emarginate to deeply 2-lobed, 2-locular, 4-ovulate, glabrous to densely pubescent; styles 2, appearing gynobasic, usually unequal in length; stigmas capitate. FRUITS capsular, indehiscent or tardily dehiscent and circumscissile, membranaceous, entire or 2-lobed, the pericarp thin. SEEDS 2-4, ellipsoid, smooth, glabrous. --Ca. 15 spp. mostly temperate or subtropical. Many of the taxa have been considered variants of *Dichondra repens*. (Greek: *di* = two + *chondros* = a grain, from fruit). Tharp, B. C. & M. C. Johnston. 1961. Brittonia 13:346-360. *Dichondra micrantha* Urban is commonly cultivated as a ground cover in lawns and can be distinguished by nodding flowers, calyces less than 2.5 mm long in fruit, and stems 0.2-0.8 mm thick.

1. Lower leaf surfaces silvery pubescent, usually contrasting with the non-shiny green upper surfaces, at least on young leaves; peduncles often weak and nodding but not sharply recurved; fruit deeply bilobed, the halves with well-marked loculicidal dehiscence, usually with 1 seed per carpel  
..... *D. sericea*
- 1' Lower and upper leaf surfaces tawny to silvery pubescent the surfaces not contrasting in color; pedicels recurved either near calyx or near the stolon; fruit entire or merely emarginate, the halves with loculicidal and septicial dehiscence, often with 2 seeds in each carpel.
  2. Plants with appressed silvery canescence; peduncles 4-6 mm long, recurved near their attachment to the stolon ..... *D. argentea*
  - 2' Plants pale, tawny, green; peduncles 5-13(-26) mm long, recurved near the calyx  
..... *D. brachypoda*

**Dichondra argentea** Humb. & Bonpl. ex Willd. (silvery-pubescent). --STEMS silvery-canescing with long, silky, usually appressed, flattened trichomes. LEAVES: herbaceous, the blades reniform, 5-13 mm long, 12-20 mm wide, both surfaces pubescent, the apex often shallowly emarginate, the base truncate to broadly and shallowly cordate, the margins entire; petioles 1-5 cm long, erect, straight. FLOWERS: pedicels 4-6 mm long, basally sharply recurved; calyx broadly campanulate, the sepals linear-oblong, 2-2.6 mm long at anthesis, accrescent to 2.4-3 mm in fruit, pubescent; corollas cream-colored, nearly cylindrical, 3.4-4 mm long, 5-lobed about half the length or more, the lobes subulate, acute, villous externally. FRUITS 2.2-2.8 mm long, 2-2.1 mm wide. SEEDS pyriform, 1.9-2.4 mm long, dark brown to black. --Desertscrub; Cochise Co.; 1700 m (5500 ft); Apr-Oct; NM, TX; s through Mex. to highlands of S Amer.

This species has not been collected in AZ since 1931 and possibly no longer grows there.

**Dichondra brachypoda** Wooton & Standl. (short-stalked). STEMS with a perennial taproot and annual stolons; densely hairy with soft silky trichomes giving the plant a pale tawny-green cast. LEAVES herbaceous, the blades reniform to orbicular, sparsely pubescent, 8-40 mm long, 10-55 mm wide, the apex often shallowly emarginate, the base truncate to broadly cordate, usually with a deep sinus; petioles 1.5-15 cm long, curved. FLOWERS: pedicels 5-13(-26) mm long, sharply recurved, usually in the upper portion; calyx broadly campanulate, the sepals lanceolate, 2.5-4 mm long at anthesis, accrescent to 3.8-5.2 mm long in fruit, villous externally; corollas greenish cream-colored, campanulate, 3.5-6 mm long, 5-lobed about 2/3-3/4 of the length, the lobes lanceolate, acute, villous on outer surface. FRUITS 6-7 mm long, 3-5 mm wide. SEEDS pyriform, 1.5-2.25(-4) mm long, brown. --Oak woodland and lower ponderosa pine zone: Cochise, Santa Cruz cos.; 1200-1850 m (4000-6000 ft); Jul-Oct; NM, TX; to Oax., Mex.

**Dichondra sericea** Sw. (silky). --STEMS sparsely to densely appressed pubescent. LEAVES chartaceous to herbaceous; blades orbicular, 8-20 mm long, 7-19 mm wide, the apex rounded or usually shallowly emarginate, the margins entire, the base cordate with shallow to deep sinuses, the lower surface densely pubescent with a silvery sheen, the upper surface green in contrast, the difference most notable on younger leaves, the petioles 0.5-7 cm long, weak, curved. FLOWERS: pedicels 5-35 mm long, erect, to slightly nodding or curved but not recurved in the upper part; calyx campanulate, the sepals obovate to obovate-spatulate, 1.5(-2.5) mm long, to 3.3 mm in fruit, 1 mm wide at widest point, sericeous on outer surface, remotely sericeous within; corolla yellow-green, campanulate, slightly shorter than the calyx, 1.5(-2) mm long, 5-lobed with sinuses nearly reaching the base, the lobes lanceolate, acute, glabrous. FRUITS 2-3.5 mm long, 1.8-2.5 mm thick, falling in 2 parts or 1, each half dehiscing loculicidally. SEEDS pyriform, 1.5(-2.1) mm long, brown. [*Dichondra repens* authors, non Forst.; *D. repens* var. *sericea* (Sw.) Choisy]. --Riparian; Sycamore Canyon, Pajarito Mts., Santa Cruz Co.; 550-1300 m (1800-4200 ft); Mar-Apr; Baja C. to Tamp., Ver., Mex., S Amer., W. Ind.

#### **Evolvulus L.**

Annual or perennial herbs or small suffrutescent shrubs. STEMS not twining but sometimes creeping. LEAVES usually small, ovate to almost linear, entire. INFLORESCENCES 1-several-flowered, axillary, pedunculate cymes. FLOWERS sessile or on pedicels about as long as calyx; sepals equal; corolla conspicuous, blue, or inconspicuous, faded pale bluish-white, rotate, funnellform to broadly campanulate, the limb plicate, entire, the lobes pilose externally; stamens with filiform filaments, the anthers ovate to oblong or linear; ovary 1-2-locular, 4-ovulate; styles 2, free or partially united at the base, each style deeply bifid for at least half its length into long, terete, filiform to clavate stigmas. FRUITS globose to ovoid, 4-valved. SEEDS 1-4, small, smooth or minutely verrucose. Ca. 100 American spp.; mostly tropical. (Latin: *evolvo* = to unroll). Ooststroom, S. J. van. 1934. Meded. Bot. Mus. Herb. Rijksun., Utrecht 14:1-267.

1. Peduncles filiform, longer or shorter than the subtending leaves.
  2. Corolla (5-)7-10 mm wide; sepals densely pilose, 2-2.5 mm long; leaves elliptic, ovate or oblong to lanceolate; stems with long spreading trichomes ..... *E. alsinoides*
  - 2' Corolla (10-)12-22 mm wide; sepals pilose to tomentose, 3-3.5 mm long; leaves lanceolate to linear-lanceolate; stems appressed pilose, rarely with spreading trichomes ..... *E. arizonicus*
- 1' Peduncles absent or very short and stout, always shorter than subtending leaves.
  3. Sepals lanceolate to narrow-lanceolate, 4-5 mm long, spreading villous ..... *E. nuttallianus*
  - 3' Sepals oblong-lanceolate, 3-5 mm long, appressed-pilose ..... *E. sericeus*

**Evolvulus alsinoides** (L.) L. (resembling *Alsine*) --Herbs. STEMS prostrate or ascending, 6-50 cm long, loosely appressed-pilose with some hairs spreading. LEAVES ovate, oblong, or elliptic to lanceolate, 8-22 mm long, 3.5-11 mm wide, the apex obtuse and mucronulate, the base acute to rounded, sparsely to densely pilose on both surfaces, with strongly and loosely appressed, soft, short, grayish trichomes. INFLORESCENCE 1-2 flowers on filiform peduncles, shorter or longer than leaves. FLOWERS on pedicels 2-4 mm long, short-pilose; bracteoles linear-subulate; sepals lanceolate, 2-2.5 mm long, acuminate,

short-pilose; corollas pale blue or white, rotate, (5-)7-10 mm wide; filaments 2-3 times as long as the anthers; ovary globose to ovoid, glabrous. FRUITS globose, 2.5 mm long, 4-valved, glabrous. SEEDS 1-4, ovoid, tan to brown, glabrous. [*E. alsinoides* (L.) L. var. *acapulcensis* (Willd.) Ooststr.]. --In disturbed often rocky sites: Cochise, Pima, Pinal, Santa Cruz cos.; reports from Gila and Maricopa, cos. are probably based on misdetermined specimens; 750-1500 m (2500-5000 ft); Apr-Sep; FL, GA, NM, TX; throughout Mex., to C. and S. Amer.; widespread in Old World. --15 vars. have been recognized and plants of AZ can be referred to var. *angustifolia* Torrey if vars. are accepted.

***Evolvulus arizonicus*** A. Gray (from Arizona). False Flax. --Suffrutescent herbs, densely appressed-pilose to almost woolly tomentose throughout. STEMS few to many, arising from woody base, erect to ascending or decumbent, 10-30(-45) cm tall. LEAVES lanceolate to linear-lanceolate, 10-25(-35) mm long, 2.5-6(-14) mm wide, gradually decreasing in size toward apex, the upper leaves linear, acute or obtuse apically, attenuate basally; petioles absent or short. INFLORESCENCE 1-3-flowered cymes, on slender peduncles usually as long as or longer than the leaves. FLOWERS on pedicels 3-4(-8) mm long, reflexed in fruit; bracteoles linear-subulate, 1.5-3 mm long; sepals equal, lanceolate, acuminate, 3-3.5 mm long; corollas blue or blue with white stripes, rotate to broadly campanulate, (10-)12-22 mm wide; filaments inserted near base, 1.5-2 times as long as the linear anthers; ovary glabrous. FRUITS globose, 3.5-4 mm long. SEEDS 2-4, 1-1.25 mm long, tan to brown, glabrous. [*Evolvulus laetus* A. Gray, *E. arizonicus* var. *laetus* (A. Gray) Ooststr.]. --Disturbed sites, often rocky: Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai cos.; 900-1850 m (2900-6000 ft); Apr-Oct; Son., Mex.; Argentina.

This species is easier to recognize in living material than on some herbarium specimens.

***Evolvulus nuttallianus*** Roemer & Schultes (for T. Nuttall). --Suffrutescent herbs. STEMS several, erect to ascending, 10-15 cm tall, densely spreading-pilose with an indumentum of ferruginous, brown, fulvous or gray color. LEAVES linear-oblong, narrow-lanceolate to narrow-oblong or rarely oblong, 8-20 mm long, 1.5-5 mm wide, entire, attenuate basally, acute to obtuse apically, densely pubescent on both surfaces; petioles short or absent. INFLORESCENCES: single flowers in axils over whole length of stem; peduncles short or absent, stout. FLOWERS on pedicels 3-4 mm long, reflexed in fruit; bracteoles subulate, 1-4 mm long; sepals lanceolate to narrowly lanceolate, long-acuminate, 4-5 mm long, spreading-villous; corollas rotate to broadly campanulate, 8-12 mm wide, entire, purple or blue; anthers 1-2 mm long, oblong, basally auriculate, the filaments twice as long as the anthers; ovary globose. FRUITS ovoid, about as long as sepals, glabrous. SEEDS (1-)2, brown, smooth. [*Evolvulus pilosa* Nutt.]. --Sandy and rocky prairies and plains, chaparral, pinyon-juniper and oak woodlands: Apache, Cochise, Coconino, Gila, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai cos.; 800-2450 m (2700-8000 ft); May-Jul; MT, ND, s to MO, KS, NM, TX; Chih., Coah., Mex.

***Evolvulus sericeus*** Sw. (silky pubescent). --Herbs. STEMS woody at the base, 10-30 cm long, prostrate or ascending, silky, with appressed to more or less spreading trichomes, these gray, white or yellowish. LEAVES distichous, lanceolate, oblong-lanceolate, oblong or ovate to elliptic, 4-25 mm long, 2-10 mm wide, densely pubescent below, glabrous or pubescent above, the apex acute, mucronate, the base rounded to acute, the petioles very short or leaves sessile. INFLORESCENCES axillary, 1-flowered, sessile or on stout peduncles 3-4 mm long. FLOWERS: bracteoles subulate, 2-4.5 mm long; sepals oblong-lanceolate, 3-5 mm long, acuminate, silky; corollas pale blue, pale violet or white, rotate to broadly campanulate, 7-12 mm wide, entire; filaments 2-3 times as long as the oblong anthers; ovary globose. FRUITS globose, 5.5 mm long, 4-valved, glabrous. SEEDS 1-4, brown or black. [*Evolvulus wilcoxianus* House; *E. sericeus* f. *wilcoxianus* (House) Ooststr.; *E. sericeus* var. *discolor* (Benth.) A. Gray]. Plains, savannas, chaparral and oak woodland: Cochise, Gila, Graham, Greenlee, Navajo, Pima, Pinal, Santa Cruz, Yavapai cos.; 1000-1900 m (3200-6200 ft); May-Oct; FL, GA, NM, TN, TX; Chih., Coah., Son., s to Chis., Mex., C. Amer., S. Amer., W. Ind.

Kearney and Peebles (1960) recognized 2 varieties, but as minor variants they are not recognized here.

**Ipomoea L. Morning Glory**

Annual or perennial vines, shrubs or trees. STEMS usually twining, sometimes prostrate or floating, glabrous or pubescent. LEAVES simple, lobed, divided or less often compound. INFLORESCENCES mostly axillary, 1-many-flowered cymes, rarely paniculate. FLOWERS on long or short pedicels, the bracts scale-like to foliaceous; sepals herbaceous to coriaceous, ovate to oblong or lanceolate, glabrous to pubescent, often somewhat enlarged in fruit; corollas purple, red, pink, white, or less often yellow, actinomorphic or rarely slightly zygomorphic, funnelform, campanulate, tubular or salverform, the limb shallowly or rarely deeply lobed, the mid-petaline bands well defined by 2 distinct nerves; stamens usually included, the filaments filiform, often triangular-dilated at the base, mostly unequal in length; ovary usually 2-4-locular, 4(-6) ovulate; style simple, filiform, usually included; stigmas capitate, entire or 2-3-lobed, globose. FRUITS globose to ovoid capsules, mostly 4-6-valved or splitting irregularly. SEEDS 1-4(-6). -Ca. 500 spp. through the tropics and subtropics. (Greek: *ipos* = worm + *homoios* = like, referring to its twining habit). O'Donell, C. A. 1959. *Lilloa* 29:19-86; Matuda, E. 1963. *An. Inst. Biol. Mex.* 34:85-145; McDonald, J. A. 1995. *Harvard Papers in Botany* 6:97-122.

*Ipomoea batatas* (L.) Lam. *I. carnea* Jacq. subsp. *fistulosa* (Choisy) D. F. Austin, *I. nil* (L.) Roth, *I. purpurea* (L.) Roth and *I. tricolor* Cav. are cultivated. *Merremia dissecta* (Jacq.) Hallier f., a species easily confused with *Ipomoea*, is also cultivated for ornament.

1. Leaves entire, linear to lanceolate; stems erect, decumbent to trailing, somewhat fleshy ..... *I. longifolia*
- 1' Leaves entire to palmately dissected, cordate to orbicular in outline; stems often twining, less often decumbent, rarely fleshy, although herbaceous.
  2. Leaves palmately dissected, less often simple with a sagittate base.
    3. Flowers 4-10 cm long, nocturnal or matinal.
      4. Sepals chartaceous, the margins scarious; flowers 4.5-10 cm long, white or white with purple limb ..... *I. tenuiloba*
      - 4' Sepals herbaceous, the margins herbaceous; flowers 5-8 cm long, white with pink limb to purple when dry ..... *I. thurberi*
    - 3' Flowers mostly less than 4 cm long, diurnal.
      5. Sepals glabrous or hirsute; corolla 2.5-3.2 cm long ..... *I. ternifolia* var. *leptotoma*
      - 5' Sepals glabrous or muricate-tuberculate; corolla 1-3 cm long.
        6. Calyx glabrous; corolla 1-1.2 cm long ..... *I. costellata*
        - 6' Calyx muricate-tuberculate; corolla 2-3 cm long.
          7. Plants decumbent; leaves palmately dissected on mature branches, 2-18 mm long, with some of the segments 1 mm or less wide; sepals 4-6 mm long; corolla 2.5-3.1 cm long; capsule 7-8 mm in diameter ..... *I. plummerae*
          - 7' Plants erect; leaves 5-20 mm long, palmately dissected with all segments 1 mm or less wide; sepals 2-3(-6) mm long; corolla 3-4 cm long; capsule 3-5 mm in diameter ..... *I. capillacea*
  - 2' Leaves simple or toothed to shallowly or deeply lobed; base usually cordate, rarely acute.
    8. Leaf bases acute; apex laciniate-dentate ..... *I. plummerae*
    - 8' Leaf bases cordate, apex usually not laciniate-dentate.
      9. Corollas salverform, scarlet, orange or yellow; bird pollinated ..... *I. cristulata*
      - 9' Corollas funnelform, lavender to white or purple; bee or moth pollinated.
        10. Sepals and/or pedicels and peduncles glabrous or with appressed small trichomes.
          11. Corollas 4.5-10 cm long; matinal; moth pollinated ..... *I. tenuiloba*
          - 11' Corollas 0.6-3 cm long; diurnal; bee pollinated or autogamous.
            12. Sepals triangular; corollas 2.6-2.7 cm long, blue (drying violet or rose) with a white throat ..... *I. cardiophylla*
            - 12' Sepals lanceolate-acuminate; corollas 0.6-1.5(-2) cm long, lavender with a darker throat or white ..... *I. xleucantha*

- 10' Sepals and/or pedicels and peduncles with spreading, ascending, or reflexed trichomes.
13. Sepal apices acute to abruptly acuminate ..... *I. purpurea*
- 13' Sepal apices acuminate to long acuminate.
14. Sepals ovate-attenuate to lanceolate-attenuate, truncate at the base; corolla 5.5-8 cm long ..... *I. pubescens*
- 14' Sepals linear-attenuate, not truncate at the base; corolla 1.6-3.7(-4.5) cm long.
15. Leaves usually with glandular dots below; sepals 10-12 mm long; sepal bases and pedicels glabrous ..... *I. barbatisepala*
- 15' Leaves without glandular dots; sepals 12-24 mm long; sepal bases and pedicels pubescent ..... *I. hederacea*

***Ipomoea barbatisepala*** A. Gray (bearded sepals). -- Low-climbing glabrous annual vines. LEAVES orbicular-ovate in outline, 3-8 cm long, 1.5-8.5 cm wide, deeply 5-7-lobed, glabrous often with glandular dots at least below, the base cordate, the lobes lanceolate and narrowed toward base, the apex acute to acuminate, the petioles 1-5.5 cm long. INFLORESCENCES axillary, 1-3-flowered cymes, the peduncles 2-6 cm long, glabrous or remotely appressed-hairy; bracts foliaceous, elliptic to linear, 5-6 mm long. FLOWERS on pedicels 4-5 mm long, glabrous, erect in fruit; sepals 10-12 mm long, 1-2 mm wide, hispid-pilose except at the base, the tips elongate, narrowly linear, the bases slightly dilated; corollas funnelform, 1.6-2(-2.5) cm long, glabrous, blue to light rosy-purple or white, the limb 1.8-2 cm wide; stamens 10-11 mm long, included; anthers 1.5 mm long; ovary conic, green, 1.5 mm long, glabrous; style 9 mm long, green. FRUITS glabrous, 8-9 mm long, rounded, apiculate, 2-3-locular. SEEDS 1-6, 4-5 mm long, pyriform, dark brown to black, appressed-pubescent. --Chaparral and desertscrub: Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, Yavapai cos.; 850-2450 m (2800-8000 ft); Jul-Dec; NM, w TX; Baja C., Son., s to Oax., Mex.

***Ipomoea capillacea*** (Humboldt, Bonpland & Kunth) G. Don (hair-like, in reference to the leaves). --Perennial herbs from elongated tubers. STEMS erect to ascending glabrous. LEAVES sessile, incised and appearing compound, the segments usually 5, linear or only tooth-like, 5-15 mm long. INFLORESCENCES axillary, flowers solitary on peduncles 5-7 mm long; bracts caducous. FLOWERS on pedicels 3-6 mm long, reflexed in fruit, the bracteoles scale-like; sepals 5-6 mm long, acute to obtuse and mucronate apically, the outer sepals 2 mm wide, elliptic to oblong, the inner sepals 3 mm wide, ovate, muriculate-tuberculate at least on the midvein; corollas funnelform, 3-4 cm long, lavender to red-purple, glabrous, the limb 2-2.5 cm wide; stamens 18-21 mm long, included, the anthers 1-1.5 mm long; ovary ovoid, 2-locular, glabrous; styles 18-20 mm long. FRUITS globose, 4-5 mm wide, the apiculum 1 mm long. SEEDS 1-4, 3 mm long, ovoid, black to dark brown, shortly erect-hispid. [*Ipomoea muricata* Cav. non L., non Jacq.; *I. muricatisepala* Matuda]. --Oak woodlands, plains, ponderosa pine zone: Cochise, Coconino, Pima, Santa Cruz, Yavapai cos.; 1500-2500 m (5000-8200 ft); Jul-Sep; NM, TX; Chih., Coah., Son., s to Pue., Mex.; C. Amer.; S. Amer.

***Ipomoea cardiophylla*** A. Gray (heart-leaved). --Annuals from a fibrous root system. STEMS twining. LEAVES simple, cordate, acuminate, 2-6 cm long, 1.4-3.8 cm wide, glabrous, the petioles 0.5-6.5 cm long. INFLORESCENCES cymose, 1-2-flowered; peduncles 1.5-4.5 cm long; bracts scale-like, caducous. FLOWERS on pedicels 10-18 mm long, reflexing in fruit; sepals triangular, glabrous, 6 mm long, 3-4 mm wide, acute, rugose along the midvein, scarious-margined, the inner sepals somewhat wider than outer ones; corollas funnelform, 2.6-2.7 cm long, blue (drying purple or pinkish), glabrous, the limb 3-3.5 cm wide; stamens 10-13 mm long, included, the anthers 1-2 mm long; ovary conic, 2-2.5 mm long, 2-locular, glabrous; style 11 mm long, green. FRUITS ovoid, 10-12 mm long, tan to brown, the apiculum to 4 mm long. SEEDS 1-4, 5-6 mm long, ovoid, brown, finely appressed-tomentose. --Desertscrub: near Tombstone and Bisbee, Cochise Co.; 1150 m (3700 ft); Sep; NM, TX; Chih., Coah., s to Oax., Mex.

***Ipomoea costellata*** Torrey (having little ribs, referring to the leaves). --Low annuals from slender



taproots. STEMS erect at first, in age trailing or twining at tips. LEAVES sessile or on petioles 1-3 cm long, deeply palmately dissected, the segments 5-9, linear, linear-lanceolate to oblanceolate, 7-25 mm long. INFLORESCENCES of mostly solitary flowers on peduncles 1-3(-7) cm long; bracts subulate, to 1 mm long. FLOWERS on pedicels 15-25 mm long, erect in fruit; sepals oblong-lanceolate, acute, mucronulate, scarious-margined, the outer sepals 3-5 mm long, 1-2 mm wide, the inner sepals 4-6 mm long, 2-3 mm wide, at least the inner sepals slightly rugose along the veins; corollas pale lavender to pink, 1-1.2 cm long; stamens 3-5 mm long, with white trichomes along filaments, the anthers 1 mm long; ovary ovoid, 1 mm long, 2-locular, cream, glabrous; styles 4 mm long, green. FRUITS tan, globose to ellipsoid-globose, 4-5 mm wide, the caducous apiculum 1-2 mm long. SEEDS 3-4, 3 mm long, ovoid, black, glabrous. [*Ipomoea pusilla* Brandegee; *I. futilis* A. Nelson]. --Rocky sites in chaparral, oak woodland and ponderosa pine zones: Apache, Cochise, Coconino, Gila, Graham, Greenlee, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai cos.; 1000-2150 m (3200-7000 ft); Jul-Oct; NM, TX; Baja C., Chih., Coah., Son., s to Chis., Mex.; introduced into S. Amer.

***Ipomoea cristulata*** Hallier (having a small crest, on sepals). Star Glory. --Annuals. STEMS twining, glabrous or pilose on the nodes. LEAVES ovate, entire or 3-5-parted or palmately lobed, 1.5-10 cm long, 1-7 cm wide, apically acute to acuminate, rarely obtuse, mucronate, glabrous or pilose below, the margins irregularly dentate, the base cordate to subtruncate, the lobes rounded to acute, the petioles 2-9 cm long. INFLORESCENCES (1-)3-7-flowered cymes; peduncles 3-6(-25) cm long; bracts linear-lanceolate to ovate, aristate, 1-3.5 mm long. FLOWERS: pedicels 5-14 mm long, reflexed in fruit; bracteoles ovate to lanceolate, 1-2 mm long; sepals unequal, the outer sepals oblong, 3-3.5 mm long, 2-2.5 mm wide, obtuse and rounded to truncate apically, mucronate or smooth, with a subterminal arista 3-5 mm long, glabrous, the inner sepals oblong 4-5.5 mm long, 3-3.5 mm wide, apically truncate, with a subterminal arista 2.5-3.5 mm long; corollas salverform, 1.8-2.6 cm long, red, red-orange, glabrous, the limb 1-1.5 cm wide; stamens 21-23 mm long, exserted; anthers 1.5 mm long; ovary ovoid, 1 mm long, 4-locular, glabrous; styles 18-20 mm long. FRUITS globose, 7-8 mm wide, the apiculum 2 mm long. SEEDS 1-4, 3.5-5 mm long, ovoid, black to dark brown, finely tomentose. [*Quamoclit gracilis* Hallier f.; *Ipomoea coccinea* var. *hederifolia* sensu Kearney & Peebles, non (L.) A. Gray; *I. coccinea* sensu authors, non L.]. Chaparral, oak woodland, ponderosa pine zones: all cos.; 750-2750 (2400-9100 ft); May-Nov; IA, KS, MN, TX; Coah. s to Ver., Mex.

***Ipomoea hederacea*** Jacq. (resembling ivy, *Hedera*). --Annuals. STEMS twining, densely to sparsely pubescent throughout. LEAVES ovate to orbicular, 5-12 cm wide and long, entire to 3-5-lobed, basally cordate, the lobes apically acute to acuminate, pubescent, the petioles to 12 cm long, rarely longer. INFLORESCENCES 1-3(-6)-flowered cymes; peduncles 5-10 cm long; bracts foliaceous, elliptic to lanceolate, 5-8 mm long. FLOWERS on pedicels 3-7 mm long, erect in fruit; sepals 12-24 mm long, 4-5 mm wide, herbaceous, lanceolate, abruptly narrowed from the rounded base into a narrow acuminate apex, usually curved at least in fruit, the apex sometimes strongly curved, densely long-hirsute at least on the basal 1/3; corollas funnelform, 2-3.7(-4.5) cm long, light blue, the tube white or pale yellow inside, the limb 1.7-3.5 cm wide; stamens 12-15 mm long, included, the anthers 1-1.5 mm long, white; ovary conic, 1 mm long, 3-locular, pubescent; styles 12 mm long. FRUITS globose, somewhat depressed, 8-12 mm wide, enclosed within the sepals. SEEDS 1-4, 4-4.5 mm long, pyriform, black to dark brown, densely pubescent with short trichomes.  $2n = 30$ . [*Ipomoea hirsutula* pro parte; *I. desertorum* House] --Disturbed ground, roadsides: Cochise, Coconino, Gila, Graham, Pima, Pinal, Santa Cruz, Yavapai, Yuma cos.; 900-1900 m (2900-6100 ft); Aug-Nov; ME to SD, FL; Chih., N.L., Son., Tamp., s to Gro., Mex., S. Amer., introduced into Old World.

***Ipomoea xleucantha*** Jacq. (white-flowered). --Annuals. STEMS twining or procumbent, glabrous to sparsely pubescent. LEAVES broadly ovate to orbicular, entire, dentate or 3-5-lobed, 2-8 cm long, 2-7 cm wide, basally cordate, the apex acute to obtuse, the petioles 2-3 cm long. INFLORESCENCES axillary sub-umbellate cymes, rarely 1-flowered; bracts scale-like. FLOWERS: pedicels (4-)10-30 mm long, erect in fruit; sepals (8-)10-14 mm long, lanceolate-acuminate, mucronate, glabrous; corollas funnelform,

0.6-1.5(-2) cm long, white to lavender, the throat often darker, the limb mostly less than 1 cm wide; stamens 5-8 mm long, included, the anthers 2 mm long; ovary ovoid, ca. 1 mm long, 2-locular, pubescent; styles 5-8 mm long. FRUITS globose, 7-8 mm wide, bristly hirsute. SEEDS 1-4, 3.2-4 mm long, ovoid, black to dark brown, glabrous. [*Ipomoea triloba* sensu auct., non L.]. Disturbed sites: Maricopa, Pima, Pinal, Yuma cos.; 50-700 m (100-2300 ft); Aug-Oct; se U.S., scattered sites in Mex., C. Amer., W. Ind., and S. Amer. In AZ two old collections have been seen (*Pringle* in 1884 and *Thornber* in 1912), and the species was found recently in cotton fields (*Heathman* in 1979 [ASU], *Tuttle* in 1985 [ARIZ]). Presumably the hybrid was introduced as a contaminant in seed of other cultivated plants.

***Ipomoea longifolia* Benth.** (long-leaved). --Perennial herbs, somewhat fleshy, rhizomatous. STEMS trailing, decumbent or ascending. LEAVES linear to oblong-lanceolate, entire, 10-12(-20) cm long, 2-4 cm wide, glabrous, the petioles 0.5-1.7 cm long. INFLORESCENCES axillary, mostly 1-flowered; peduncles 3.5-4(-11) cm long; bracts caducous. FLOWERS: pedicels 2-3.5 cm long, mostly erect in fruit; sepals ovate, coriaceous, glabrous, the outer sepals 12-14(-17) mm long, 6-7 mm wide, the inner sepals 15-20 mm long, 7-8 mm wide; corollas funnelform, 7-12 cm long, the limb white to white-cream, 7-8 cm wide, the throat purple; stamens 33-42 mm long, included, the anthers 9-10 mm long, white; ovary conic, 5 mm long, 2-locular, glabrous; styles 40-42 mm long, white. FRUITS ovoid, 14-16 mm wide, the apiculum 2-3 mm long. SEEDS 1-3(-4), 10-11 mm long, ovoid, brown, with long pilose indumentum on the margins and near the apex. Desert grasslands to oak woodlands: Cochise, Santa Cruz cos.; 1000-1850 m (3200-6000 ft); Apr-Aug; Son., s to Dgo., Gto., Zac., S.L.P., Ags., Qro., Jal., Mex.

***Ipomoea plummerae* A. Gray** (for Sara Allen Plummer, wife of J. G. Lemmon). --Glabrous perennial herbs with globose or elongate, tuberous roots. STEMS erect to procumbent, ascending, not twining or only slightly at tips. LEAVES orbicular in outline, 1-3 cm long, glabrous, palmately dissected to rarely cuneate-obovate, the apex lacinate-dentate, the base cordate, the lobes acute; petioles 2-5 mm long. INFLORESCENCES 1-flowered; peduncles 1.5-2.5 cm long, erect or reflexed in fruit; bracts caducous. FLOWERS: sepals unequal, the outer sepals 5-8 mm long, 2-3 mm wide, oblong, obtuse to acute, mucronate, muricate at least along the midrib, the inner sepals 7-9(-10) mm long, 3-4 mm wide, broadly ovate, acute to acuminate, muricate on the midrib or glabrous; corollas broadly funnelform, 2.5-3.1 cm long, purple, glabrous, the limb 1.8-2.2 cm wide; stamens 8-10 mm long, included, the anthers 1.5 mm long; ovary ovoid, 1 mm long, 2-locular, green, glabrous; styles 13-14 mm long, white. FRUITS globose, 5-6 mm wide, the apiculum to 5 mm long. SEEDS 1-4, 2-2.5 mm long, ovoid, black to dark brown, finely tomentose. [*Ipomoea egregia* House; *I. plummerae* var. *cuneifolia* (A. Gray) Ooststr.]. --Open rocky slopes: Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai cos.; 1350-2600 m (4500-8500 ft); Aug-Sep; NM; Chih., Coah., Son., Mex.

***Ipomoea pubescens* Lam.** (pubescent). --Perennial herbs from large oblong root. STEMS twining, hirsute with retrorse trichomes. LEAVES ovate, nearly entire, with the margins sinuate, or 3-5 palmately lobed, 2-8 cm long, 2-9 cm wide, basally cordate, hirsute with antrorse trichomes, at times sericeous, apically acute to obtuse, mucronate, the petioles 2-5 cm long, the lobes elliptic or ovate. INFLORESCENCES 1-2-flowered; peduncles 15-18 mm long; bracts subulate, acuminate, 5-12 mm long. FLOWERS: pedicels 3-10 mm long, erect in fruit; sepals unequal, antrorsely hispid at times sericeous, the outer sepals ovate, acuminate, 9-21 mm long, 5-11 mm wide, basally truncate, the middle sepals asymmetrical, ovate, acuminate, 9-19 mm long, 3-8 mm wide, the inner sepals ovate-lanceolate, 9-20 mm long, 2-4 mm wide; corollas funnelform, 5.5-8 cm long, blue to violet, glabrous, the limb 6-7 cm wide; stamens 30-35 mm long, with few glandular trichomes on base of filaments, the anthers sagittate, 3-4 mm long; ovary globose to ovoid, 1.5-1.75 mm long, 3-locular, glabrous; styles 40-45 mm long; stigmas 3-capitate. FRUITS surrounded by the sepals, globose, 10-12 mm wide. SEEDS 3-6, 5-6 mm long, ovoid, brown to black, densely pubescent with velvety trichomes. [*Ipomoea heterophylla* Ortega; *I. lindheimeri* A. Gray var. *subintegra* House]. --Rocky areas and stream beds in oak woodland: Cochise, Pima, Santa Cruz cos.; 1050-1350 m (3500-4500 ft); Aug-Sep; NM, TX; s to Dgo., S.L.P., Mex.; disjunct to S. Amer.

***Ipomoea purpurea* (L.) Roth** (purple, referring to flowers). --Annuals, loosely pubescent to tomentose with short, appressed retrorse trichomes, and often with large spreading trichomes which may reach 4 mm long. STEMS twining, branched to simple. LEAVES ovate, entire to 5-lobed, 1-11 cm long, 1-12 cm wide, the base cordate, the apex acute to acuminate, rarely obtuse, mucronate, the petioles 1-14 cm long. INFLORESCENCES (1-)2-5-flowered cymes; bracts linear to lanceolate, 1.3-9 mm long. FLOWERS: pedicels 5-16 mm long, erect in flower, reflexed and enlarged in fruit, reaching 25 mm long; bracteoles similar to bracts, 4.5 mm long; sepals 8-15 mm long, the outer sepals narrowly ovate-lanceolate to elliptic, (1.5-)2.5-4.5 mm wide, acute to abruptly acuminate apically, more pubescent near base, the inner sepals ovate-lanceolate, 2.5-3 mm wide, acute to abruptly acuminate; corollas funnelform, 2.5-4.3(-5) cm long, blue (white to purple in cultivated plants), white within the tube, glabrous, the limb 2.4-4.8(-7) cm wide; stamens 8-10(-14) mm long, the anthers 1.5-2(-3) mm long; ovary ovoid to conic, 1.5-2 mm long, 3-locular, glabrous; style 14-22(-30) mm long; stigmas 3, globose. FRUITS globose to ovoid, 7-8(-10) mm wide, 6-valvate, the apiculum 2-4 mm long. SEEDS 3-6, 4-5 mm long, ovoid, black to dark brown, finely tomentose.  $2n = 30$ . [*Ipomoea hirsutula* Jacq.f.]. --Disturbed sites and in cultivation: Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Santa Cruz, Yavapai cos.; 300-2300 m (1000-7500 ft); Jul-Nov; pantropical, widespread in N. Amer.; probably naturalized from Mex.

This is an unusually variable species, at least in part due to human selection. Cultivated forms are always larger than wild forms, but the size of flowers and sepals may vary even in wild plants.

***Ipomoea tenuiloba* Torrey** (slender-lobed, a reference to the leaves). --Perennial herbs with tuberous roots. STEMS prostrate but twining near the tips, glabrous. LEAVES orbicular in outline, palmately 5-9 lobed, the lobes linear to lanceolate, 1-7 cm long, 0.5-6.5 mm wide, entire, glabrous, the base cordate, the petioles 2-38 mm long. INFLORESCENCES mostly 1-flowered; peduncles (1-)5-39 mm long; bracts linear to deltoid-attenuate, 1-3 mm long. FLOWERS: pedicels (0-)2.5-8 mm long, recurved in fruit; sepals unequal with scarious margins, the outer oblong-lanceolate, 5-11.5 mm long, 2-3 mm wide, muricate along the midrib or almost smooth, mucronate, the inner 8-9 mm long, 3-4 mm wide, obovate-acuminate, smooth; corollas funnelform or salverform, glabrous, 3.5-10 cm long, completely white or white with pale rose to purple limb, the limb 3-3.6 cm wide; stamens exerted, the filaments 8-19 mm long, the anthers 2-2.5 mm long; ovary ovoid, 1.5-2 mm long and wide, 2-locular, glabrous; styles 30-36 mm long; stigmas 2, globose. FRUITS globose to broadly ovoid, 4-8 mm wide, the apiculum 4-5 mm long. SEEDS 1-4, 3.5-5 mm long, ovoid, black to dark brown, finely appressed tomentose. 2 vars. both in AZ; NM, TX; Chih., Son., Mex.

Var. ***lemmonii*** (A. Gray) Yatskievych & C. Mason. (for J. G. Lemmon). --Leaves with 7-9 linear to linear-lanceolate divisions to 6.5 mm wide, the petioles 8-38 mm long. FLOWERS: sepals to 11 mm long; corollas funnelform, 3.5-6.5 cm long, the upper portion purple or bluish-purple, the tube white, the free portion of filaments 14-19 mm long. [*I. lemmonii* A. Gray]. Oak and pinyon-juniper woodlands: Cochise, Pima, Santa Cruz cos.; 1200-1950 m (4000-6400 ft); Aug-Sep; Chih., Son., Mex.

Var. ***tenuiloba***. --LEAVES with 5-7 filiform divisions to 1.2 mm wide; petioles 2-16 mm long. FLOWERS: sepals to 14 mm long; corollas 6.5-10 cm long, salverform, white or slightly tinged with pink, the free portion of filaments 14-19 mm long. Oak and pinyon-juniper woodlands: Cochise Co.; 1850-2050 m (6000-6800 ft); Aug-Sep; NM, TX; Chih., Mex.

***Ipomoea ternifolia* Cav.** (for leaf with three leaflets). --Annuals or tap-rooted perennials. STEMS slender and procumbent, twining at tips, glabrous. LEAVES: petioles 1-3 cm long; blades palmately 5-11-parted, 1-8 cm long, 1-6 cm wide, glabrous to remotely setose, the segments lanceolate, linear, elliptic, obovate, rhombic, rarely filiform. INFLORESCENCES 1-3 flowered cymes; peduncles 0.5-6.5 cm long, equalling or exceeding the leaves; bracteoles subulate, 1-2.5 mm long. FLOWERS on pedicels 6-18 mm long, erect in fruit; sepals unequal, 4-14 mm long, glabrous or hirsute on the 3 main veins and along the margins; corolla funnelform, 1.5-4.5 cm long, purple, glabrous; stamens 8-20 mm long, the filaments covered with orange trichomes, the anthers 3 mm long; ovary conic, 1 mm long, 2-locular, glabrous, the styles 19-20 mm long. FRUITS ellipsoid to ovoid depending on the number of seeds, 3-5 mm long, with an apiculum 5 mm or more long. SEEDS 1-4, 5-6 mm long, ovoid, black and gray mottled, minutely ap-

pressed-tomentose. --3 vars. in AZ and Mex.

Var. *leptotoma* (Torrey) J. A. McDonald (narrow sections, in reference to the leaves). --Annuals, with fibrous roots. LEAVES: petioles to 2 cm long; blades palmately 5-7-parted, 1.5-3 cm long and wide, the base cordate, the segments linear, apically acute, INFLORESCENCES 1-2-flowered; bracteoles 2-2.5 mm long. FLOWERS: pedicels erect in fruit; sepals 9-14 mm long, attenuate-acuminate; corollas 2.3-4.5 cm long, the limb 3.2-4.6 cm wide; stamens 8-12 mm long. [*Ipomoea leptotoma* Torrey, *Ipomoea leptotoma* var. *wootonii* Kelso]. --Plains, desert scrub: Cochise, Gila, Graham, Pima, Pinal, Santa Cruz cos.; 600-1400 m (2000-4600 ft); Jun-Oct; Chih., Sin., Son., Mex.

*Ipomoea thurberi* A. Gray (for G. Thurber). --Glabrous, perennial herbs from elongate, tuberous roots. STEMS trailing. LEAVES sagittate to palmately 5-7-lobed, sparsely strigose, the lobes divergent, lanceolate, linear to oblong, 1-5 cm long, 2-6.5 cm wide, the base sagittate, the petioles 0.9-2 cm long. INFLORESCENCES 1-flowered; peduncles 3-4 mm long; bracts scale-like, ca. 1 mm long. FLOWERS: pedicels 7-8 mm long, erect in fruit; sepals equal, lanceolate, 12-15 mm long, 3-4 mm wide, acuminate apically, smooth, setaceous-caudate, sometimes obscurely warty at the base; corollas funnelform-salverform, 5-8 cm long, white with a rose limb and green tube (drying purple), opening in the evening, glabrous, the limb 5-6.5 cm wide; stamens 55-59 mm long, exerted, the anthers 3.5-4 mm long; ovary ovoid, 1-1.5 mm long, 3-locular, glabrous; styles 55-59 mm long. FRUITS globose to ovoid, 6-7 mm wide, the apiculum 4-5 mm long. SEEDS 3-6, 3.5-4 mm long, ovoid, black to dark brown, finely tomentose. -- Oak woodlands, rocky sites: Cochise, Pima, Santa Cruz cos.; 1150-1500 m (3800-5000 ft); Aug-Sep; Chih., Son., Mex.

#### *Jacquemontia* Choisy

Vines, herbs or suffrutescent shrubs. STEMS herbaceous toward tips, procumbent to twining, glabrous or densely pubescent. LEAVES chartaceous to herbaceous, mostly cordate, glabrous or with stellate trichomes, entire, dentate or lobate, petiolate. INFLORESCENCES scorpioid or head-like cymes, umbels, or flowers solitary; bracts small and linear to lanceolate or large and foliose. FLOWERS on pedicels 5-30 mm long; sepals equal or unequal, variable in shape, pubescent or glabrous; corollas blue, lilac or white (red in one West Indian species), subtovate, campanulate or funnelform, deeply lobed, dentate or almost entire, glabrous or pubescent; stamens and styles included (in our species); ovary 2-locular, glabrous or pubescent; styles 1, filiform; stigmas 2, ellipsoid or oblong and flattened. FRUITS capsular, with 4 or 8 valves, globose. SEEDS 1-4, glabrous, tuberculate, winged or pilose. --Ca. 80-100 spp. Subtropics and tropics from s U.S. to c S. Amer., Asia, Australia. (for V. Jacquemont). Robertson, K. R. 1971. A revision of the genus *Jacquemontia* (Convolvulaceae) in North and Central America and the West Indies, Ph.D. dissertation, Washington Univ., St. Louis.

*Jacquemontia pringlei* A. Gray (for C. G. Pringle). --Perennial vines. STEMS pubescent with 4-6-armed stellate trichomes, rarely glabrate. LEAVES broadly ovate to ovate, 2-6.5 cm long, 1.5-4.8 cm wide, the base shallowly cordate to truncate, the apex acute or less often retuse to obtuse, sometimes mucronate. INFLORESCENCES axillary, loose cymes of 1-7 flowers; peduncles 1-11 cm long, longer than the leaves; bracts linear, to 6 mm long. FLOWERS: pedicels 2-10 mm long, erect to nodding in fruit; sepals more or less equal, 5.5-9 mm long, pubescent without and to a lesser degree within, the apices acute, the outer sepals ovate to broadly ovate, the middle sepals falcate, the inner sepals narrowly ovate; corollas funnelform, 1.4-2.7 cm long, lavender to white, glabrous; stamens 5-10 mm long, included, the anthers 1.5-2 mm long; ovary ovoid, 1-1.5 mm long, 2-locular, glabrous; styles 7-9 mm long. FRUITS broadly ovoid, enclosed by accrescent sepals, 5-6 mm long. SEEDS 1-4, 2-2.5(-3) mm long, trigonous, brown, minutely areolate and ruminant. --Upper Sonoran zone, basaltic hills and rocky cliffs: Cochise, Pima, Yuma cos.; 900-1350 m (3000-4500 ft); Apr-Oct: Chih., Son., Mex.

The related species, *Jacquemontia agrestis* (Choisy) Meisner has not been collected in AZ since 1945. Its continued existence in the state is unlikely. In Mex., C. Amer., and S. Amer. it tends to become a weed in cultivated fields.

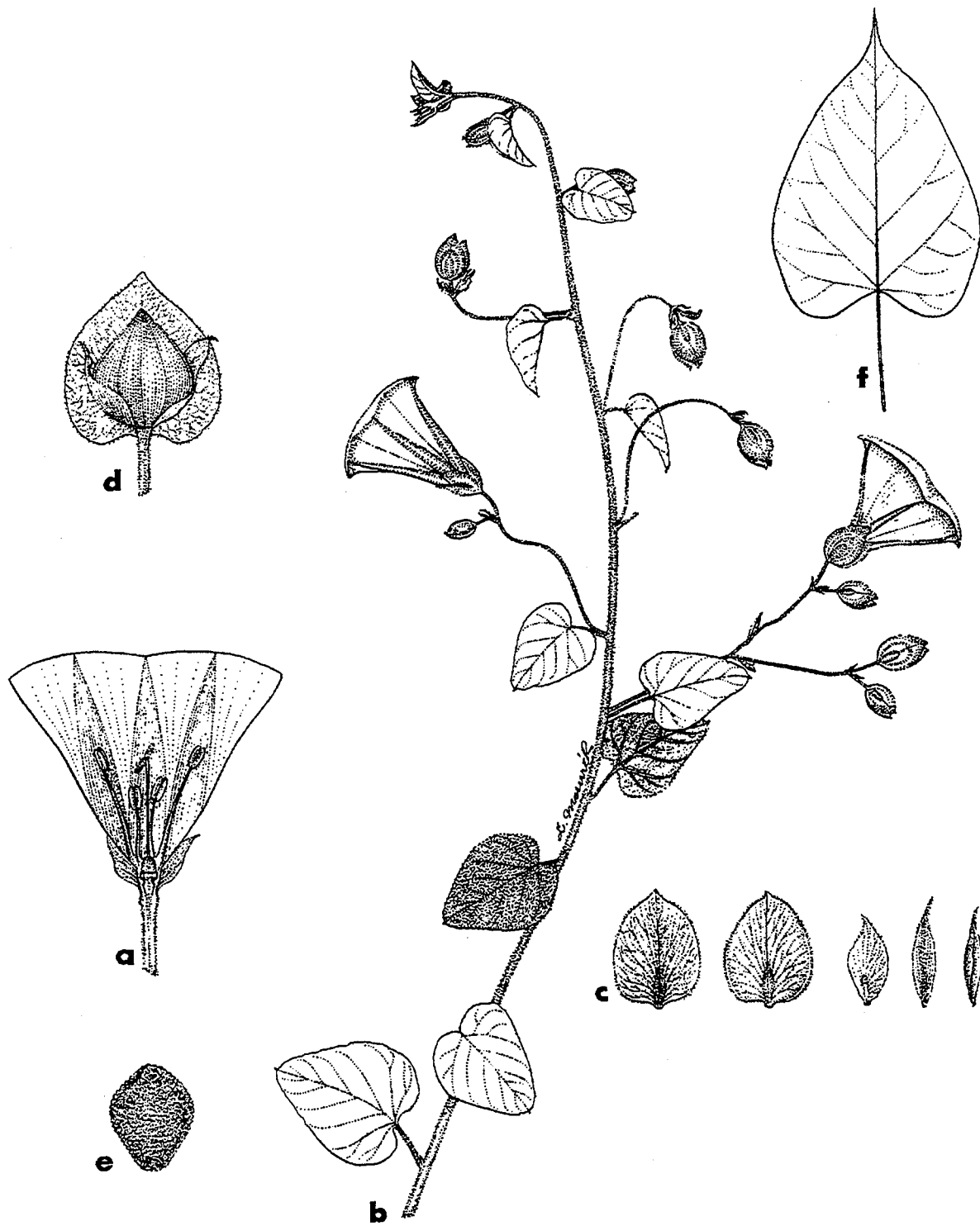


Figure 1. *Jacquemontia pringlei*; a, flower; b, habit; c, sepals, inner on right; d, capsule; e, seed; f, leaf; a-c, *Parker 8026 (NY)*; d, *Rose 1265 (F)*; e-f, *Palmer 294 (GH)*. From K. R. Robertson (1971), used with permission of author. Drawings by Leonardo Morr .

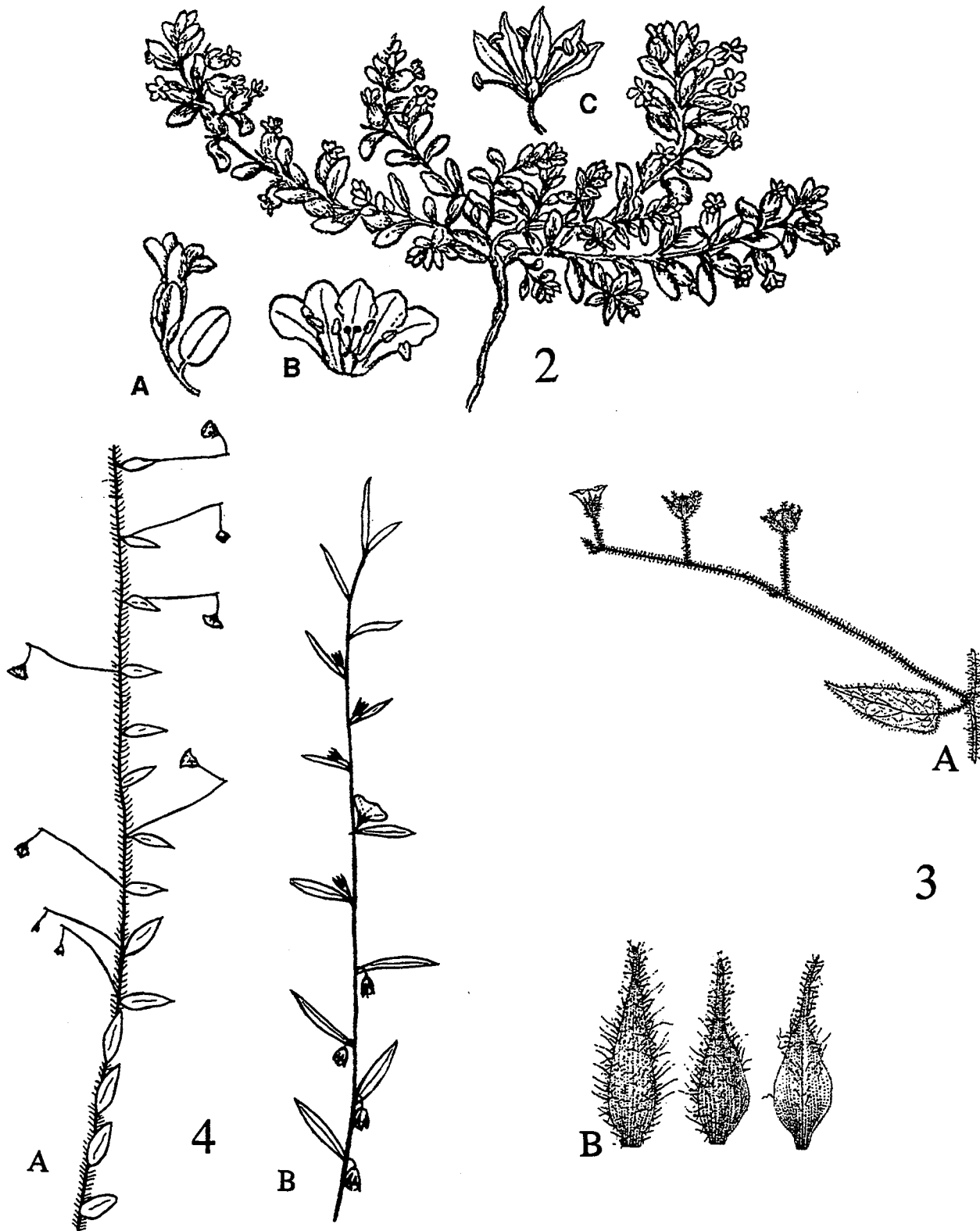


Figure 2. *Cressa truxillensis*. A, branch with flower. B, open corolla showing androecium and gynoecium. C, dissected flower with calyx, androecium and gynoecium. Modified from A. A. Heller. 1913. *Muhlenbergia* 8:142.

Figure 3. *Jacquemontia agrestis*. A, inflorescence. B, sepals, inner on right. *Gentry* 4795 (GH). From K. R. Robertson (1971), used with permission of author. Drawings by Leonardo Morr .

Figure 4. *Evolvulus*. A, *Evolvulus alsinoides*. *Agostini* 608 (VEN). B, *Evolvulus sericeus*. *Montes* 421 (VEN). From D. F. Austin. 1982. *Covulvulaceae*. In *Luces de Febres, Z. and J. A. Steyermark. Flora of Venezuela Vol. 8, part 3.*

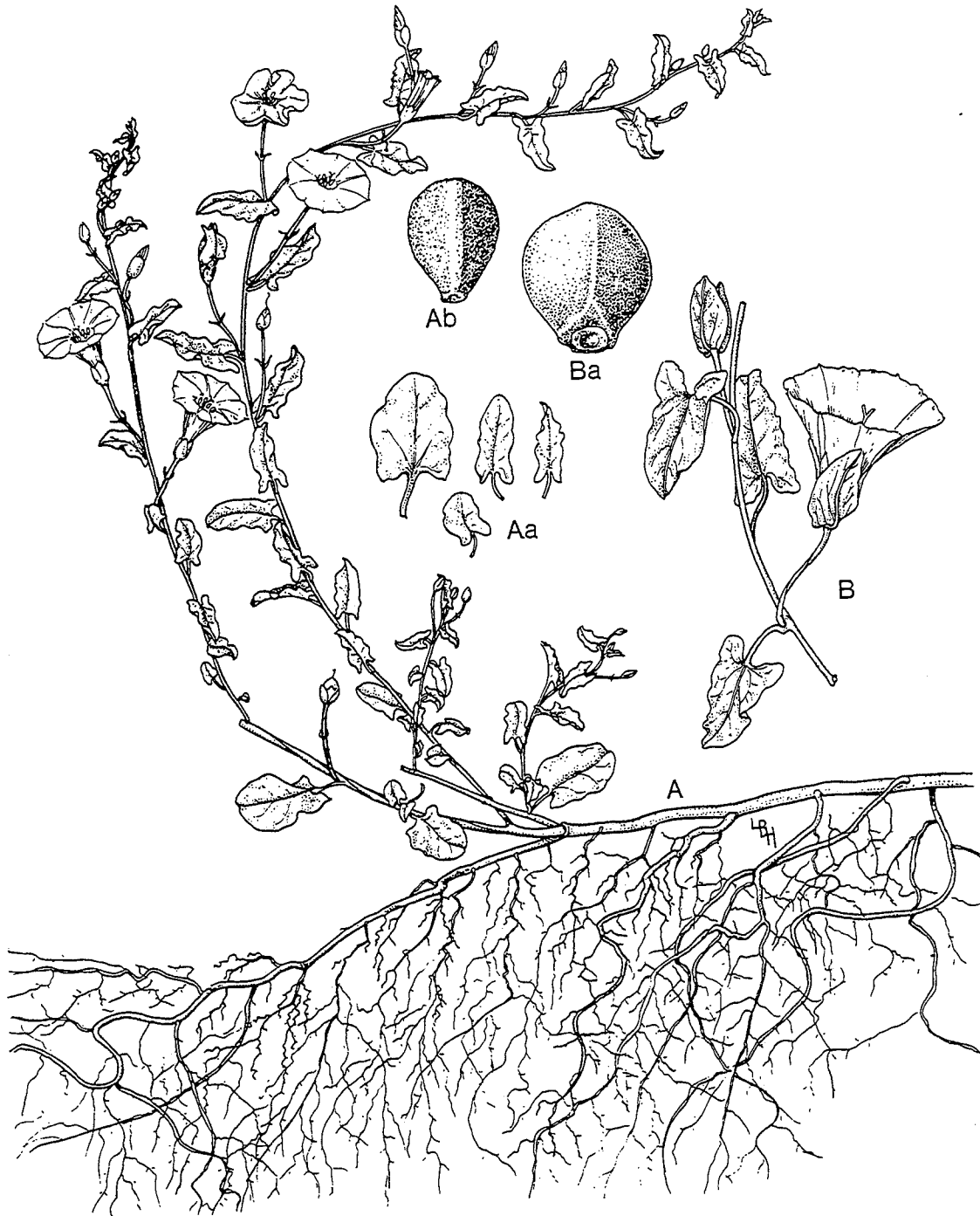


Figure 5. A, *Convolvulus arvensis*, prostrate plant with both flowers and fruits; Aa, various shapes of leaves; Ab, seed. B, *Calystegia macounii*, branch with flower; Ba, seed. Reprinted with permission from *An Illustrated Guide to Arizona Weeds*, University of Arizona Press, by Kittie F. Parker; illustration by Lucretia Breazeale Hamilton.



Figure 6. *Ipomoea cristulata*, flowering branch; a, fruit; b, seed. Reprinted with permission from *An Illustrated Guide to Arizona Weeds*, University of Arizona Press, by Kittie F. Parker; illustration by Lucretia Breazeale Hamilton.



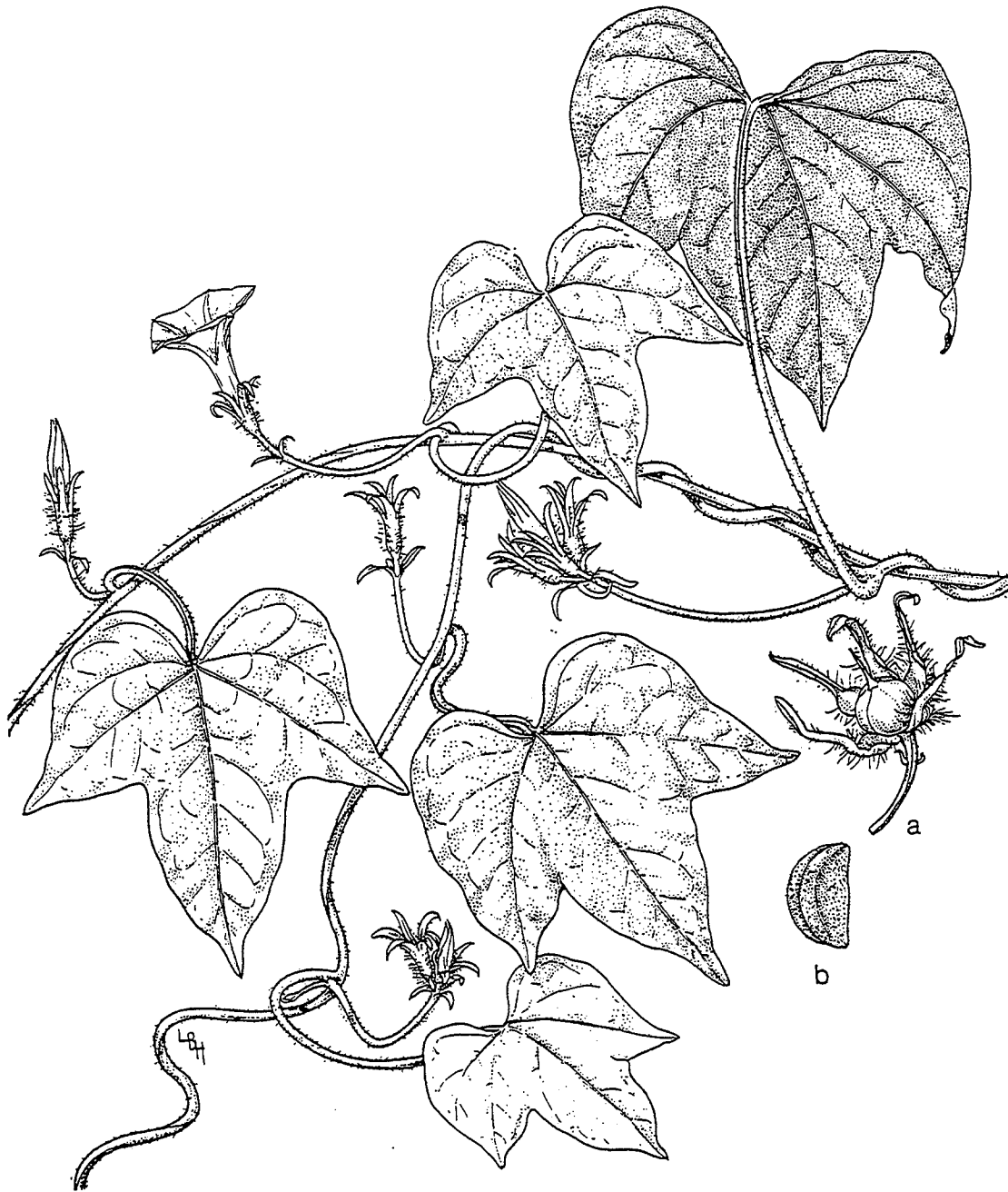


Figure 7. *Ipomoea hederacea*, portion of the leafy plant showing flowers and twining habitat of the stem; a, fruit surrounded by calyx lobes; b, seed. Reprinted with permission from *An Illustrated Guide to Arizona Weeds*, University of Arizona Press, by Kittie F. Parker; illustration by Lucretia Breazeale Hamilton.

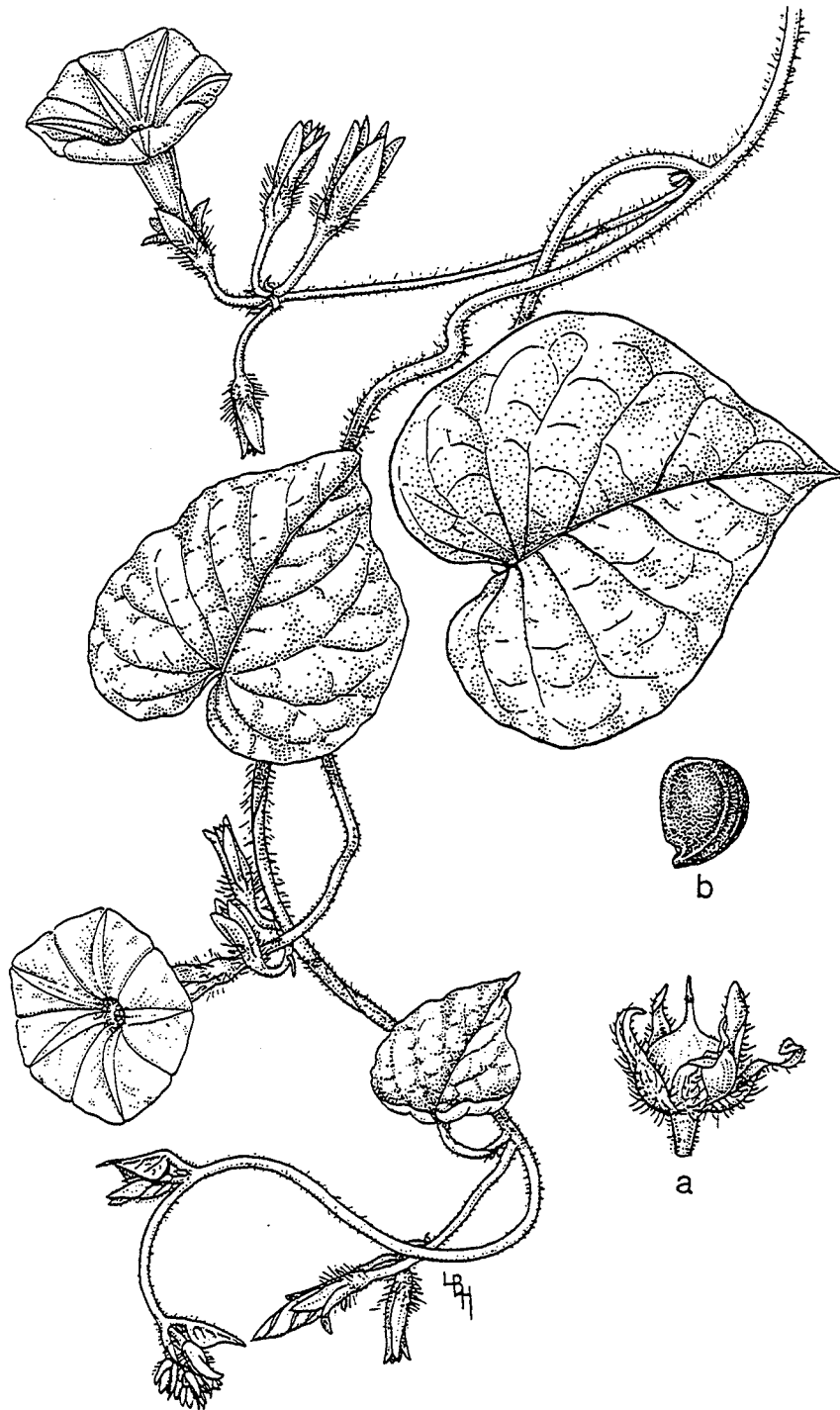


Figure 8. *Ipomoea purpurea*, leafy portion of plant showing flowers and hairy, twining stems; a, fruit enclosed in calyx; b, seed. Reprinted with permission from *An Illustrated Guide to Arizona Weeds*, University of Arizona Press, by Kittie F. Parker; illustration by Lucretia Breazeale Hamilton.



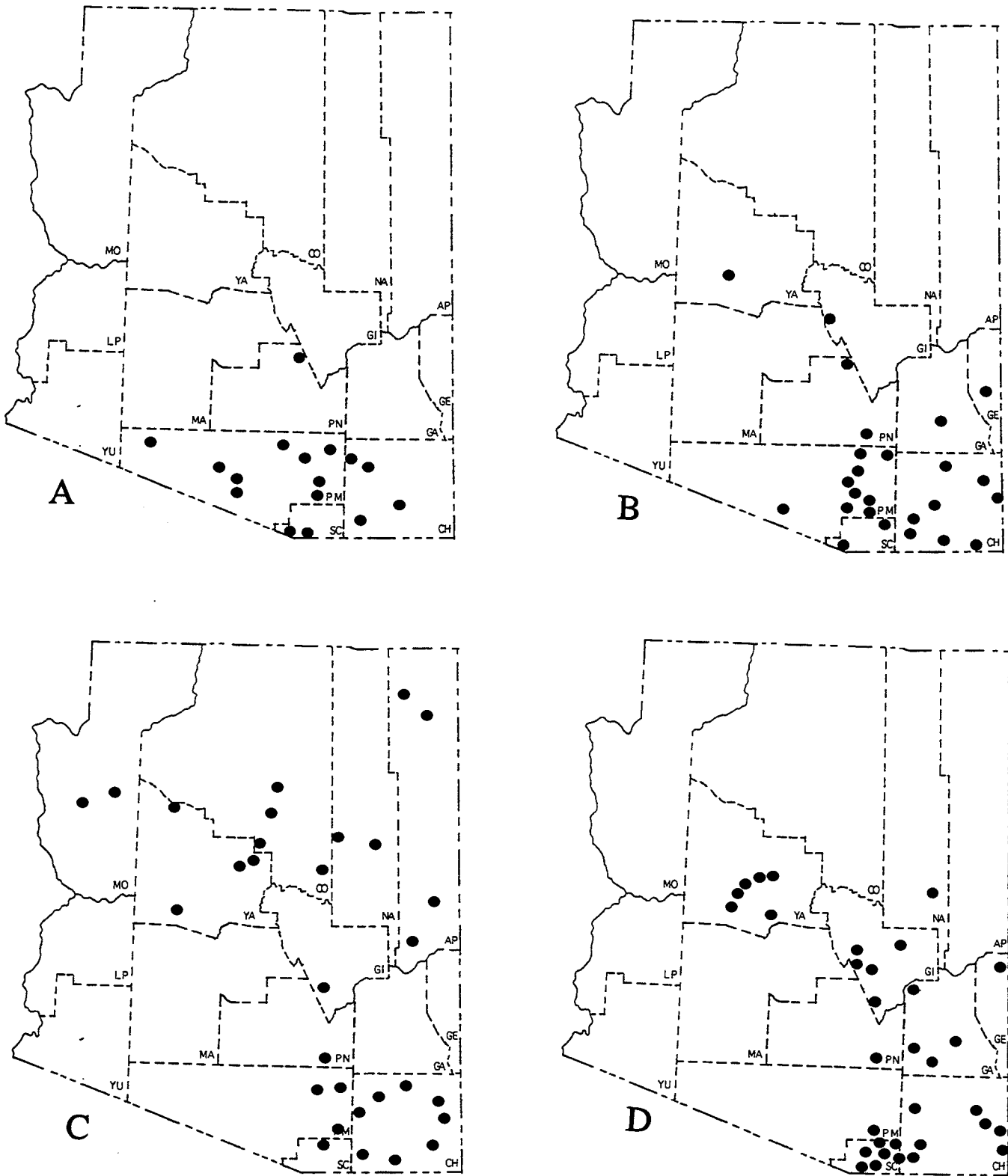


Figure 10. Distribution of: A, *Evolvulus alsinoides*; B, *Evolvulus arizonicus*; C, *Evolvulus nuttalianus*; D, *Evolvulus sericeus*.

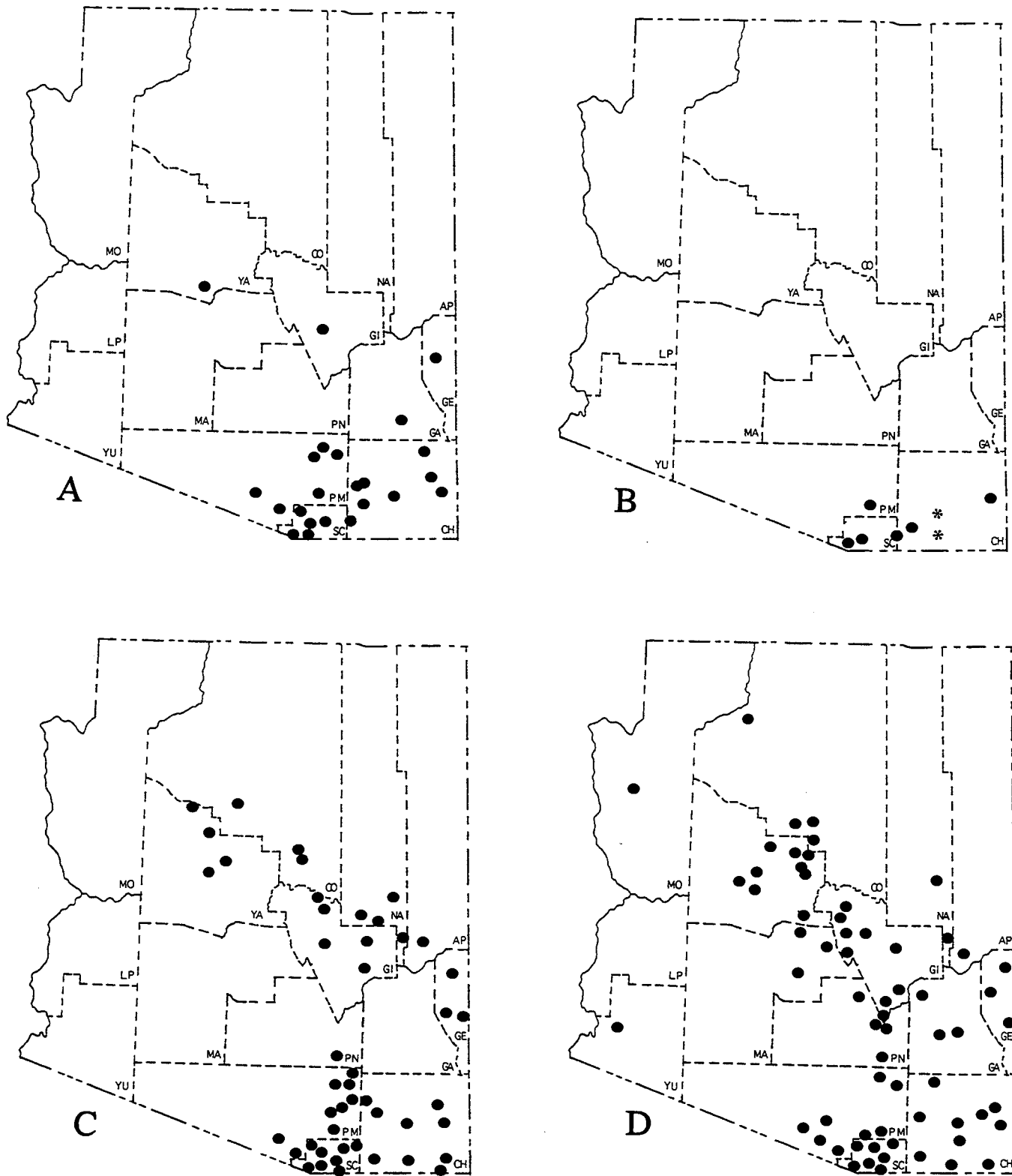


Figure 11. Distribution of: A, *Ipomoea barbataisepala*; B, *Ipomoea capillacea* (dots), *Ipomoea cardiophylla* (stars); C, *Ipomoea costellata*; D, *Ipomoea cristulata*.

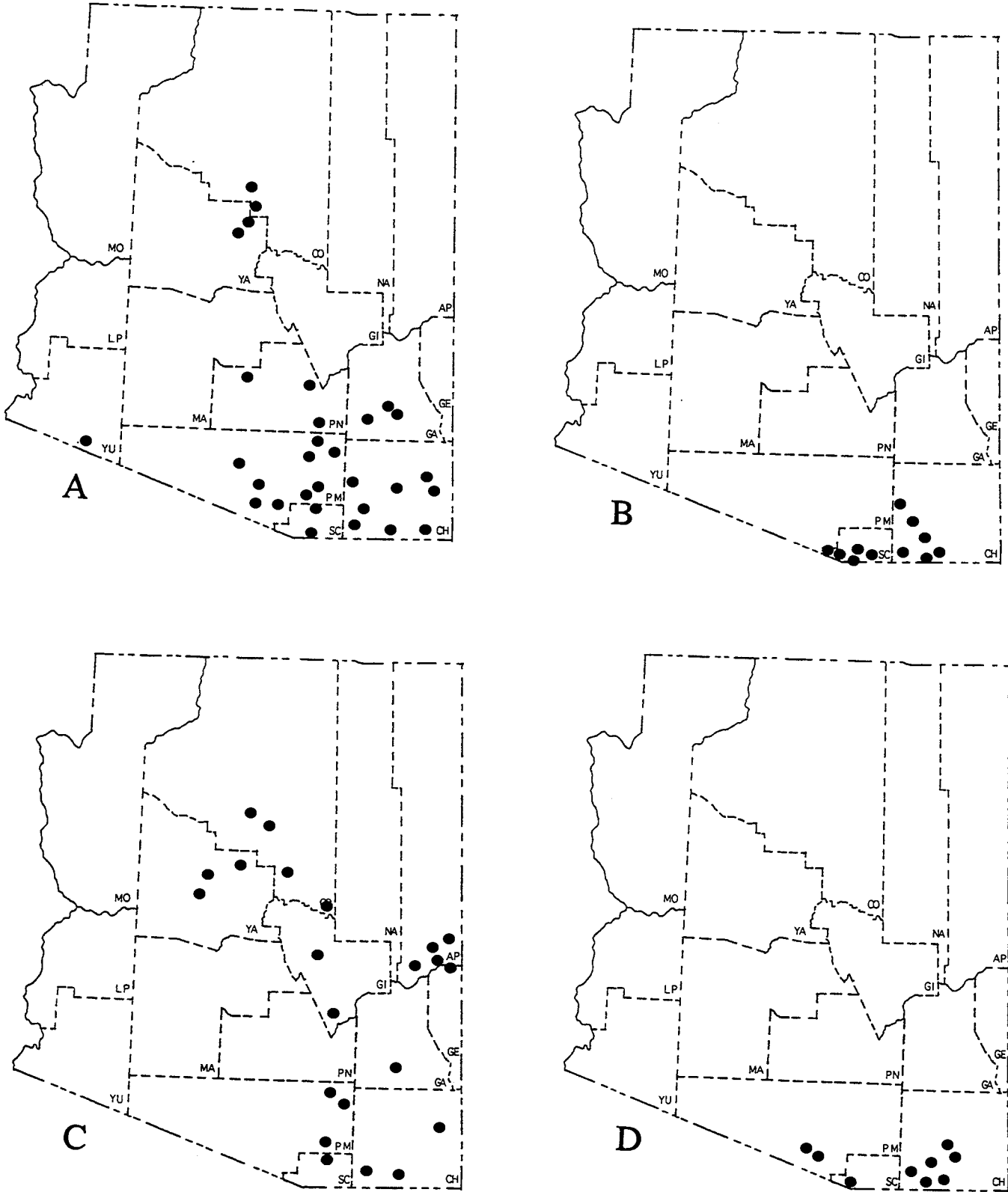


Figure 12. Distribution of: A, *Ipomoea hederacea*; B, *Ipomoea longifolia*; C, *Ipomoea plurmerae*; D, *Ipomoea pubescens*.

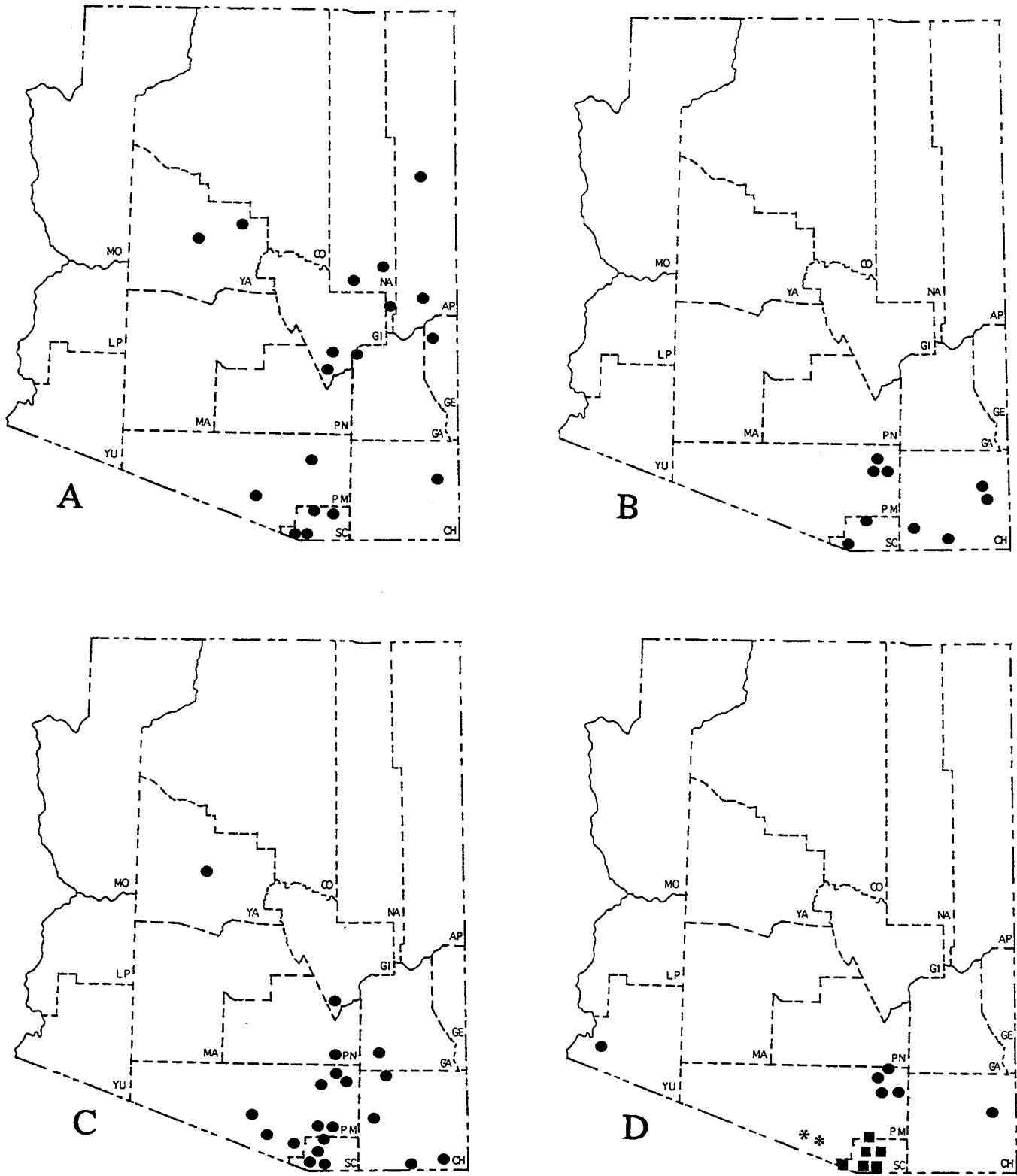


Figure 13. Distribution of: A, *Ipomoea purpurea*; B, *Ipomoea tenuiloba*; C, *Ipomoea ternifolia* var. *leptotoma*; D, *Ipomoea thurberi* (squares), *Jacquemontia pringlei* (dots), *Jacquemontia agrestis* (stars).