

PAPAVERACEAE POPPY FAMILY

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Ours annual or perennial herbs, with taproot or fibrous roots, the sap watery or colored. LEAVES basal, cauline, or basal and cauline, alternate, opposite or whorled, without stipules, linear, cuneate and apically 3-5-lobed, or shallowly to deeply ternately or pinnately lobed. FLOWERS perfect, solitary or cymose, actinomorphic, hypogynous or perigynous; sepals 2 or 3, caducous; petals 4-6, early deciduous or persistent; stamens 12-many; pistil of 2-6 or more united carpels or of 6 or more tardily separating carpels. FRUITS unilocular capsules with valvate dehiscence, splitting from the apex or base, with few to numerous seeds, or a group of several moniliform (like a string of beads) loosely associated carpels that break transversely between the seeds. SEEDS ovoid, smooth, reticulate, ridged or pitted, aril present or absent. -26 genera, 200 spp., chiefly n temperate. Includes the opium poppy, the source of the opiate drugs.

1. Plants thistle-like, heavily armed with prickles *Argemone*
- 1' Plants unarmed (or merely having spinulose leaf tips in *Arctomecon*).
2. Leaves entire *Platystemon*
- 2' Leaves lobed, toothed, or dissected.
3. Leaves long-hairy, mainly apically 3-5-toothed or -lobed, each tooth or lobe with a slender spinulose tip; flowers white; on gypsiferous substrates near Lake Mead, Mojave Co.
 *Arctomecon*
- 3' Leaves glabrous, ternately dissected, the terminal divisions acute to obtuse, each division without a spinulose tip; flowers yellow to orange; widespread in AZ *Eschscholzia*

Arctomecon Juss. Bearclaw Poppy, Desert Poppy
 Jeffrey W. Brasher

Perennial herbs with a caudex and long taproot. LEAVES cauline and basal, long-hirsute, usually cuneate, mostly toothed or lobed apically, the teeth spinulose-tipped. FLOWERS white or yellow, 1.5-4 cm

across, solitary, or borne in leafy-bracteate cymes, nodding in bud; sepals 2 or 3; petals 4 or 6; stamens many; styles lacking or less than 1.5 mm long; stigmas connate, 3-6. CAPSULES ovoid, 3-6-valved. SEEDS several, strophiolate. -3 spp.; narrowly endemic genus restricted to 7 counties in 4 states: Mohave Co., AZ; Inyo and San Bernadino cos., se CA; Clark, Lincoln, Nye cos., s NV; Washington Co., sw UT. (Greek *arktos* = of bear + *mekon* = a poppy).

Arctomecon californica Torr. & Frém. (of California). --Plants forming rounded clumps, 2.5-6 dm tall, with a branching caudex, this clothed with ash to straw colored marcescent leaf bases. LEAVES 5-14 cm long, 3-25 mm wide, cuneate, usually apically 3-5-toothed or -lobed, each tooth or lobe with an acerose bristle 4-8 mm long, densely clothed with strongly ascending barbellate trichomes to ca. 10 mm long. INFLORESCENCES paniculiform cymes 10-30 cm long, with 5-20 flowers; peduncles mainly 7-17 cm long, often with 1 or 2 foliose bracts. FLOWERS: sepals 3, 8-15 mm long; petals yellow. CAPSULES obovoid to obconic, 12-23 mm long, 7-10 mm wide. SEEDS shiny-black, 2.5-3 mm long, ca. 1.2 mm thick, conspicuously strophiolate. --Heavily gypsic substrates in desert shrub communities not dominated by *Larrea*; Mohave Co.; 550-950 m (1800-3100 ft); Mar-May; Clark Co., NV. Nelson and Welsh (1993) advocate federal listing of *A. californica* as an endangered species due to rapid habitat destruction.

Argemone L. Prickly Poppy
Gerald B. Ownbey

Annual or perennial herbs or shrubs. STEMS 0.5-1.2 m or more tall, 1-many from the base, branched above, all axes determinate, prickly, rarely smooth, glaucous. LEAVES glaucous, often mottled, sessile; margin dentate, each tooth terminated by a spine; blade shallowly to deeply lobed, rarely unlobed, the surface smooth to closely prickly. INFLORESCENCE cymose. FLOWERS conspicuous, perfect, trimerous; buds smooth to prickly; sepals caducous, imbricated each with a single erect subterminal prickle-tipped, saccate process, the sepal horn; petals 6, in two whorls of 3, white or yellow (in ours), pink, purple or bronze; stamens 20-150 or more; ovary unilocular, 3-5-carpellate. FRUITS prickly capsules (rarely smooth), dehiscent apically for about one-third their length, the carpellary wall separating at the sutures from a framework of vascular elements which are attached apically to the persistent style and stigma. SEEDS numerous pitted. $2n = 28, 56, 84, 112$. --31 spp.; s and sw U.S., Mex., C. Amer., S. Amer., HI. (Greek name of a poppy-like plant). Extracts of the plant are used in folk medicine. The alkaloidal constituents of most species have been identified.

- 1. Petals yellow; stamens fewer than 75 *A. ochroleuca*
- 1' Petals white; stamens more than 100.
 - 2. Leaf surfaces usually prickly on and between the veins; main lobes of leaves generally rounded at the apex *A. munita*
 - 2' Leaf surfaces seldom prickly except on the veins, or essentially smooth; main lobes of leaves angular at the apex.
 - 3. Leaves often thickened, hardly coriaceous; middle or lower cauline leaves mostly lobed three-fourths or more to the midrib; leaf surfaces and stems variously prickly.
 - 4. Capsules densely prickly, 40-120 or more prickles per square cm of surface; bud prickles perpendicular, the back of each sepal with 80-120 prickles, the base of each horn with 6-15 prickles.
 - 5. Principal leaves lobed three-fourths to five-sixths to the midrib, the sinuses and lobes subequal in width; mature capsules with 100-120 or more prickles per square cm of surface; apical prickle of sepal horn flattened and indurated at its base *A. pleiacantha* subsp. *pleiacantha*
 - 5' Principal leaves lobed five-sixths to nine-tenths to the midrib, the sinuses 1-5 times the width of the lobes; mature capsules with 40-60 prickles per square cm of surface; apical prickle of sepal horn terete at its base *A. arizonica*

- 4' Capsules less prickly, 20-50 prickles per square cm of surface; bud prickles ascending or perpendicular, the back of each sepal with 10-45 prickles, the base of each horn with 0-5 prickles.
6. Stems glaucous-green; prickles on back of sepals mostly ascending; sepal horns terete when fresh, the apical prickle not much flattened at its base .. *A. gracilentia*
- 6' Stems purplish; prickles on back of sepals perpendicular; sepal horn flattened or angular in cross section when fresh, the apical prickle flattened at its base
..... *A. pleiucantha* subsp. *umbigua*
- 3' Leaves thickened and coriaceous; middle and lower cauline leaves unlobed to lobed three-fourths to the midrib; leaf surfaces with scattered prickles on the main veins below, smooth or nearly so above; stems with widely spaced prickles *A. corymbosa*

Argemone arizonica G. B. Ownbey (of Arizona). --STEMS diffusely branched, often decumbent, very prickly, about 60-80 perpendicular prickles per square cm of surface, the largest prickles 7-10 mm long. LEAVES prickly on the veins beneath, remotely prickly on the midrib above, glabrous between the veins; lower and middle cauline leaves lobed five-sixths to nine-tenths to the midrib, the lobes often five or more times as long as wide, the margin angular at the apex, the sinuses to five times the width of the main lobes; uppermost leaves similar but smaller. FLOWER buds elliptic-oblong; calyx with 80-120 perpendicular prickles per sepal, the sepal horn 12-15 mm long with 7-15 prickles near its base, the apical prickle terete at its base; petals white; stamens 150 or more. CAPSULES fusiform, with 40-60 simple prickles per square cm of surface, the largest prickles 8-10 mm long. --Dry, precipitous slopes along Kaibab Trail, n wall of Grand Canyon, Grand Canyon National Park, Coconino Co.; 900-1500 m (3000-5000 ft); June.

Argemone corymbosa Greene (corymbose). --STEMS sparsely to moderately prickly with perpendicular to declinate prickles. LEAVES thick and coriaceous, smooth to sparsely prickly on the veins beneath, smooth or with scattered prickles on and between the veins above; basal and lower cauline leaves essentially unlobed to lobed; upper leaves half-clasping. FLOWER buds broadly elliptic-obovate; sepals sparingly prickly, the horns smooth, 4-7 mm long, terete or tangentially flattened in cross-section, the apical prickle flattened basally; petals white; stamens ca 100-120. CAPSULES ovate or lanceolate, with about 15-30 prickles per square cm of surface, the longest prickles 3-7 mm long. --2 subspp., both in AZ; CA.

1. Basal and cauline leaves undulate or shallowly lobed to one-fifth to the midrib ... subsp. *corymbosa*
- 1' Basal and cauline leaves lobed one-half to three-fourths to the midrib subsp. *arenicola*

Subsp. *arenicola* G. B. Ownbey (sand dweller). --STEMS with 0-12 prickles per square cm of surface, the largest 2-5 mm long. LEAVES with 0-4 prickles per square cm of surface beneath, smooth above; basal and lower cauline leaves lobed one-half to three-fourths to the midrib, the lobes and sinuses subequal in width; uppermost leaves more shallowly lobed. FLOWERS with 8-15 prickles per sepal, the sepal horn 4-6 mm long. $2n = 56$. --Dry desert valleys, sandy or granitic soils and dunes of n AZ: Coconino Co.; 900-1500 m (3000-5000 ft); May; se UT.

Subsp. *corymbosa* STEMS with 10-15 prickles per square cm of surface, the largest 5-7 mm long. LEAVES with 5-10 prickles per square cm; basal and lower cauline leaves undulate or shallowly lobed one-tenth to one-fifth to the midrib. FLOWERS with 15-25 prickles per square cm; basal and lower cauline leaves undulate or shallowly lobed one-tenth to one-fifth to the midrib. FLOWERS with 15-25 prickles per sepal, the sepal horn 5-7 mm long. --Dry washes, sandy soil, desert foothills: sw Yavapai Co. 700 m (2400 ft); May; San Bernardino and Inyo cos., CA.

Argemone gracilentia Greene (slender). --STEMS glaucous green, with 5-25 perpendicular or declinate prickles per square cm of surface, the largest 7-10 mm long. LEAVES prickly on the veins, about 3-15 prickles per square cm of surface below, 0-5 prickles per square cm above; lower and middle cauline leaves lobed one-fourth to four-fifths to the midrib, the lobes one or two times as long as wide, the margin angular

at the apex, the sinuses and lobes subequal in width; uppermost leaves shallowly lobed or dentate, half-clasping. FLOWER buds subspherical before anthesis; calyx with 10-30 mostly ascending prickles per sepal, the sepal horn 7-12 mm long, with 0-4 prickles near its base, typically terete when fresh, the apical prickle usually not basally flattened or enlarged; petals white; stamens 150 or more. CAPSULES narrowly elliptic, with 20-50 prickles per square cm of surface, the largest prickles 5-10 mm long. $2n = 28$. [*A. intermedia* authors, not Sweet]. --Deserts and foothills, Coconino, La Paz, Maricopa, Mohave, Pima, Pinal, Yavapai, Yuma cos.; 50-1050 m (100-3500 ft); Mar; Baja C., Son., Mex. May hybridize with *A. ochroleuca* and *A. pleiacantha*.

Argemone munita Durand & Hilg. (armored). --STEMS densely to sparingly prickly. LEAVES copiously prickly on the veins and intervein surfaces to sparingly prickly only on the main veins; basal and lower cauline leaves lobed about one-fourth to three-fourths to the midrib, the lobes usually distinctly rounded; uppermost leaves half-clasping. FLOWER buds oblong to elliptic or obovate; sepals variably prickly, the horn terete, angular or flattened in cross-section, the base of the apical prickle usually flattened and indurated; petals white; stamens 150 or more. CAPSULES elliptic, ovate or lanceolate; capsular prickles widely spaced and few to numerous, the largest prickles 6-10 mm long. $2n = 28$. 4 subspp., 2 in AZ; CA, NV, OR, UT; Baja C., Mex.

1. Largest prickles of the stem 4-6 mm long; stems usually purplish; bud prickles sometimes compound subsp. *rotundata*
- 1' Largest prickles of the stem 7-10 mm long; stems greenish-white; bud prickles simple subsp. *argentea*

Subsp. *argentea* G. B. Ownbey (silvery). --Much like subsp. *rotundata* except: STEMS greenish-white, with 70-110 prickles per square cm of surface, the largest prickles 7-10 mm long. LEAVES less prickly, 60-80 prickles per square cm of surface below, 20-40 above. FLOWER buds with sepal horns 7-10 mm long, the base of the apical prickle not so flattened and indurated. CAPSULES with 40-60 prickles per square cm of surface, the largest prickles 7-10 mm long. $2n = 28$. --Washes, sandy or granitic soils, desert: La Paz, Mohave cos.; 450-600 m (1500-2000 ft); Mar-May; se CA, s NV.

Subsp. *rotundata* (Rydb.) G. B. Ownbey (rounded). --STEMS usually purplish, with 25-100 perpendicular or declinate prickles per square cm of surface, the largest 4-6 mm long. LEAVES prickly on and between the veins, about 50-100 prickles per square cm below, 30-100 above; lobes less than one-half to twice as long as wide, mostly broader than the sinuses. FLOWER buds obovate; calyx with 80-120 or more spreading or ascending prickles per sepal, the largest prickles sometimes compound, the sepal horn 6-7 mm long, with about 10-15 prickles near its base, angular in cross-section, the base of the apical prickle flattened and indurated. CAPSULES mostly ovate, with 60-100 prickles per square cm of surface, the largest prickles 6-8 mm long. $2n = 28$. [*A. rotundata* Rydb.] --Deserts and slopes: Coconino, Maricopa, Mohave cos.; 1200-2600 m (4000-8500 ft); May; CA, NV, OR, n UT.

Argemone ochroleuca Sweet (ochre-colored white). --STEMS with scattered, perpendicular or slightly declined prickles, 0-10 per square cm of surface, more abundant upward, the largest prickles 5-10 mm long. LEAVES with scattered prickles on the veins below, 0-4 prickles per square cm, nearly or quite smooth above, lower and middle cauline leaves lobed three-fourths to five-sixths to the midrib, the lobes about 1-1.5 times as long as wide, mostly 3-5 on each side of the midrib, about equaling the sinuses in width; uppermost leaves reduced, more shallowly lobed and distinctly clasping by their broad bases. FLOWER buds oblong, about 1.5 times as long as wide; calyx with 4-10 prickles per sepal, the sepal horn 5-12 mm long, smooth, terete, the apical prickle not basally enlarged; petals pale lemon-yellow, rarely darker yellow; stamens 20-75. CAPSULES ovate-elliptic to oblong with about 10-16 scattered prickles per square cm of surface, the largest ones 6-12 mm long. $2n = 56$. [*A. mexicana* authors, not L.] --2 subspp., 1 in AZ; throughout Mex., its native area uncertain; introduced to tropical and temperate zones, worldwide. Hybridizes with *A. pleiacantha* and, possibly, with *A. gracilentia*.

Subsp. *ochroleuca* --BUDS excluding sepal horns 12-18 mm long, 6-8, broad. FLOWERS 4-7 cm in diameter. STAMENS 40-75. --Weed in disturbed soil: Tucson vicinity and Organ Pipe National Monument, Pima Co.; 600-750 m (2000-2500 ft); Apr-May; introduced to tropical and temperate zones worldwide.

Argemone pleiakantha Greene (many spines). --STEMS purplish, rather closely to sparingly prickly throughout. LEAVES prickly mainly on the vein, less so above, essentially smooth between the veins; lower and middle cauline leaves lobed one-half to five-sixths to the midrib, the lobes one to two times as long as wide, the margin angular at the apex, the sinuses and lobes subequal in width; uppermost leaves either not clasping or subclasping. FLOWER buds subspherical to obovate; calyx with few to many perpendicular prickles per sepal, the sepal horn 6-10 mm long, flattened or angular in cross-section when fresh, the apical prickle usually flattened and indurated at its base; petals white; stamens 150 or more. CAPSULES ovate to elliptic, sparsely to closely prickly. --3 subspp., 2 in AZ; NM; Chih., Son., Mex.

1. Capsules with 100-120 spines and prickles per square cm, the largest 4-6 mm; stems with 40-60 prickles per square cm; uppermost leaves not clasping subsp. *pleiakantha*
- 1' Capsules with 24-36 prickles per square cm, the largest 6-8 mm; stems with 12-24 prickles per square cm; uppermost leaves usually clasping subsp. *ambigua*

Subsp. *ambigua* G. B. Ownbey --STEMS sparsely prickly, with 12-24 perpendicular or declined prickles per square cm of surface, the largest 5-8 mm long. LEAVES with 3-8 prickles per square cm of surface below, 0-5 prickles per square cm above; lower and middle cauline leaves lobed one-half to four-fifths to the midrib; uppermost leaves often clasping. FLOWERS with 15-45 or more perpendicular prickles per sepal, all of them simple; sepal horn 6-10 mm long, with 1-5 prickles near its base. CAPSULAR surface visible, with 24-36 prickles per square cm of surface, the largest ones 6-8 mm long. --Dry, gravelly soil, foothills and mountain valleys: Coconino, Gila, Graham, Maricopa, Mohave, Pinal, Santa Cruz, Yavapai cos.; 1050-2000 m (3500-6500 ft); Apr. Intermediates may be hybrids with subspp. *pleiakantha* and *A. gracilentia*.

Subsp. *pleiakantha* --STEMS very prickly, with 40-60 slender, perpendicular or declined prickles per square cm of surface, the largest 4.5-6.5 mm. LEAVES with 10-20 prickles per square cm of surface below, 4-6 prickles per square cm above; lower and middle cauline leaves lobed three-fourths to five-sixths to the midrib; uppermost leaves not clasping. FLOWERS with 80-120 perpendicular prickles per sepal, the largest prickles sometimes branched; sepal horn 7-10 mm long, with 6-10 prickles near its base. CAPSULAR surface obscured by 100-120 prickles per square cm of surface, the largest ones 4-6 mm long. $2n = 28$. [*A. platyceras* authors, not Link & Otto]. --Dry gravelly soil, foothills and high plains: Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Pinal, Santa Cruz, Yavapai cos.; 750-2300 m (2500-7500 ft); Apr; sw NM; nw Chih., ne Son., Mex. Hybridizes with *A. ochroleuca* and possibly also with *A. gracilentia*.

Eschscholzia Cham. in Nees California-poppy, Gold-poppy
Jeffrey W. Brasher and Curtis Clark

Annual or perennial herbs, the sap colorless or translucent orange. LEAVES basal, often also cauline, glabrous, ternately dissected. FLOWERS in scapes or few- to many-flowered cymes; stalk of each flower terminating in a funnel-shaped cup (variously interpreted as receptacle or hypanthium), the cup sometimes with a spreading rim below sepals (outer rim); sepals 2, connate, calyprate, shed as a unit at anthesis; petals 4 (rarely more), distinct, obovate or wedge-shaped, generally yellow to orange (white or pink), shed after pollination, leaving a crown-like membrane (inner rim); stamens 12-many, distinct; placentae 2; style lacking; stigma lobes 4-8, linear, spreading. CAPSULE cylindric, dehiscent from base. SEEDS many, spheric to ovoid, net-ridged, bur-like, or pitted, tan, brown, or black, 1-2 mm wide. --12 spp., 3 in AZ; w N. Amer. (For J. F. Eschscholtz). The spelling "Eschscholtzia" is incorrect according to the International Code of Botanical Nomenclature. *Eschscholzia californica* subsp. *californica* is cultivated and used in

reclamation planting; the other taxa may merit domestication.

1. Outer rim at least 0.5 mm wide *E. californica*
- 1' Outer rim lacking or less than 0.5 mm wide.
 2. Leaves in a basal tuft; terminal divisions of the leaves linear to filiform, acute, to 5 mm long or longer; petals more than 12 mm long, entirely yellow *E. glyptosperma*
 - 2' Leaves usually both cauline and basal; terminal divisions of the leaves prevailing oblong to linear, broadened at the tips, usually obtuse, the longest often less than 2 mm long; petals 3-8 mm long, yellow, sometimes with a basal orange spot *E. minutiflora*

***Eschscholzia californica* Cham.** (of California). --Annual or perennial herbs 0.5-6 dm tall. LEAVES basal and sometimes also cauline, erect or spreading, glabrous, sometimes glaucous; terminal leaf divisions obtuse or acute, often widened at the tips, 0.5-11 mm long. FLOWERS: bud erect, lance-ovoid, acute to long-pointed; outer rim spreading to recurved, 0.5-6 mm wide; inner rim erect, hyaline, less than 1 mm tall; sepals glabrous, sometimes glaucous, 8-40 mm long; petals orange to yellow, sometimes with a darker orange basal spot, (0.9-) 1.5-7.0 cm long. CAPSULES 3-11 cm long. SEEDS 1.5-1.8 mm wide, spheric to ellipsoid, net-ridged, brown to black. $2n = 12$. --2 subspp., both in AZ, 1 introduced; from WA, UT and TX s to Baja C. Sur and Chih., Mex.

1. Outer rim 2-6 mm wide; plants usually perennial; seedling with bifid cotyledons; plants of reclamation seedings or otherwise cultivated subsp. *californica*
- 1' Outer rim 0.5-2.0 mm wide; plants usually annual; seedling with simple cotyledons; plants native subsp. *mexicana*

Subsp. *californica* California Poppy. --Plants usually perennial, mainly 2-5 dm tall; seedlings with bifid cotyledons. FLOWERS: outer rim 2-6 mm wide; sepals 1-4 cm long. --Plants of reclamation seedings or otherwise cultivated in Coconino, Gila, Maricopa, Mohave, Pima, Santa Cruz, Yavapai cos. and to be expected in all other AZ counties: at least 900-1500 m (3000-5000 ft); Mar-Apr (fr. Apr-May); CA, NV, OR, WA; Baja C., Baja C. Sur, Mex.

Subsp. *mexicana* (Greene) C. Clark (of Mexico) Mexican Gold-poppy. --Plants nearly always annual, mainly 1-3.5 dm tall; seedlings with simple cotyledons. FLOWERS: outer rim 0.5-2.0 mm wide; sepals 3-8 cm long. [*E. mexicana* Greene]. --On mesas, bajadas, and in dry washes in Sonoran Desert scrub and desert grasslands, occasional in Chihuahuan Desert scrub and juniper-oak grasslands: all AZ cos. except: Apache, Coconino, Navajo; 300-1400 m (1000-4600 ft); Feb-May (fr. Mar-Jun); CA, NM, NV, TX, UT; Chih., Son., Mex.

***Eschscholzia glyptosperma* Greene** (sculptured seed). --Annual herbs 0.5-2.5 dm tall. LEAVES all basal or apparently so, ascending to erect (rarely spreading), glabrous, sometimes glaucous; terminal leaf divisions linear to filiform, acute, the longest 5-10 mm or more. FLOWERS: bud generally nodding, ovoid, acute to acuminate; outer rim lacking or less than 0.5 mm wide; inner rim erect, hyaline, less than 0.5 mm tall; sepals glabrous, sometimes glaucous, 8-13 mm long; petals yellow, usually more than 12 mm long. CAPSULES 4-8 cm long. SEEDS spheric or ovate, microscopically pitted, tan to brown, 1.2-1.8 mm wide. $2n = 14$. --In Mojave and Sonoran Desert scrub, often in sandy or gravelly soil: La Paz, Mohave, Yavapai, Yuma cos.; 450-800 m (1400-2600 ft); Feb-May (fr. Mar-Jun); CA, NV, UT.

***Eschscholzia minutiflora* S. Watson** (small flowers). --Annual herbs 0.5-3.5 dm tall. LEAVES basal and usually also cauline, the basal leaves at least twice as long as the cauline ones; leaves erect to spreading, glabrous, gray- or blue-glaucous; terminal leaf divisions obtuse, less than 2 mm long. FLOWERS: bud nodding, ellipsoid-ovoid, short-pointed; outer rim obsolete; inner rim erect, hyaline, less than 0.5 mm tall; sepals glabrous, sometimes glaucous, 4-6 mm long; petals yellow, 3-8 mm long (in ours). CAPSULES 3-6 cm long. SEEDS 1-1.4 mm wide, generally oblong to elliptic, net-ridged, brown to black. $2n = 12, 24, 36$

(36 in ours). --Washes, flats, and slopes in Sonoran and Mojave Desert scrub, commonly in sandy soil: Coconino, La Paz, Maricopa, Mohave, Pima, Pinal, Yuma cos.; 200-1350 m (700-4400 ft); (Jan) Feb-May (fr. Mar-Jun); CA, NV, UT; Baja C., Baja C. Sur, Son., Mex.

Three morphologically overlapping chromosome races have been named as subspecies. Our plants are subsp. *minutiflora*, differing from the other subspecies in having $2n = 36$ rather than $2n = 12$ or 24 and petals 0.3-0.8 cm long rather than 0.6-2.6 cm long.

Platystemon Benth. Cream-cups
Jeffrey W. Brasher

Annual, subscapose herbs, mainly 1-2.5 dm tall, many stemmed, sparsely to moderately covered with long, spreading, soft hairs; sap colorless. LEAVES opposite, whorled, mainly basal or near the stem base, entire, 1.2-5 cm long, linear, sessile or subsessile. FLOWERS solitary; peduncles mainly 10-20 cm long; sepals 6-10 mm long, pilose, the hairs 1-2.5 mm long; petals 6, cream (fading yellow), distinct, deciduous, elliptic, 8-12 mm long or longer; stamens many; filaments flattened; anthers linear; ovary of 6 or more united carpels, these separate in fruit. FRUITS moniliform, 10-20 mm long, linear, beaked, constricted between each of several seeds, breaking at maturity into 1-seeded, indehiscent segments. SEEDS 1 mm long, elliptic to reniform, brown, wrinkled, moderately shiny. $2n = 12$ (plus occasional supernumerary chromosomes). --1 sp.; CA, NV, UT; Baja C., Mex. (Greek *platus* = broad + *stemon* = stamen).

Platystemon californicus Benth. (of California). [*P. arizonicus* Greene, *P. confinis* Greene, *P. mohavensis* Greene]. --Sonoran and other warm desert scrub, desert grassland, and chaparral communities, including both dry upland sites and riparian areas, especially on damp streambanks. Often appearing after a burn: Coconino, Gila, Graham, Maricopa, Mohave, Pima, Pinal, Yavapai cos.; 550-1350 m (1800-4500 ft); Mar-May; CA, NV, UT; Baja C., Mex. Though this genus has been subdivided into as many as 57 species, it seems best to treat it as a single highly variable species.

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REFERENCES

- CLARK, C. 1993. Papaveraceae. Pp. 810-814. In: J. C. Hickman (ed.). The Jepson Manual: Higher Plants of California. University of California Press, Berkeley.
- HANNAN, G. L. 1997. *Platystemon*. Pp. 338-339. In: N. R. Morin (convening ed.). Flora of North America. Vol. 3. Oxford University Press, New York.
- NELSON, D. R. and S. L. WELSH. 1993. Taxonomic revision of *Arctomecon* Torr. & Frém. *Rhodora* 95: 197-213.
- KEARNEY, T. H. and R. H. PEEBLES. 1960. Arizona Flora. University of California Press, Berkeley.
- OWNBEY, G. B. 1958. Monograph of the genus *Argemone* for North America and the West Indies. Mem. Torrey Bot. Club 21:1-159.
- WELSH, S. L. 1993. Papaveraceae. Pp. 508-512. In: S. L. Welsh, N. D. Atwood, S. Goodrich, and L. C. Higgins (eds.). A Utah Flora, ed. 2. Brigham Young University Print Services, Provo, Utah.

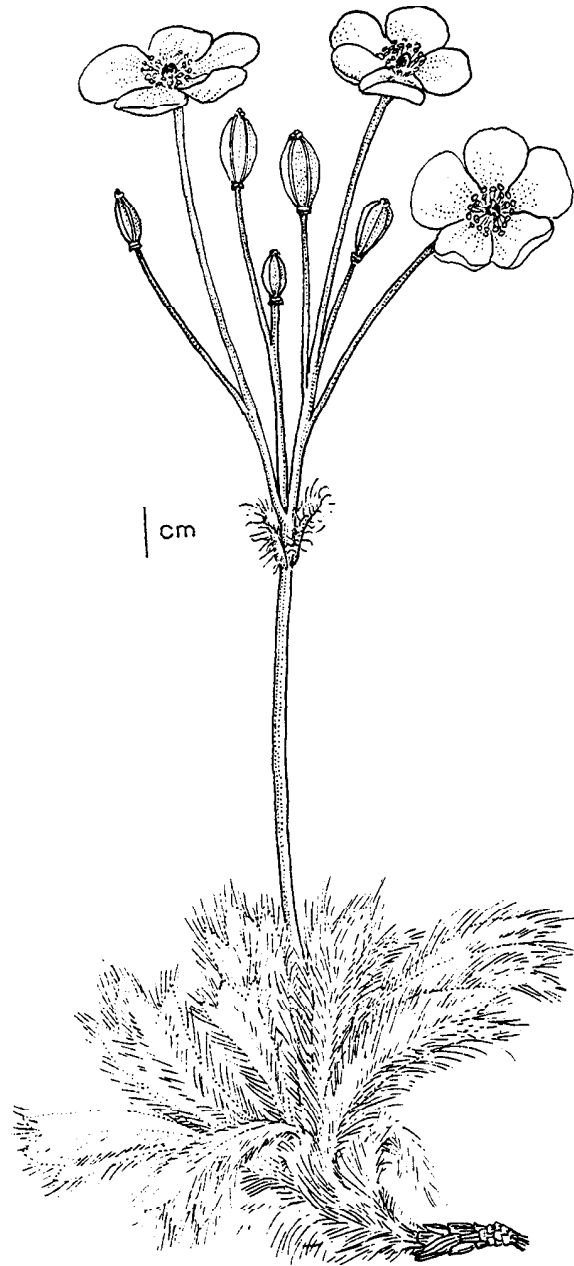


Figure 1. *Arctomecon californica*. From Rhodora 95:197-213, by permission.

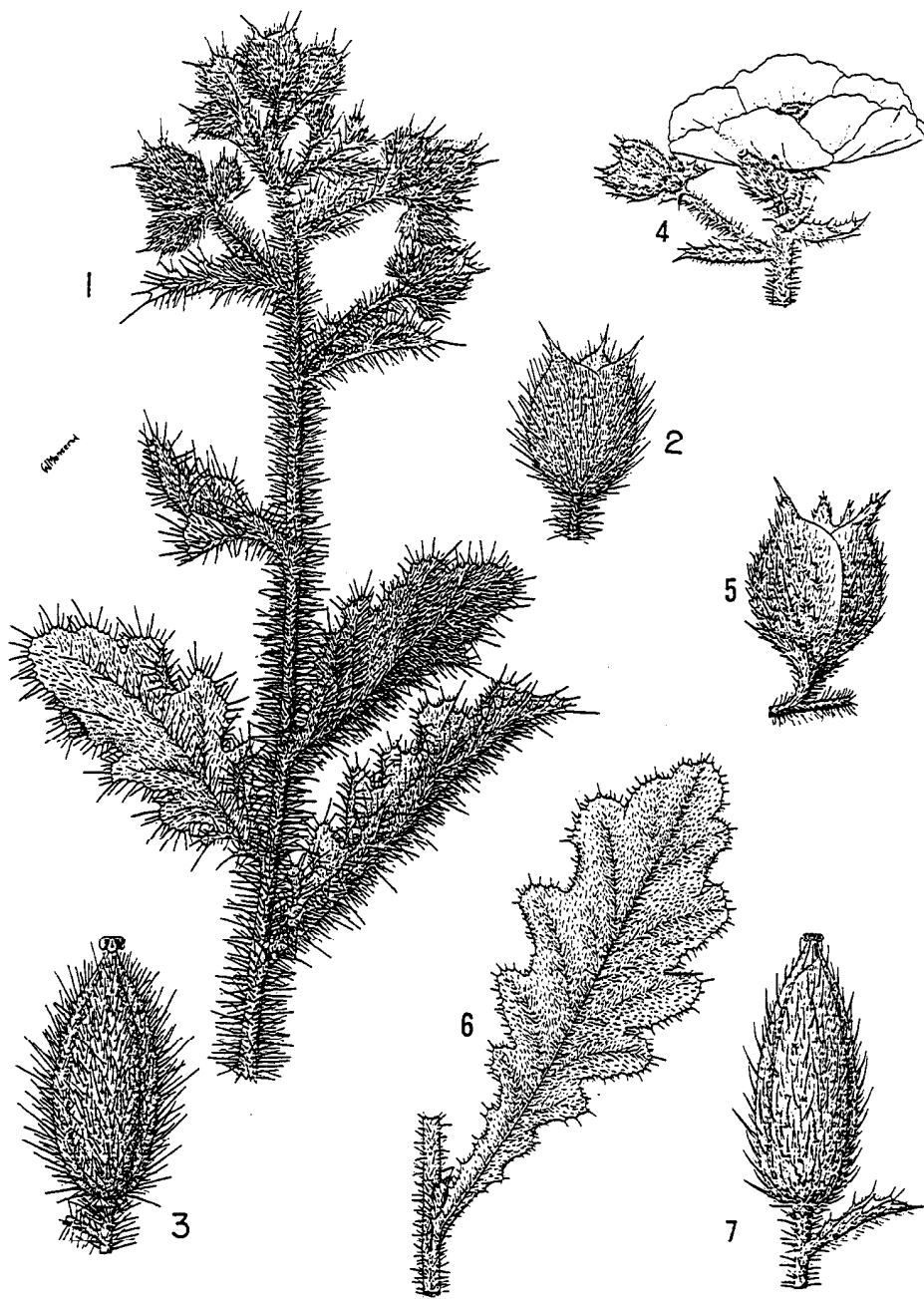


Figure 2. *Argemone munita* subsp. *argentea*: 1, habit x 0.75; 2, bud x 1.5; 3, capsule x 1.5. Subsp. *rotundata*: 4, habit x 0.75; 5, bud x 1.5; 6, lower surface of leaf x 0.75; 7, capsule x 1.5. From Mem. Torrey Bot. Club 21: 76, 85, by permission.

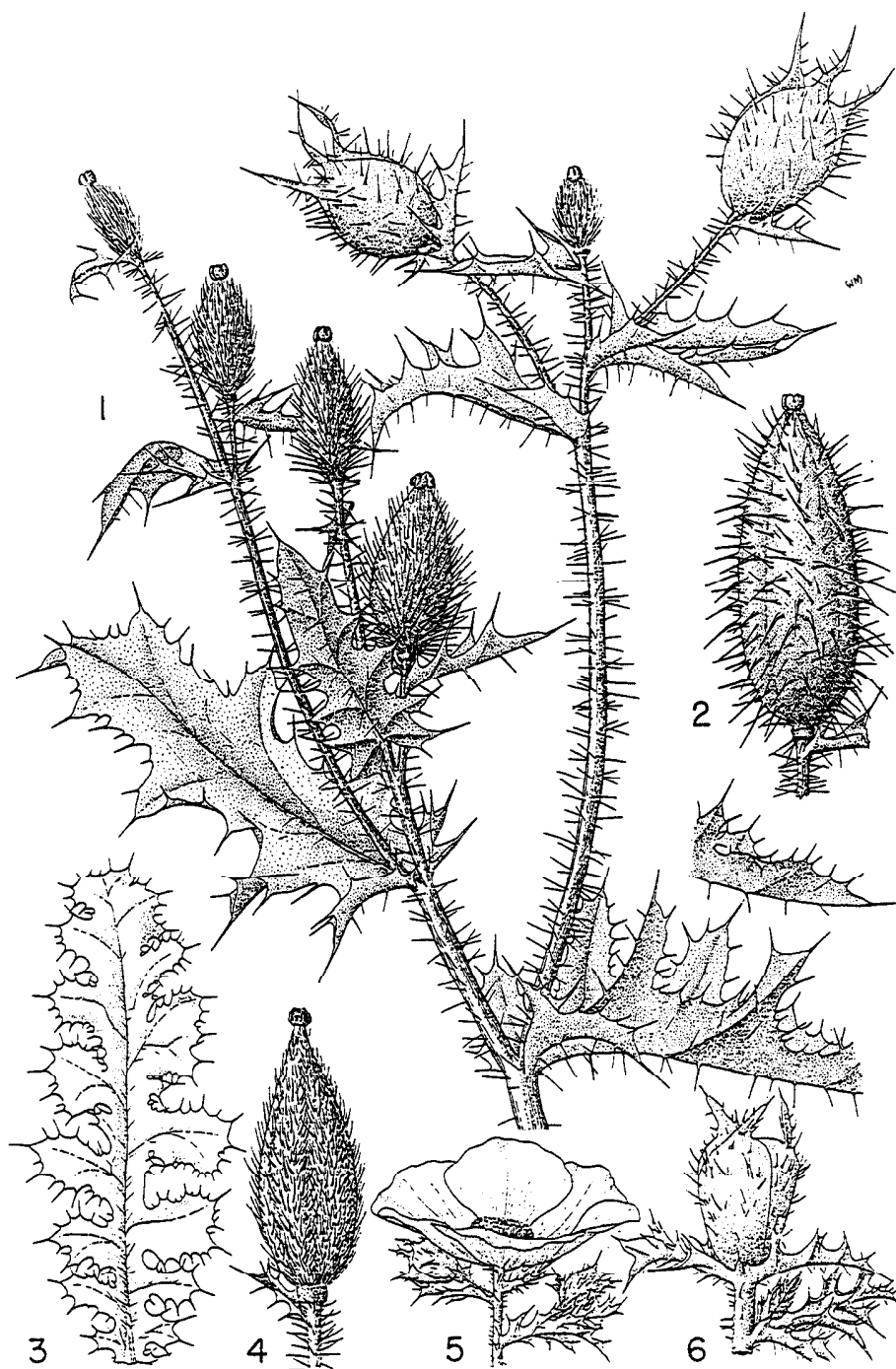


Figure 3. *Argemone pleiacantha* subsp. *ambigua*: 1, habit x 1.5; 2, capsule x 1.5. Subsp. *pleiacantha*: 3, upper surface of leaf x 0.75; 4, capsule x 1.5; 5, flower with huds x 0.75; 6, bud x 1.5. From Mem. Torrey Bot. Club 21: 96, by permission.

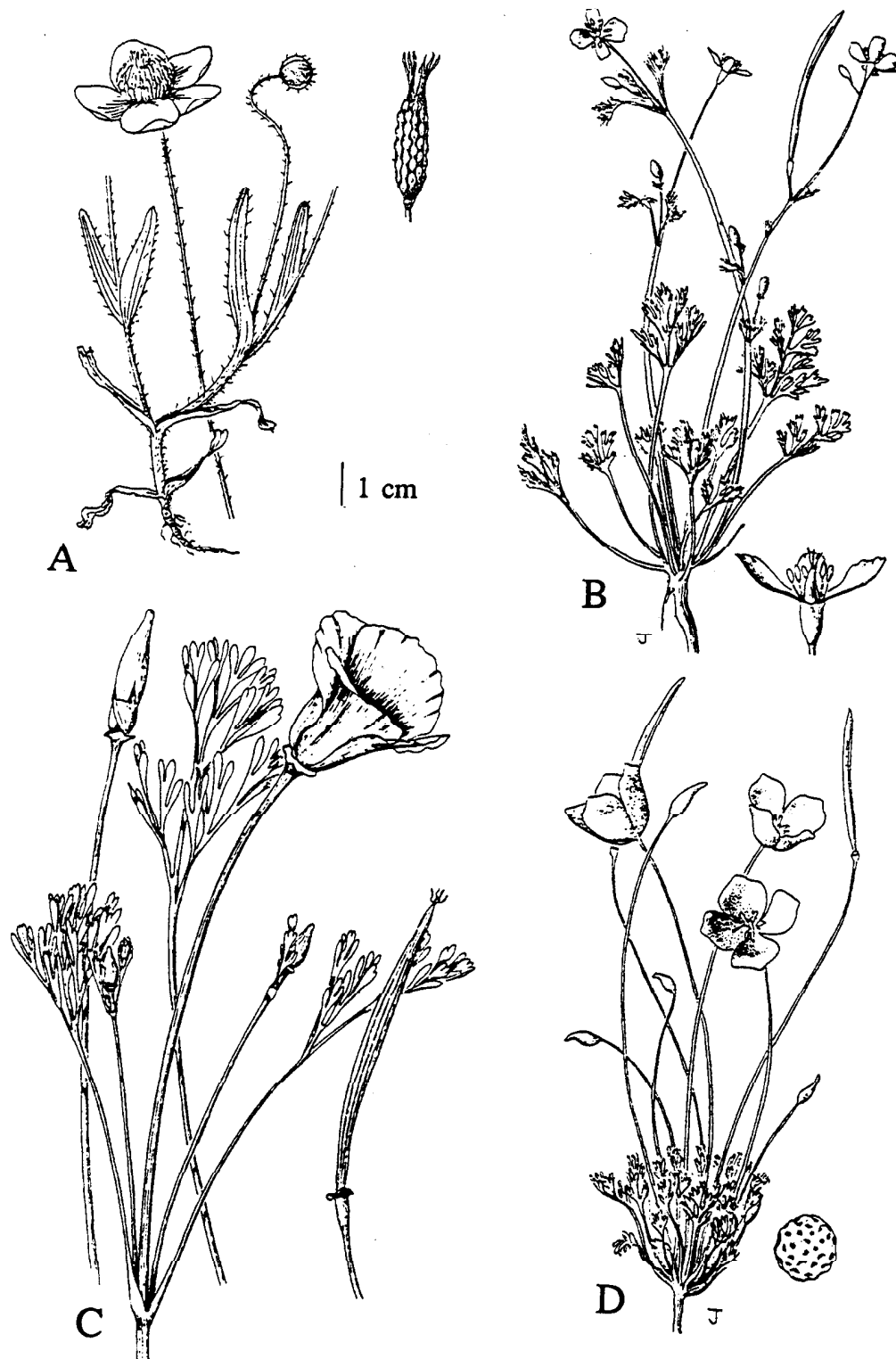


Figure 4. A, *Platystemon californicus*; B, *Eschscholzia minutiflora* with enlarged flower; C, *E. californica* subsp. *californica*; D, *E. glyptosperma* with enlarged seed. Centimeter scale applies to all illustrations except the enlarged flower and seed. From L. Abrams, 1944, Illustrated Flora of the Pacific States, Vol. 2. Stanford University Press, Stanford, California, by permission.

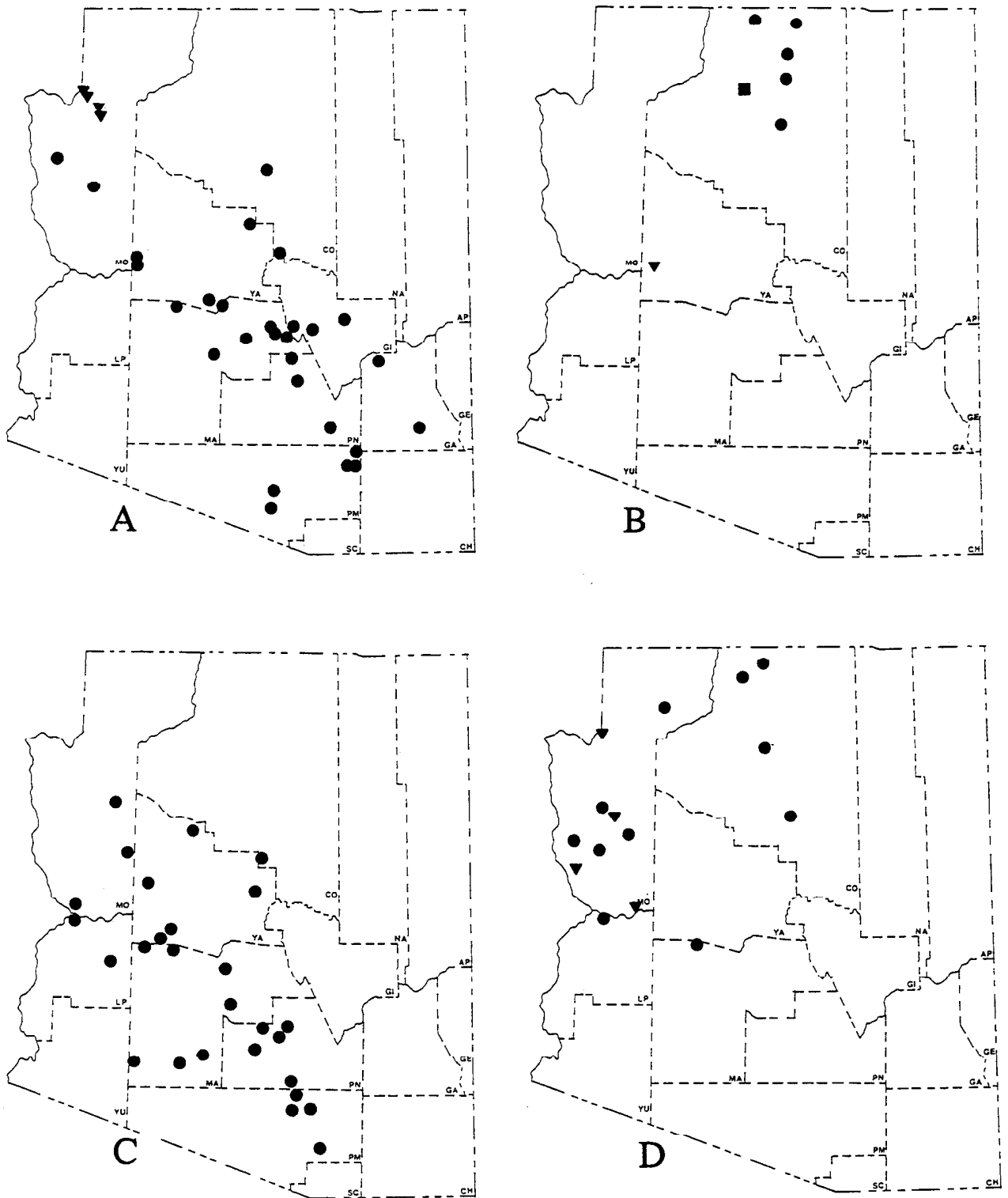


Figure 5. Distributions of: A, *Arctomecon californica* (triangles) and *Platystemon californicus* (dots); B, *Argemone arizonica* (square), *A. corymbosa* subsp. *arenicola* (dots), and *A. corymbosa* subsp. *corymbosa* (triangle); C, *A. gracilentia*; D, *A. munita* subsp. *argentea* (triangles), *A. munita* subsp. *rotundata* (dots).

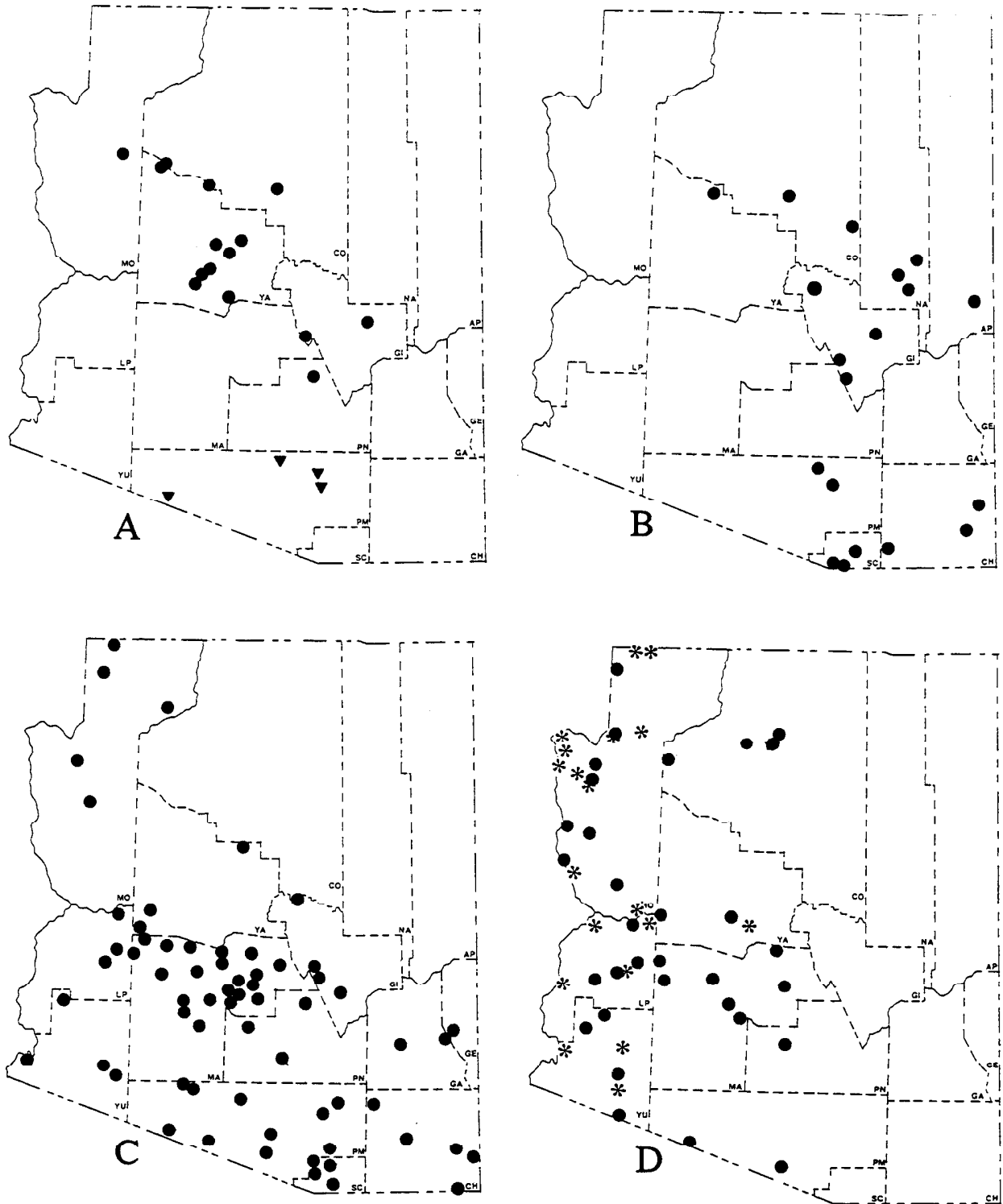


Figure 6. Distributions of: A, *Argemone ochroleuca* subsp. *ochroleuca* (triangles) and *A. pleiacantha* subsp. *ambigua* (dots); B, *A. pleiacantha* subsp. *pleiacantha*; C, *Eschscholzia californica* subsp. *mexicana*; D, *E. minutiflora* subsp. *minutiflora* (dots) and *E. glyptosperma* (asterisks).