LOASACEAE STICKLEAF OR BLAZING-STAR FAMILY

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Plants annual or perennial herbs, shrubs, one species a small tree; hairs diverse, often barbed, sometimes dendritic or stinging, usually unicellular and silicified or calcified. STEMS mostly erect, usually brittle; mature epidermis often white. LEAVES exstipulate, ours alternate, simple and usually toothed or lobed. INFLORESCENCES cymose or sometimes racemose. FLOWERS perfect, actinomorphic, epigynous or rarely perigynous, the hypanthium often extending slightly beyond the ovary as a short tube; sepals 5 (in ours), usually persistent; petals 5 (in ours), sometimes appearing more numerous by development of petaloid staminodia, free or connate; stamens (2), 5 or 10-many, free to epipetalous; pistil (in ours) 3- or 5-carpellate, unilocular; style 1, often persistent. FRUIT a capsule or an achene. SEEDS 1 and subapical or 1-many and parietal; endosperm present or absent. --15 genera, ca. 250 species, New World, except 1 genus in Afr. and Arabia, 1 in Marquesas Islands. Hufford, L. D. 1989. Nordic J. Bot. 9:217-227, and references therein.

1. Fruit an achene; stamens 5.
   2. Flowers in strongly congested cymes; connectives of stamens conspicuously inflated; stinging hairs present ..... ***Cevallia***
   2' Flowers in racemes; connective of stamens not inflated; stinging hairs absent ..... ***Petalonyx***
1' Fruit a capsule; stamens 10-many.
   3. Seeds in numerous rows on each of 5 placentae; stinging hairs present ..... ***Eucnide***
   3' Seeds in 1-2 rows on each of 3 placentae; stinging hairs absent ..... ***Mentzelia***

Cevallia Lagasca

Shrubs or suffrutescent perennials, to 1 m tall; hairs include barbed, stinging and dendritic forms. LEAVES short-petiolate, 2-7.5 cm long, elliptic; lower surface densely covered with dendritic trichomes; margins sinuate-toothed to pinnately lobed; upper leaves subsessile, lanceolate. INFLORESCENCES strongly congested cymes, 1-4 cm in diameter, appearing white from dense covering of trichomes, these 1-1.5 mm long; peduncles bractless, 2-10 cm long. FLOWERS ca. 1 cm long at anthesis; subtending bract linear; calyx persistent, the lobes linear, appearing plumose with long trichomes; petals distinct, linear, also plumose, persistent, yellowish; stamens 5, shorter than the petals, opposite the sepals, persistent, distinct and free; connective prolonged much past the anthers, inflated, yellow; pistil 3-carpellate, the style short, the stigma conical, level with lower portions of the anthers. ACHENES ca. 1.5(-2) cm long including the persistent floral parts, the seed-containing portion 3-4 mm long. SEED 1, subapical; testa non-sculptured; endosperm lacking. $x = 7$. --A monotypic genus.

Cevallia sinuata Lagasca (leaves with wavy margins). $2n = 26$ in ours. --Scattered along washes, rocky slopes or outcrops, roadsides, often on limestone or gypsum; a mostly Chihuahuan Desert species (Map 2A): Cochise, Graham, Greenlee, Pinal cos.; 700-1600 m (2300-5200 ft); Jun-Oct; s NM, sw TX to sw OK; s to c Mex.

Eucnide Zucc. Rocknettle

Suffrutescent perennials; hairs barbed, some stinging. LEAVES mostly petiolate; blades elliptic, broadly ovate to suborbicular, often cordate; margins lobed, crenate, toothed or incised. INFLORESCENCES cymose. FLOWERS subtended by 1 often leaf-like bract; calyx persistent, the lobes linear to lanceolate; petals greenish, white to cream, yellow or orange-red, either basally coherent and adherent to staminal tube or clearly sympetalous and the stamens epipetalous; stamens ca. 20-100, shorter or longer than the petals,

the filaments linear, connate into a short tube; pistil 5-carpellate; stigmas 5, the lobes appressed and appearing as grooves or a terminal tuft of hairs. CAPSULES apically dehiscent by 5 valves. SEEDS numerous, 0.5-1.5 mm long, parietal; testa longitudinally striate; endosperm lacking. $x = 21$. [*Sympetaleia* A. Gray]. --14 spp.; sw U.S. to Guatemala. (Greek: *eu* = true + *knide* = nettle). These species characteristically grow from crevices of rock faces or on very steep rocky slopes.

1. Flowers showy; corolla funnelform, white to cream ..... ***E. urens***
1' Flowers inconspicuous; corolla tubular, the tube yellow, the lobes green ..... ***E. rupestris***

Eucnide rupestris (Baillon) H. J. Thompson & W. R. Ernst (of rocks). --STEMS 1-several, 4-35 cm long. LEAVES ovate to suborbicular; petiole 1-6 cm long; blade 1.5-7 cm long, 1.5-8 cm wide; margin short-toothed, usually lobed; uppermost leaves short-petiolate. FLOWERS inconspicuous; calyx lobes oblong, 0.8-1 cm long; corolla sympetalous, tubular, 9-18 mm long, the tube 6-14 mm long, yellowish, the lobes 3-4 mm long, green, erect; stamens epipetalous, included; filaments to 2 mm long; style included, not exceeding stamens. CAPSULES reflexed, to 1 cm long excluding calyx lobes. $2n = 42$. [*Sympetaleia rupestris* (Baillon) A. Gray ex S. Watson]. --Known in AZ from only two collections: near Cabeza Prieta Tanks, Yuma Co.; Rancho Bonito, La Abra Valley, Pima Co. (Map 2B); 350-500 m (1100-1500 ft); Dec-Feb; s CA; Baja C., Son., Mex.

Eucnide urens (Parry ex A. Gray) Parry (stinging). --STEMS usually several, to ca. 1.5 m long. LEAVES mostly ovate to suborbicular; petiole 1-6 cm long; blade 1-7 cm long, 0.5-6 cm wide; margin coarsely toothed, not lobed; uppermost leaves sessile, cordate-clasping. FLOWERS showy; calyx lobes lanceolate, 1.5-2 cm long; corolla basally connate, funnelform, 2-5.5 cm long, white to cream, the tube 2-4 mm long; stamens basally adnate to petals, included, the filaments 1.5-2.5 cm long; style included, slightly exceeding stamens. CAPSULES erect, to 2 cm long excluding calyx lobes. $2n = 42$. --Mostly along the Colorado R. (Map 2B): Coconino (Grand Canyon), n La Paz, Mohave cos.; 200-1200 m (600-4000 ft); Feb-Jun; s NV, s CA; nw Mex.

Another showy, white-flowered taxon, *E. hypomalaca* Standley, (corolla tubular, to ca. 4 cm long, the style and stamens exserted), approaches se AZ but is not known to occur north of Mexico.

Mentzelia L. Blazing-star, Stickleaf

Annuals or perennials, ours herbaceous to suffrutescent; hairs often barbed, not stinging. LEAVES sessile (including those with blades narrowing gradually to the base) or distinctly petiolate; blades linear, lanceolate to elliptic, ovate or oblanceolate; margins dentate to pinnately lobed, sometimes crenate or entire. INFLORESCENCES cymose. FLOWERS subtended by 0-several, leaf-like to linear bracts; calyx mostly persistent, the lobes lanceolate to subulate; petals distinct or basally coherent and adherent to filaments, deciduous, white to yellow or orange; stamens 10-ca. 300, shorter than the petals, free or basally coherent, those of outer whorls often with broad filaments and often forming petaloid staminodia; pistil (in ours) 3-carpellate, exceptionally more; stigmas 3 appressed lobes but appearing as 3 grooves, sometimes separating in age. CAPSULES apically dehiscent by 3 valves. SEEDS 10-many, rarely fewer, 1-4 mm long, parietal; testa diversely sculptured, smooth, reticulate or striate at low magnification; endosperm present. $x = 14$. --At least 100 spp.; New World. (for C. Mentzel). The sections are sufficiently distinctive that several have occasionally been treated as separate genera. Fruit measurements (and the term "body") refer to the seed-containing portion, exclusive of the calyx lobes when these persist. Specimens that are depauperate or that lack mature fruits and seeds may be impossible to identify.

1. Seeds and ovules projecting horizontally from the placentae, in two distinct rows per placenta; capsules five or fewer times as long as wide.
   2. Outer filaments with two lateral teeth near apex; seeds not winged; annuals; section ***Bicuspidaria***.
      3. Floral bracts scarious, with green margins, mostly obscuring the ovary; fruits erect; seeds.

not constricted near the middle ..... *M. involucrata*

3' Floral bracts completely green, the ovary easily visible; at least the first-formed fruits reflexed; seeds constricted near the middle .....*M. tricuspis*

2' Outer filaments lacking teeth; seeds winged; perennials; section ***Bartonia***.

4. Petals with trichomes covering the majority of the outer surface; both capsules and petals usually 10 mm long or less; plants of sand in extreme n AZ ..... *M. cronquistii*

4' Petals with trichomes restricted to the apex; both capsules and petals often exceeding 10 mm long; plants not restricted to both sand and extreme n AZ.

5. Leaves mostly linear, mostly entire, to 5 cm long and 3 mm wide; stems to 25 cm tall; capsules 3-5 mm long; plants of gypsum; n Mohave Co ..... *M. polita*

5' Leaves elliptic, oblanceolate, lanceolate or ovate, or, if linear, then either not entire or longer than 5 cm or wider than 3 mm; stems often exceeding 25 cm tall; capsules 6-30 mm long; plants mostly not on gypsum; distributions various.

6. Plants of cinders in c Coconino Co, to 35 cm tall; leaves to 5 cm long; petals to 11 mm long; style to 7 mm long ..... *M. collomiae*

6' Plants not of cinders in c Coconino Co or, if so, commonly exceeding 35 cm tall; leaves to 15 cm long; petals to 23 mm long; style mostly more than 10 mm long.

7. Plants to 1.5 m tall; branches relatively short and restricted to upper half of stem; petals usually white when fresh; capsules often exceeding 2 cm long; at elevations above ca. 6000 ft.

8. Petals erect-spreading, less than 25 mm long; native..... *M. rusbyi*

8' Petals wide-spreading, usually exceeding 25 mm long; probably escaped from cultivation ..... *M. nuda*

7' Plants to 80 cm tall, often shorter; branches often relatively long and mostly produced to base of stem (unless plant is depauperate or stems are crowded), petals yellow when fresh, rarely nearly white; capsules rarely exceeding 2 cm long; mostly at elevations below ca. 7000 ft.

9. Leaves pinnatifid, divided to within 1 mm of the midrib; lobes linear, 1-2 mm wide, ca. 1 cm apart; plants possibly of e Apache Co ... *M. laciniata*

9' Leaves entire to lobed, if pinnatifid the lobes broader or more closely spaced; plants variously distributed.

10. Leaves obovate to broadly elliptic or lanceolate, to 6 cm long; plants to 35 cm tall.

11. Style mostly 10-15 mm long; upper leaf bases distinctly broadened and clasping, lacking prominent basal lobes ..... *M. pterosperma*

11' Style 4-10 mm long; upper leaf bases not to slightly broadened, at most slightly clasping, basal lobes often prominent ..... *M. puberula*

10' Leaves narrowly elliptic to lanceolate, rarely oblanceolate, to 15 cm long; plants to 80 cm tall.

12. Stems glabrous or nearly so; fruits broadly cylindric to cup-shaped; upper leaf bases frequently with conspicuously clasping lobes but not with clasping bases; plants of n Mohave Co. ..... *M. integra*

12' Stems scabrous; fruits cylindric, rarely broadly so; upper leaf bases frequently conspicuously clasping, clasping basal lobes present or absent; plants more widely distributed.

13. Style mostly 10-14 mm long; capsules mostly 10-20 mm long; leaves commonly narrowly elliptic to lanceolate; plants to 80 cm tall ..... *M. multiflora*

13' Style 4-10 mm long; capsules 6-12 mm long; leaves commonly obovate to broadly elliptic or lanceolate; plants to 45 cm tall ..... *M. puberula*

1' Seeds and ovules pendulous, parallel to the placentae, appearing as if in one row per placenta; capsules more than five times as long as wide, rarely broader.

14. Placentae filiform; testa cells isodiametric; rarely a few leaves clearly petiolate, the blades not hastately lobed; annuals; section ***Trachyphytum***.

15. Capsules linear, strongly ribbed and becoming woody at base; seeds in upper half of capsule triangular in cross-section; petals less than 5 mm long ..... *M. affinis*

15' Capsules tapering at least at the base, not strongly ribbed, not woody at base; seeds in upper half of capsule irregular in cross-section; petals 1-40 mm long.

16. Petals 8-40 mm long; bracts green; style distinctly exceeding calyx lobes in fruit.

17. Petals 8-20 mm long; capsules often arched; testa cells pointed-papillate; a widespread native species ..... *M. jonesii*

17' Petals 15-40 mm long; capsules straight; testa cells low domes; an occasional escape from cultivation ..... *M. lindleyi*

16' Petals 1-6 mm long, or, if to 10 mm long, then the bracts with whitish bases; style shorter than to only slightly exceeding calyx lobes in fruit.

18. Bracts with whitish bases, mostly attached to ovary, mostly ovate to obovate and few-toothed; fruits straight, rarely slightly curved.

19. Cauline leaves often entire; petals 2.5-10 mm long; fruits mostly 10-16 mm long; a relatively slender plant, not very leafy ..... *M. montana*

19' Cauline leaves mostly toothed to lobed; petals 4-10 mm long; fruits 15-30 mm long; a relatively more robust plant, rather leafy ..... *M. veatchiana*

18' Bracts rarely with whitish bases, mostly attached below ovary, mostly ovate to linear-lanceolate, entire; fruits (especially the first-formed) often markedly arched.

20. Seeds with sharp angles between facets; testa cells pointed-papillate; bracts mostly linear-lanceolate ..... *M. albicaulis*

20' Seeds with rounded angles between facets; testa cells flat or with a low dome; bracts mostly ovate.

21. Testa cells flat; capsules nearly linear ..... *M. desertorum*

21' Testa cells domed; capsules long-tapering ..... *M. obscura*

14' Placentae broad; testa cells markedly elongate; most leaves clearly petiolate, the blades often hastately lobed; annuals and perennials; section *Mentzelia*.

22. Annuals; rootstock slender; main stem 1, erect.

23. Leaves long-lanceolate, the basal lobes narrow, often prominent; capsule long-tapering to base ..... *M. isolata*

23' Leaves mostly ovate, the basal lobes broad, sometimes tooth-like; capsule long-tapering to base or cylindric.

24. Capsule long-tapering, sessile; outer filaments slightly dilated; leaves often exceeding 8 cm in length ..... *M. aspera*

24' Capsule cylindric, pedicellate; outer filaments linear; leaves rarely exceeding 4 cm in length ..... *M. asperula*

22' Perennials; rootstock thickened; main stems usually several, divergent to scandent.

25. Seeds 1-3(-4) per capsule, oblong; fruits clavate, most reflexed; petals usually less than 1 cm long, with trichomes on most of the dorsal surface ..... *M. oligosperma*

25' Seeds ca. 10 per capsule, constricted near hilum; fruits cylindric, erect; petals usually more than 1 cm long, with trichomes at apex only ..... *M. lindheimeri*

Mentzelia affinis Greene (related). --Annuals. STEMS to 50 cm tall. LEAVES to 14 cm long, sessile, oblanceolate, narrowly elliptic or nearly linear; margin mostly toothed to lobed. BRACTS lanceolate to ovate, green, mostly not on ovary; margins entire or few-toothed to -lobed. FLOWERS sessile; petals yellow, 2-4.5 mm long, 1-2.5 mm wide; staminodia 0; stamens ca. 15-30, all with linear filaments; style 1-2.5 mm long. CAPSULES narrowly cylindric, linear, not tapering to base; base with woody ribs; body (6-)10-28 mm long, straight or arching to 90 degrees. SEEDS pendulous, not winged, those in upper half of capsule prismatic, 3-faceted, 3-angled in cross-section; testa cells with straight adjoining walls, the surface walls flat-topped. $2n$ = 18, 36. --Mostly Sonoran Desert (Map 2C): Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Yavapai, Yuma cos; 300-1350 m (1000-4500 ft); Jan-May; CA; nw Son., Baja C., Mex. Best recognized by linear, strongly ribbed fruits that become woody at the base and its three-angled seeds.

Mentzelia albicaulis Hook. (white-stemmed). --Annuals. STEMS to 45 cm tall. LEAVES to 15 cm long, sessile, narrowly elliptic to lanceolate; margins mostly lobed, often with teeth in the sinuses. BRACTS narrowly lanceolate to ovate, green, sometimes with faintly whitish bases, mostly not on ovary; margins entire or few-toothed. FLOWERS sessile; petals yellow, 2-5 mm long; staminodia 0; stamens ca. 15-30, all with linear filaments; style 2-4 mm long. CAPSULES clavate, often long-tapering to base; base not woody; body 8-28 mm long, straight or arched less than 180 degrees. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted, irregular in cross-section, the angles sharp; testa cells with straight adjoining walls, the surface walls pointed-papillate. $2n$ = 54, 72. [*M. albicaulis* var. *gracilis* J. Darl.]. --Upper elevations of warm deserts to chaparral and Great Basin Desert on a variety of soil types (Map 3A): Apache, Cochise, Coconino, Gila, Graham, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai cos; 300-2250 m (1000-7400 ft); Feb-Jun; CA, CO, ID, NM, NV, OR, UT, WA, WY; British Columbia, Baja C., n Son., Mex. This intergrades in AZ with *M. montana*.

Mentzelia aspera L. (rough). --Annuals. STEMS 20-75 cm tall. LEAVES (6) 8-18 cm long, 4-8 cm wide; petiole 1.5-6.5 cm long; blade ovate, often broadly so, with two large teeth near base; uppermost leaves sublanceolate. FLOWERS sessile; calyx usually deciduous; petals orange, 6-10 mm long, 5 mm wide, with trichomes at apex only; staminodia 0; outer stamens with slightly broadened filaments; style ca. 3 mm long. CAPSULES clavate, long-tapering to base, erect; body 2.4-3 cm long. SEEDS 5-6, pendulous, not winged, blocky in outline except for the protruding hilum end; testa cells elongate, the surface striate. $2n$ = 20. --Rocky slopes (Map 2C): Cochise, Santa Cruz cos.; 1050-1850 m (3500-6000 ft); Aug-Sep; s to Mex., W. Ind., S. Amer., including the Galapagos Islands.

Mentzelia asperula Wooton & Standl. (slightly rough). --Annuals. STEMS 18-25 cm tall. LEAVES 2-4 cm long, 1.5-3 cm wide; petiole 0.5-1 cm long; blade broadly ovate, with two large teeth near base; uppermost leaves sublanceolate. FLOWERS with pedicel 1-2(-7) mm long; petals orange, 4-15 mm long, 2-6 mm wide, with trichomes mostly at apex; staminodia 0; stamens all with linear filaments; style 3-9 mm long. CAPSULES cylindric, erect; body 7-15 mm long. SEEDS 7-12, pendulous, not winged, blocky in outline except for the protruding hilum end; testa cells elongate, the surface striate. $2n$ = 20, 40. --Rocky slopes; a mostly Chihuahuan Desert species (Map 2D): Cochise Co.; 1500-2150 m (5000-7000 ft); Aug-Oct; s NM, s TX; to c Mex.

A somewhat similar taxon from Baja C., *M. adhaerans* Benth., has recently been found in the Pinacate region of nw Sonora, Mex., and should be looked for in adjacent sw AZ. It would key here to *M. asperula,* but differs by having nearly isodiametric seed coat cells and distinctive "double grappling-hook" trichomes (small trichomes with a smooth or few-barbed shaft with a cap of 4-6 recurved barbs at each end) on its ovaries and fruits.

Mentzelia collomiae Christy (for R. E. Collom). --Perennials. STEMS to 35 cm tall, potentially producing branches along their entire length. LEAVES to 5 cm long, to 14 mm wide, sessile, oblanceolate or narrowly elliptic to lanceolate; margins toothed to shallowly lobed; upper leaves with slightly clasping

bases or basal lobes. FLOWERS pedicellate, subtended by 1-2 linear-lanceolate, entire to few-lobed bracts; petals yellow, 5-11 mm long, 2-4 mm wide, with trichomes at apex only; staminodia 3-5, often with an anther, clearly narrower than petals; stamens with slightly broadened filaments few; style (3-)5-7 mm long; stigmatic papillae inconspicuous. CAPSULES cylindric, 6-17 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with straight adjoining walls, the surface walls with a finely cobble-stone dome. $2n = 22$. --Known only from the area of Sunset Crater and from Red Mountain, where it is restricted to relatively undisturbed, open cinder areas (Map 2D): c Coconino Co.; 1900-2450 m (6200-8000 ft); Jun-Oct. A slender, wand-like plant, sparsely-branched unless injured or extremely robust.

Mentzelia cronquistii H. J. Thompson & Prigge (for A. Cronquist). --Perennials. STEMS to 60 cm tall, producing branches along their entire length. LEAVES to 10 cm long, to 2 cm wide, sessile, oblanceolate to narrowly elliptic or lanceolate; margins toothed to lobed; upper leaves with slightly clasping bases or basal lobes. FLOWERS pedicellate, subtended by 0-2 linear-lanceolate entire bracts; petals yellow, 5-10(-15) mm long, 1.5-5 mm wide, with trichomes covering the outer surface; staminodia 3-5, slightly shorter and narrower than petals; outer 1-2 whorls of stamens with broadened filaments; style 4-8 mm long; stigmatic papillae forming a slight tuft. CAPSULES cylindric, subglobose when short, 4-10(-15) mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with curved to wavy adjoining walls, the surface walls with 15-20 small bumps. $2n = 20$. --Commonly on sand (Map 3B): n Coconino Co.; 650-1900 m (2200-6200 ft); Apr-Nov; sw CO, nw NM, se UT. Reported from n Apache and n Mohave cos, but I have not seen these specimens. Best recognized by the relatively small flowers and fruits and the trichomes that cover the dorsal surface of its often relatively narrow petals.

Mentzelia desertorum (Davidson) H. J. Thompson & J. E. Roberts (of deserts). --Annuals. STEMS to 40 cm tall. LEAVES to 12 cm long, sessile, nearly linear to narrowly elliptic or lanceolate; margin mostly toothed to lobed. BRACTS (lanceolate) ovate, green, mostly not on ovary; margins usually entire. FLOWERS sessile; petals yellow, broadly to narrowly obovate, 2.5-4 mm long, 1.5-2.5 mm wide; staminodia 0; stamens ca. 15-30, all with linear filaments; style 2-4 mm long. CAPSULES very narrowly clavate, long-tapering to base; base not woody; body 12-30 mm long, arching to 180 degrees. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted; irregular in cross-section, the angles rounded; testa cells with straight adjoining walls, the surface walls flat. $2n = 18$. --On sand (Map 2A): La Paz, Mohave, w Pima,Yuma cos; 50-500 m (200-1700 ft); (Feb-) Mar-May; CA; Baja C., nw Son., Mex. Best recognized by very slender fruits, often prominent bracts and seed characters.

Mentzelia integra (M. E. Jones) Tidestrom (entire, referring to the leaf margins). --Perennials. STEMS glabrous or with sparse, diminutive trichomes, to 60 cm tall, producing branches along their entire length. LEAVES to 14 cm long, to 2.5 cm wide, sessile, narrowly elliptic to lanceolate; margins entire or shallowly toothed to lobed; upper leaves often only slightly broadened at base and with clasping basal lobes. FLOWERS pedicellate, subtended by 0-1(-2) linear-lanceolate entire bracts; petals yellow,10-20 mm long, 4-6 mm wide, with trichomes at apex only; staminodia (0)5, slightly smaller than the petals; outer 1-2 whorls of stamens commonly with broadened filaments; style 6-10 mm long; stigmatic papillae forming a slight tuft. CAPSULES cup-shaped to broadly cylindric, (5-)9-15 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with curved to wavy adjoining walls, the surface walls with ca. 10 bumps. $2n = 20$. [*M. multiflora* var. *integra* M. E. Jones] --Commonly on sandy or gravelly soils, somtimes on cinders (Map 2A): n Coconino, n Mohave cos.; 350-1850 (-2150) m (1100-6000 (-7000) ft); Apr-Nov; s NV, sw UT. Similar to *M. multiflora*, but differing in chromosome number and seed surface characters. Best recognized by its often nearly glabrous stem and widely spaced flowers and broad fruits.

Mentzelia involucrata S. Watson (involucrate bracts). --Annuals. STEMS 2.5-35 cm tall. LEAVES 2.5-16 cm long, 0.4-5 cm wide, sessile, lanceolate to elliptic; margins dentate or lobed to pinnatifid; upper leaves with a broad to markedly clasping base. BRACTS 2-several, ovate to elliptic, scarious with green margins, obscuring ovary. FLOWERS pedicellate; petals light yellow to cream, each with a horizontal orange band

at base, 1-4.5 cm long, 0.5-2 cm wide; staminodia 0; stamens ca. 100, the outer filaments broadened and 3-toothed at apex; styles 10-20 mm long; papillae of stigmas not conspicuous. CAPSULES cylindric, 1-3 cm long, erect. SEEDS horizontal, not winged, subrectangular, flattened, tapered at hilum end but not constricted; testa cells with straight adjoining walls, the surface walls mostly smooth. $2n = 18$. --Roadsides, rocky slopes, washes (Map 3C): Coconino (Grand Canyon), La Paz, Maricopa, Mohave, Pima, Pinal, Yavapai, Yuma cos; 250-900 m (700-2900 ft); Feb-May; s CA; Baja C., Son, Mex. Specimens with petals at least 35 mm long have been called var. *megalantha* I. M. Johnston; the variation possible in petal length within a single plant argues against recognition of this variety.

Mentzelia isolata H. S. Gentry (for its apparent geographic isolation from related species). --Annuals. STEMS 8-45 cm tall. LEAVES 2-14 cm long, 0.5-4.5 cm wide; petiole 0.5-2.5 cm long; blade lanceolate, the basal ones sometimes elliptic, with 2 (or 4) prominent basal lobes; uppermost sublinear and entire. FLOWERS sessile; calyx usually persistent; petals orange, 5-7 mm long, 3-4 mm wide, with trichomes at apex only; staminodia 0; outer stamens with very slightly broadened filaments; style 4-5 mm long. CAPSULES clavate, long-tapering to base, erect; body 2-3 cm long. SEEDS 8-12, pendulous, not winged, blocky in outline except for the protruding hilum end; testa cells elongate, striate. $2n = 20$. --Washes, grasslands, canyons, rocky slopes (Map 3D): Cochise, sw Graham, e Pima, Santa Cruz cos.; 1050-1850 m (3500-6000 ft); Aug-Oct; s to Sin., Mex. The most common species in section *Mentzelia* in AZ. Often misidentified as *M. texana* Urban & Gilg, which is not known to occur in AZ.

Mentzelia jonesii (Urban & Gilg) H. J. Thompson & J. E. Roberts (for M. E. Jones). --Annuals. STEMS to 60 cm tall. LEAVES to 15 cm long, sessile, elliptic to lanceolate; margin toothed to pectinately lobed. BRACTS ovate to lanceolate or triangular, green, mostly not on ovary; margins few-toothed to entire. FLOWERS sessile; petals yellow, 8-20 mm long, (3-)5-10 mm wide; staminodia 0; stamens ca. 30-50, all with linear filaments; style 5-10 mm long. CAPSULES clavate, long-tapering to base; base not woody; body 20-38 mm long, S-shaped or arching to 180 degrees. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted, irregular in cross-section, the angles sharp; testa cells with straight adjoining walls, the surface wall pointed-papillate. $2n = 36, 54$ [*M. nitens* var. *leptocaulis* J. Darl., *M. nitens* var. *jonesii* (Urban & Gilg) J. Darl.] --Deserts to low chaparral (Map 3B): nw Cochise, Coconino (Grand Canyon), w Gila, w Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Yavapai, Yuma cos.; 200-1300 (-1600) m (600-4200 (-5300) ft); Jan-Jun; CA, NV. When robust, the stems of this taxon often sprawl or scramble through shrubs.

Two similar species, *M. eremophila* (Jepson) H. J. Thompson & J. E. Roberts and *M. nitens* Greene have been reported to occur in AZ but I have seen no specimens of them. These taxa are both found mostly in the Mohave Desert and are diploid ($2n = 18$). They can be distinguished from *M. jonesii* because they possess seeds with rounded angles, domed testa cells and folded hilum ends. These taxa can be distinguished from each other by the mostly larger flowers (petals 10-25 mm long) of *M. eremophila* (vs. petals 7-15 mm long in *M. nitens*).

* **Mentzelia laciniata** (Rydb.) J. Darl. (laciniate leaves). --Perennials. STEMS to 50 cm tall, usually producing branches along their entire length. LEAVES to 8 cm long, to 3 cm wide, sessile, elliptic to lanceolate or linear; margins deeply and narrowly pinnately lobed, sometimes approaching entire and then linear; upper leaves without clasping bases or clasping basal lobes. FLOWERS pedicellate, subtended by 0-2 linear to lanceolate, entire or lobed bracts, these sometimes fused to ovary; petals yellow, 8-15 mm long, 3-5 mm wide,with trichomes at apex only; staminodia or petaloid stamens 3-5, slightly smaller than petals; outer several whorls of stamens with slightly broadened filaments; style 7-10 mm long; stigmatic papillae inconspicuous. CAPSULES cylindric, 9-15 mm long. SEEDS horizontal, winged, oval to obovate; testa cells with wavy adjoining walls, the surface walls with 5-10 small bumps. $2n = 20$. -- (not mapped): possibly in e Apache co.; 2000-2200 m (6500-7200 ft); probably Jun-Sep; sw CO, ne NM. This taxon has been collected in NM in the vicinity of Green Knobs (north of Ft. Defiance), ca. 1.5 miles east of the AZ border. These collections have been mistakenly reported as AZ records, both as *M. laciniata*, and with an incorrect

identification, as *M. humilis* (A. Gray) J. Darl., a similar species that is most common in se NM and w TX, on gypsum.

Mentzelia lindheimeri Urban & Gilg (for F. J. Lindheimer). --Perennials with enlarged rootstock. STEMS several, often scandent, 30-70 cm or longer. LEAVES 2.5-6 cm long, 1-4 cm wide; petiole 0.4-1.2 cm long; blade broadly lanceolate to ovate, with two large teeth near base; uppermost leaves similar to other leaves. FLOWERS with pedicel 2-4 mm long; calyx usually deciduous; petals yellowish-orange, 12-14 mm long, 7-8 mm wide, with trichomes at apex only; staminodia 0; stamens all with linear filaments; style 8-11 mm long. CAPSULES cylindric, erect; body 10-14 mm long. SEEDS ca. 10, pendulous, not winged; blocky in outline except for the protruding hilum end; testa cells elongate, striate. $2n = 20$. --Rocky slopes (Map 4C): Cochise, Graham cos.; 1500-2300 m (5000-7500 ft); Aug-Oct; s NM, s TX; n Mex. This species can potentially be confused with *M. asperula* if inadequate material is collected; they differ most obviously in rootstock characters.

Mentzelia lindleyi Torrey & A. Gray (for J. Lindley). --Annuals. STEMS to 60 cm tall. LEAVES to 10 cm long, sessile, narrowly elliptic to lanceolate; margin pectinate with teeth in the sinuses. BRACTS ovate to lanceolate, green; margins toothed to lobed. FLOWERS sessile; petals golden yellow, 15-40 mm long, 10-26 mm wide; staminodia 0; stamens ca. 100, all with linear filaments; style 10-25 mm long. CAPSULES clavate; long-tapering to base; base not woody; body 20-40 mm long, usually straight to slightly arched. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted, irregular in cross-section; testa cells with straight adjoining walls, the surface wall domed. $2n = 18$. --Cultivated as an ornamental and occasionally escaping, but apparently not becoming established (not mapped): Maricopa Co.; ca. 350 m (1200 ft); Feb-May; native to coastal CA.

Mentzelia montana (Davidson) Davidson (of mountains). --Annuals. STEMS to 50 cm tall. LEAVES to 10 cm long, sessile, narrowly elliptic to lanceolate or nearly linear; margins often entire, the lowest toothed to lobed, occasionally lobed throughout. BRACTS narrowly lanceolate to ovate or obovate, with whitish bases, commonly on ovary; margins mostly entire or few-toothed on later flowers. FLOWERS sessile or short-pedicellate; petals yellow, 2.5-10 mm long, 2-5 mm wide; staminodia 0; stamens ca. 10-30, all with linear filaments; style 1.5-7 mm long. CAPSULES clavate to nearly cylindric, mostly tapering only near base; base not woody; body 10-16 (-20) mm long, when mature straight. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted, irregular in cross-section, the angles sharp; testa cells with straight adjoining walls, the surface walls pointed-papillate. $2n = 36$. --Disturbed and open areas, from chaparral to pine woodlands (Map 4A): Apache, Cochise, Coconino, Mohave, Navajo, Pima, Santa Cruz, Yavapai cos; 900-2350 m (3000-7700 ft); Apr-Jun; CA, CO, NM, OR, TX, UT; n Mex. Best recognized by its erect, straight fruits that taper only near the base and its white-based bracts. The branches below the earliest flower are commonly alternate and less well-developed than those from lower nodes; most taxa in section *Trachyphytum* have mostly opposite and well-developed branches immediately subtending the earliest flower. This species generally looks like a less-robust version of *M. veatchiana*. It apparently intergrades in AZ with *M. albicaulis* and *M. veatchiana*.

Mentzelia multiflora (Nutt.) A. Gray (many-flowered). --Perennials. STEMS to 80 cm tall, usually producing branches along their entire length. LEAVES to 15 cm long, to 3 cm wide, sessile, narrowly elliptic to lanceolate, occasionally oblanceolate; margins toothed to lobed, sometimes pinnatifid, sometimes approaching entire in very narrow leaves; upper leaves commonly with broad, clasping bases and sometimes with clasping basal lobes. FLOWERS pedicellate, subtended by 0-2 linear-lanceolate entire or few-toothed to lobed bracts, these sometimes fused to ovary; petals yellow, rarely nearly white, 9-23 mm long, 3-10 mm wide, with trichomes at apex only; staminodia 5, occasionally more or fewer, slightly smaller than petals; outer several whorls of stamens with broadened filaments; style (7-)10-14 mm long; stigmatic papillae forming a slight tuft. CAPSULES cylindric, sometimes broadly so, mostly 10-20 mm long, sometimes shorter when depauperate. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with sinuate

adjoining walls, the surface walls with a finely cobble-stone dome. $2n = 18(20)$. [The name *M. pumila* (Nutt.) Torrey & A. Gray has been misapplied by numerous authors, including Kearney and Peebles]. --A widespread, diverse species, without specific soil preferences, commonly on sand and gravel bars, roadcuts and banks (Map 4A): all cos. of AZ; it is uncommon north of the Grand Canyon but apparently is absent only at elevations above ca. 7500 ft; 50-2300 m (100-7500 ft); mostly Mar-Oct, potentially flowering year-round at lower elevations; s CA, CO, NE, NM, w OK, s TX, UT, s WY; s to c Mex. The most common species of section *Bartonia* in Arizona, it is morphologically variable and often considered polymorphic. Much of the variability seems to result from plastic responses to the local environment. It appears to intergrade somewhat with *M. integra* in Mohave and n Yavapai counties. The $2n = 20$ form occasionally hybridizes with *M. rusbyi*; hybrids are morphologically intermediate and are nearly sterile. The form common in extreme sw AZ and s CA has been called ssp. *longiloba* (J. Darl.) Felger. Its characteristic leaf margin occurs elsewhere within *M. multiflora*, apparently as a response to a sand substrate, thus it is not recognized here.

Mentzelia nuda (Pursh) Torrey & A. Gray (naked, referring to the sometimes bractless capsules). --Perennials. STEMS to 150 cm tall, producing branches mostly along their upper half. LEAVES to 15 cm long, to 2 cm wide, sessile, narrowly elliptic to lanceolate; margins shallowly toothed; upper leaves with prominently clasping bases. FLOWERS pedicellate, with (0-)2-6 lanceolate, several-toothed to -lobed bracts, these mostly arising from the ovary; petals white, but drying pale yellow, 25-50 mm long, 5-12 mm wide, with trichomes at apex only; staminodia 5, equal to the petals; stamens with broad filaments common in several outer whorls; style 15-30 mm long; stigmatic papillae inconspicuous. CAPSULES cylindric, (15-)20-30 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with straight to curved adjoining walls, the surface walls with 3-5 bumps. $2n = 20$. --On various substrates, especially roadsides (not mapped): Navajo co.; 1850 m (6000 ft); probably Aug-Sep; CO, KS, NB, NM, OK, TX, WY. Known in AZ from two collections, made during 1961 and 1965, in the vicinity of Keams Canyon and Bidahochi. One specimen (*Barr 65-310*, ARIZ) was described as having yellow petals; this color is not otherwise known for the species, although the petals discolor and become yellowish on drying. Probably an occasional escapee from cultivation, as it is otherwise known only from the Great Plains. In AZ, this species is easily identified by its size and large, conspicuous flowers.

Mentzelia obscura H. J. Thompson & J. E. Roberts (poorly-known). --Annuals. STEMS to 30 cm tall. LEAVES to 8 cm long, sessile, elliptic to lanceolate; margins entire or those of the basal leaves lobed. BRACTS lanceolate to ovate, green, occasionally with whitish bases, mostly not on the ovary; margins mostly entire or few-toothed. FLOWERS sessile; petals yellow, 2.5-6 mm long, 1.5-3.5 mm wide; staminodia 0; stamens ca. 15-30, all with linear filaments; style 2-4 mm long. CAPSULES clavate, long-tapering to base; base not woody; body 11-22 mm long, the earliest S-shaped or arching at least 90 degrees. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted, irregular in cross-section, the angles rounded; testa cells with straight adjoining walls, the surface walls domed. $2n = 36$. --Deserts, mostly along the Colorado R. (Map 3D): Coconino (Grand Canyon), La Paz, Mohave cos; 150-1350 m (500-4500 ft); Feb-May; CA, NV, UT; n Mex. Best recognized by the characters of its bracts, seeds and fruits.

Mentzelia oligosperma Sims (few-seeded) --Perennials with enlarged rootstock. STEMS several, divergent, to 35 cm long. LEAVES 1.5-6 cm long, 0.6-3.2 cm wide; petiole 0.1-1 cm long; blade broadly lanceolate to ovate, with two large teeth near base; uppermost leaves similar to the lower ones. FLOWERS subsessile or pedicel 1-2 mm long; calyx usually deciduous; petals orange, 6-8 mm long, 4 mm wide, with trichomes dorsally on upper half and along midline to near base; staminodia 0; stamens all with linear filaments; style 5-7 mm long. CAPSULES linear or clavate, often irregularly enlarged, reflexing; body 7-12 mm long. SEEDS 1-3(-4), pendulous, not winged, oblong, the hilum end not constricted; testa cells elongate, striate. $2n = 22$. --Rocky slopes, canyons, on limestone (Map 2B): Cochise, Pima cos.; 1450-1700 m (4800-5500 ft); Aug-Oct; AR, MO, NM, OK, TX, s WY; n Mex.

Mentzelia polita A. Nelson (polished). --Perennials. STEMS to 25 cm tall, occasionally producing branches in their lower halves. LEAVES to 5 cm long, to 3 mm wide, sessile, linear or sometimes narrowly oblanceolate or lanceolate; margins entire, occasionally few-toothed; upper leaves without clasping bases. FLOWERS pedicillate, subtended by 0-1 linear entire bracts; petals yellow, 7-10 mm long, 3-4 mm wide, with trichomes at apex only; staminodia 0-5, slightly to definitely smaller than petals; outer 2 whorls of stamens with broadened filaments; style 5-6 mm long; stigmatic papillae inconspicuous. CAPSULES cylindric to subglobose, 3-5 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with straight adjoining walls, the surface walls with ca. 10 bumps. $2n = 22$. -- Restricted to gypsum or mixed gypsum and clay soils (Map 2C): n Mohave Co.; 1350-1500 m (4500-5000 ft); July-Sep; s CA, s NV. Best recognized by its many slender stems, small fruits and mostly linear and entire leaves.

Mentzelia pterosperma Eastw. (winged seed). --Perennials. STEMS to 25 cm tall, producing branches along their entire length. LEAVES to 6 cm long, to 2.5 cm wide, sessile, oblanceolate, or obovate to broadly lanceolate; margins mostly crenate to toothed, the lowest leaves sometimes entire or lobed; upper leaves with clasping bases, without clasping basal lobes. FLOWERS pedicillate, subtended by 0-1 linear-lanceolate, entire bracts; petals yellow,10-15 (-20) mm long, 3-6 mm wide, with trichomes at apex only; staminodia 0(-5), smaller than petals; stamens with broad filaments common in outer whorl; style (8-)10-15 mm long; stigmatic papillae inconspicuous. CAPSULES cup-shaped to cylindric, 9-15 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with straight to slightly curved adjoining walls, the surface walls with ca. 10-15 bumps. $2n = 22$. --Commonly on sandy clays, sometimes also on gypsum (Map 4B): n Coconino (Grand Canyon), n Mohave cos.; 900-1350 m (2900-4500 ft); May-Sep; se CA, w CO, s NV, UT. Potentially an annual or biennial, often blooming at ca. 5 cm tall. Similar to *M. puberula*, differing in chromosome number, habitat, proportions of its floral parts and in leaf and seed characters.

Mentzelia puberula J. Darl. (minutely pubescent). --Perennials. STEMS to 45 cm tall, producing branches along their entire length. LEAVES to 13 cm long, to 3 cm wide, sessile, obovate or oblanceolate to elliptic and broadly lanceolate; margins toothed to lobed, or entire if plants are not rapidly growing; upper leaves tapering to slightly broadened or sometimes slightly clasping bases, often also with clasping basal lobes. FLOWERS pedicillate, subtended by 1 linear-lanceolate, entire or few-toothed bract; petals yellow, (6-)8-15 mm long, (2-)4-6 mm wide, with trichomes at apex only; staminodia 0-5, slightly to definitely smaller than petals; stamens with broad filaments common in 2-3 whorls; style 4-10 mm long; stigmatic papillae forming a slight tuft. CAPSULES cylindric, sometimes broadly so, 6-12 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with straight to slightly wavy adjoining walls, the surface walls with ca. 5-10 bumps. $2n = 20$. --Commonly on rock outcrops, talus of canyon walls (Map 4B): La Paz (?), Maricopa, Mohave, Pima, Pinal, Yuma cos.; 100-1100 m (400-3600 ft); Mar-Oct (-Dec); s CA, s NV; Baja C, Mex. These plants become broadly hemispheric in age and when growing rapidly have broad leaves with relatively short internodes, giving the plant a very leafy appearance.

Mentzelia rusbyi Wooton (for H. H. Rusby). --Perennials. STEMS to 100 cm tall, producing branches along their upper half. LEAVES to 15 cm long, to 2 cm wide, sessile, narrowly elliptic to lanceolate; margins shallowly toothed, occasionally subentire; upper leaves with prominently clasping bases. FLOWERS pedicellate, with 2-4 lanceolate few-lobed bracts mostly arising from the ovary; petals white, but drying pale yellow, erect-spreading at anthesis, 14-23 mm long, 4-6 mm wide, with trichomes at apex only; staminodia ca. 3, equal to or smaller than petals; stamens with broad filaments few; style 9-12 mm long; stigmatic papillae forming a slight tuft. CAPSULES cylindric, 14-32 mm long. SEEDS horizontal, winged, oval to obovate, flattened; testa cells with sinuate adjoining walls, the surface walls a finely cobble-stone dome. $2n = 20$. --On various substrates, especially roadsides (Map 4D): Apache, Coconino cos.; 2000-2600 m (6500-8500 ft); Jun-Sep; UT, CO, NM. This species is most easily recognized by its size, branching pattern and clustered flowers and large, ridged fruits with conspicuous bracts. It will rarely have pale yellow petals; normally, they are white when fresh and fully expanded, although in bud, the petals may be tinged peach to orangish, especially at their tips.

Mentzelia tricuspis A. Gray (for three-pointed filaments). --Annuals. STEMS 6-20 cm tall. LEAVES 3-12 cm long, 0.8-2.7 cm wide, sessile, elliptic or somewhat obovate to lanceolate; margins dentate or lobed to pinnatifid, rarely entire; upper leaves with a broad to somewhat clasping base. BRACTS 1-2, elliptic to lanceolate, green, not obscuring ovary. FLOWERS pedicellate; petals white to cream, 1.2-5.2 cm long, 1.5-4 cm wide; staminodia 0; stamens 80-100, outer filaments broadened and 3-toothed at apex; style 8-15 mm long; papillae of stigmas conspicuous. CAPSULES 0.7-2 cm long, at least the first to mature reflexing 90-180 degrees. SEEDS horizontal, not winged, mostly obovate, not compressed, submedian constriction usually pronounced, the hilum end a folded flap; testa cells with straight adjoining walls, the surface walls tuberculate. $2n = 20$. --Rocky slopes, washes, roadsides (Map 4C): n La Paz, Mohave cos; 200-750 m (600-2500 ft); Feb-May; s CA, s NV, sw UT.

Mentzelia veatchiana Kellogg (for A. A. Veatch). --Annuals. STEMS to 60 cm tall. LEAVES to 15 cm long, sessile, narrowly elliptic to lanceolate; margins mostly lobed. BRACTS mostly elliptic to broadly ovate, with whitish bases, often located on the ovary; margins toothed to lobed. FLOWERS sessile or short-pedicellate; petals yellow to orangish, 4-10 mm long, 3-6 mm wide; staminodia 0; stamens ca. 20-50, all with linear filaments; style 2-5 mm long. CAPSULES clavate, tapering to base; base not woody; body 15-30 mm long, the earliest straight or slightly arched. SEEDS pendulous, not winged, those in upper half of capsule grain-like, several-faceted, irregular in cross-section, the angles sharp; testa cells with straight adjoining walls, the surface walls pointed-papillate. $2n = 54$. [*M. albicaulis* var. *veatchiana* (Kellogg) Urban & Gilg] --Chaparral to pine woodlands (Map 3A): Graham, Pima, Yavapai cos; 1050-2050 m (3500-6800 ft); Mar-Jun; CA, CO, NV, OR, UT; Baja C, Son, Mex. Should be looked for in other counties in AZ. Best recognized by its broad, several-toothed or lobed, conspicuously white-based, bracts. Very similar to *M. montana*, often looking like a more robust and leafy version of that species; the two apparently intergrade.

Petalonyx A. Gray Sandpaper-plant

Shrubs and subshrubs; hairs barbed, not stinging. LEAVES sessile or petiolate; blades ovate, lanceolate, elliptic or linear; margins entire, crenate or dentate. INFLORESCENCES racemes. FLOWERS subtended by two small bracts and often nearly hidden by the third and outer bract; calyx persistent or irregularly deciduous, the lobes linear or lance-linear; petals distinct or the adaxial edges of the claws connate such that the stamens are held outside the tube at anthesis, deciduous, white to cream, rarely pale yellow; stamens 5, exceeding petals, all fertile (in ours), or 3 lacking anthers; filaments linear, distinct, free; pistil 3-carpellate; stigma minute. FRUIT an achene. SEED subapical; testa non-sculptured; endosperm lacking. $x = 23$. --5 spp.; sw US; Baja C., s to c Mex. (Greek: *petalon* = petal + *onyx* = claw).

1. Petals free; leaves mostly linear ..... ***P. linearis***
1' Petals connate; leaves mostly ovate.
   2. Leaves sessile, entire or few-toothed but not crenate, those of branches markedly reduced in size; stems of current growth often much branched ..... ***P. thurberi***
   2' Leaves petiolate, toothed or crenate to entire, those of branches mostly similar in size to those of main axis; stems of current growth sparsely branched.
      3. Leaves few-toothed; petals mostly 0.5-1 cm long ..... ***P. nitidus***
      3' Leaves crenate or entire; petals mostly 1-1.5 cm long ..... ***P. parryi***

Petalonyx linearis Greene (linear-leaved). --Shrubs or subshrubs to 0.5 m tall, often less; current growth often sparsely branched. LEAVES sessile, 1-3(-4) cm long, 0.2-1 cm wide, those of branches and main axis similar in size; blade linear to narrowly oblong or elliptic; margin entire, occasionally few-toothed. RACEMES to 10(-20) cm long, 1-2 cm wide. OUTER BRACT 5-11 mm long, 2-7 mm wide; margin crenate to entire; apex obtuse. FLOWERS: petals free, 2-5.5 mm long; stamens 3-7 mm long. ACHENE 2-4 mm long. $2n = 46$. --Rocky canyons to sandy washes and dunes (Map 4C): sw Pima, Yuma cos.; to ca. 1000 m (3200 ft); (Dec)Mar-Jun; s CA; Baja C., nw Son., Mex.

Petalonyx nitidus S. Watson (shining). --Shrubs or subshrubs to 0.5 m tall; current growth often sparsely branched. LEAVES petiolate, 1.5-4 cm long, 1-2.5 cm wide, those of branches and main axis similar in size; blade ovate to broadly elliptic; margin sometimes entire, usually few-toothed. RACEMES to 3 cm long, ca. 2 cm wide. OUTER BRACT 5-12 mm long, 2-6 mm wide; margin crenate or with small teeth to nearly entire; apex abruptly attenuate. FLOWERS: petals connate, 5-10(-11) mm long; stamens 7-14 mm long. ACHENE 1-3 mm long. $2n = 46$. --Open slopes and mesas, frequently on volcanic substrates (Map 4D): Coconino (Grand Canyon), Mohave (Black Mts) cos.; 950-1450 m (3000-4700 ft); May-Jul; s CA, s NV. The pale yellow flowers of specimens from Lava Canyon (Grand Canyon National Park; *Hodgson 5823*, DES) are unusual for this genus.

Petalonyx parryi A. Gray (for C. C. Parry). --Shrubs to 1 m tall; current growth sparsely or not branched. LEAVES petiolate, 1.5-4 cm long, 1-3 cm wide, those of branches and main axis similar in size; blade ovate to broadly elliptic; margin sometimes entire, usually crenate. RACEMES to 7 cm long, 2.5-3.5 cm wide. OUTER BRACT 6-18 mm long, 2-12 mm wide; margin crenate or with small teeth; apex abruptly attenuate. FLOWERS: petals connate, (8-)10-15 mm long; stamens 11-17 mm long. ACHENE 2-4 mm long. $2n = 46$. --Open slopes and washes, frequently on clay or gypsum (Map 4D): nw Mohave Co.; 500-1000 m (1700-3200 ft); Apr-Jul; s NV, extreme sw UT.

Petalonyx thurberi A. Gray (for G. Thurber). Shrubs to 2 m tall, often sprawling; current growth much branched. LEAVES sessile, 0.4-4.5 cm long, 0.2-1.4 cm wide, those of branches markedly smaller that those of main axis; blade ovate to lanceolate; margin entire or with a few teeth. RACEMES to 10 cm long, 1-1.5 cm wide. OUTER BRACT 3-8 mm long, 2-6 mm wide; margin crenate or with small teeth to nearly entire; apex abruptly attenuate. FLOWERS: petals connate, 2.5-6.5 mm long; stamens 5-10 mm long. ACHENE 1.5-3 mm long. --2 ssp., 1 in AZ; sw U. S., nw Mex.

Subsp. **thurberi** --Herbage harshly short pubescent; representing the larger extremes for most characters of the species, except for the mostly narrower leaves of its branches. --Open sandy to gravelly areas, Sonoran and Mohave Deserts, often in washes (Map 2D): La Paz, Maricopa, Mohave, Pima, Pinal, Yavapai, Yuma cos.; below 1500 m (5000 ft); Apr-Nov; s CA, s NV; Baja C, Son., Mex.

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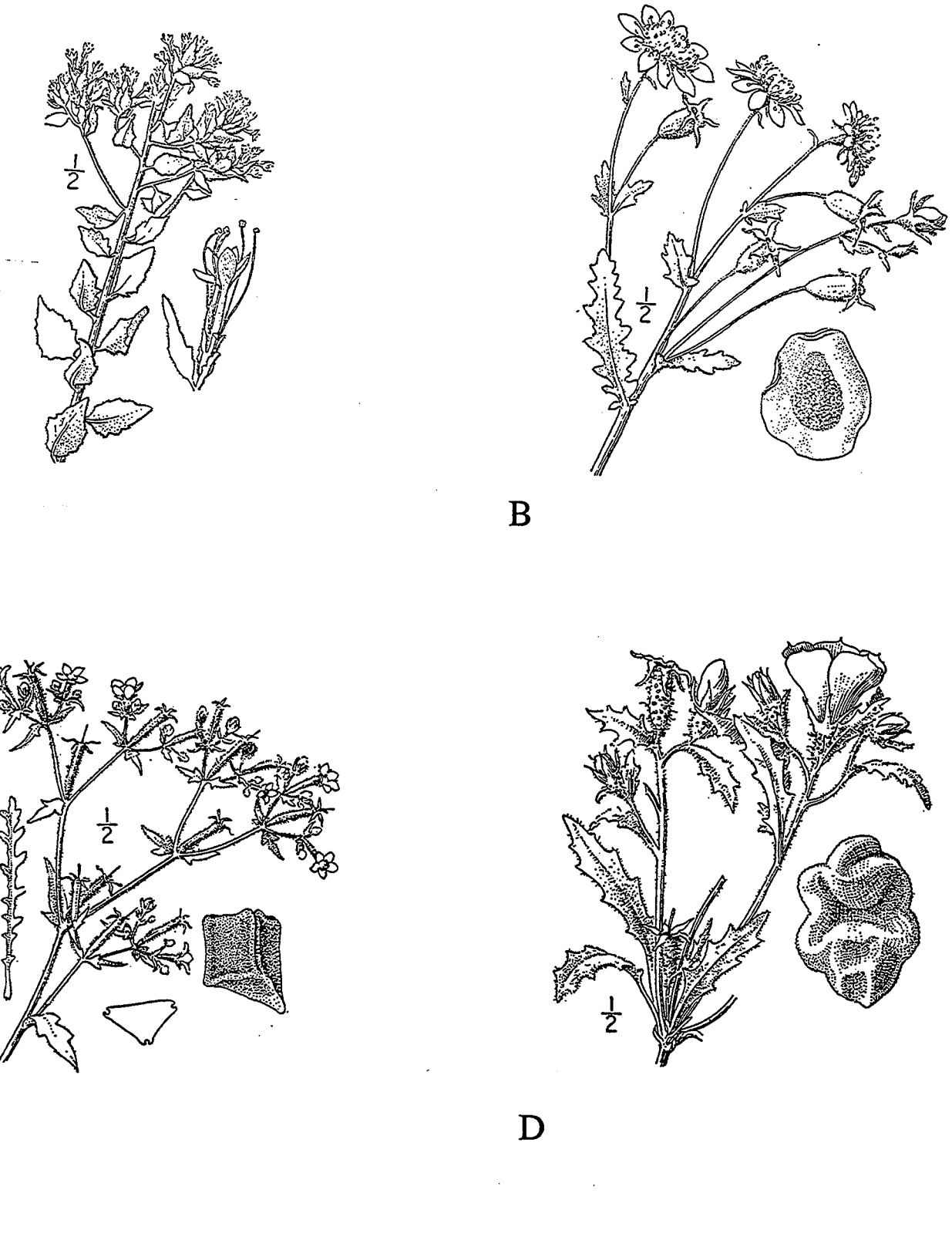

Figure 1. Illustrations of: A, *Petalonyx nitidus*; B, *Mentzelia multiflora*, as a representative of section *Bartonia*; C, *Mentzelia affinis*, as a representative of section *Trachyphytum*; D, *Mentzelia tricuspis*, as a representative of section *Bicuspidaria*. All reproduced with permission of publisher from Abrams (1951) Illustrated Flora of the Pacific States, Stanford University Press.

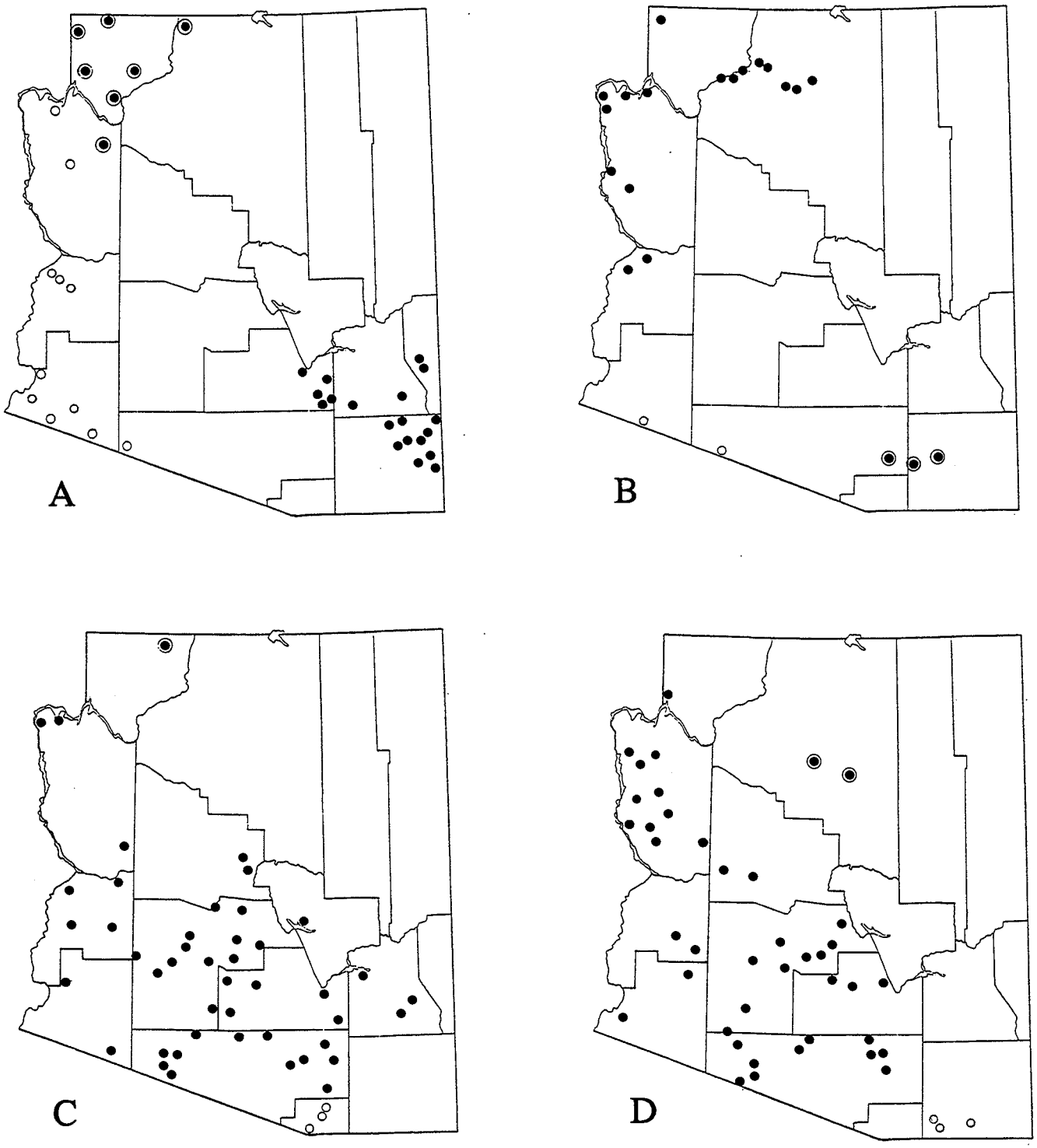

Figure 2. Distribution of: A, *Cevallia sinuata* (dots), *Mentzelia desertorum* (open circles), *Mentzelia integra* (circled dots); B, *Eucnide urens* (dots), *Eucnide rupestris* (open circles), *Mentzelia oligosperma* (circled dots); C, *Mentzelia affinis* (dots), *Mentzelia aspera* (open circles) *Mentzelia polita* (circled dots); and D, *Petalonyx thurberi* (dots), *Mentzelia asperula*, (open circles), *Mentzelia collomiae* (circled dots).

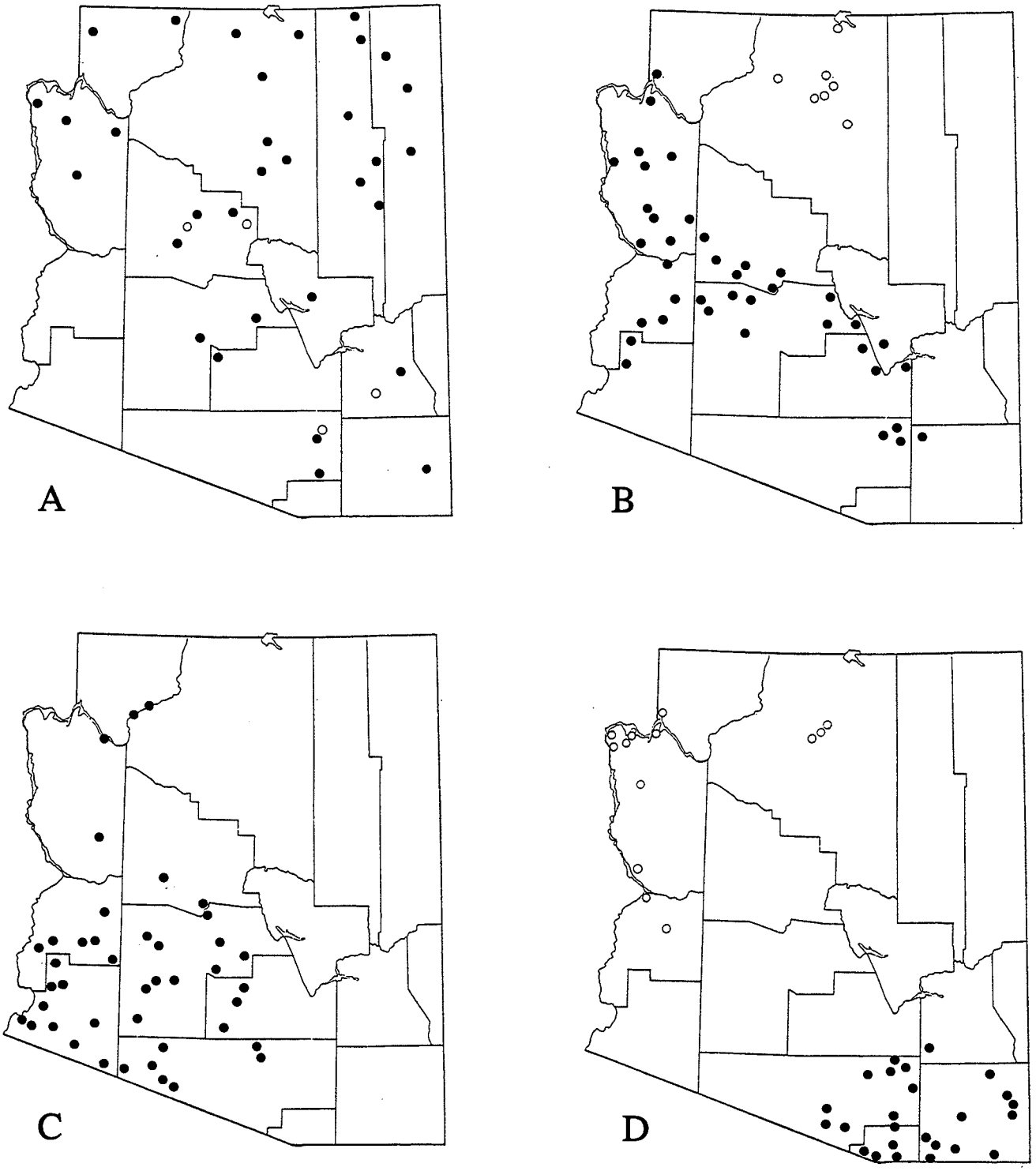

Figure 3. Distributionof: A, *Mentzelia albicaulis* (dots), *Mentzelia veatchiana* (open circles); B, *Mentzelia jonesii* (dots), *Mentzelia cronquistii* (open circles); C, *Mentzelia involucrata* (dots); D, *Mentzelia isolata* (dots), *Mentzelia obscura* (open circles).

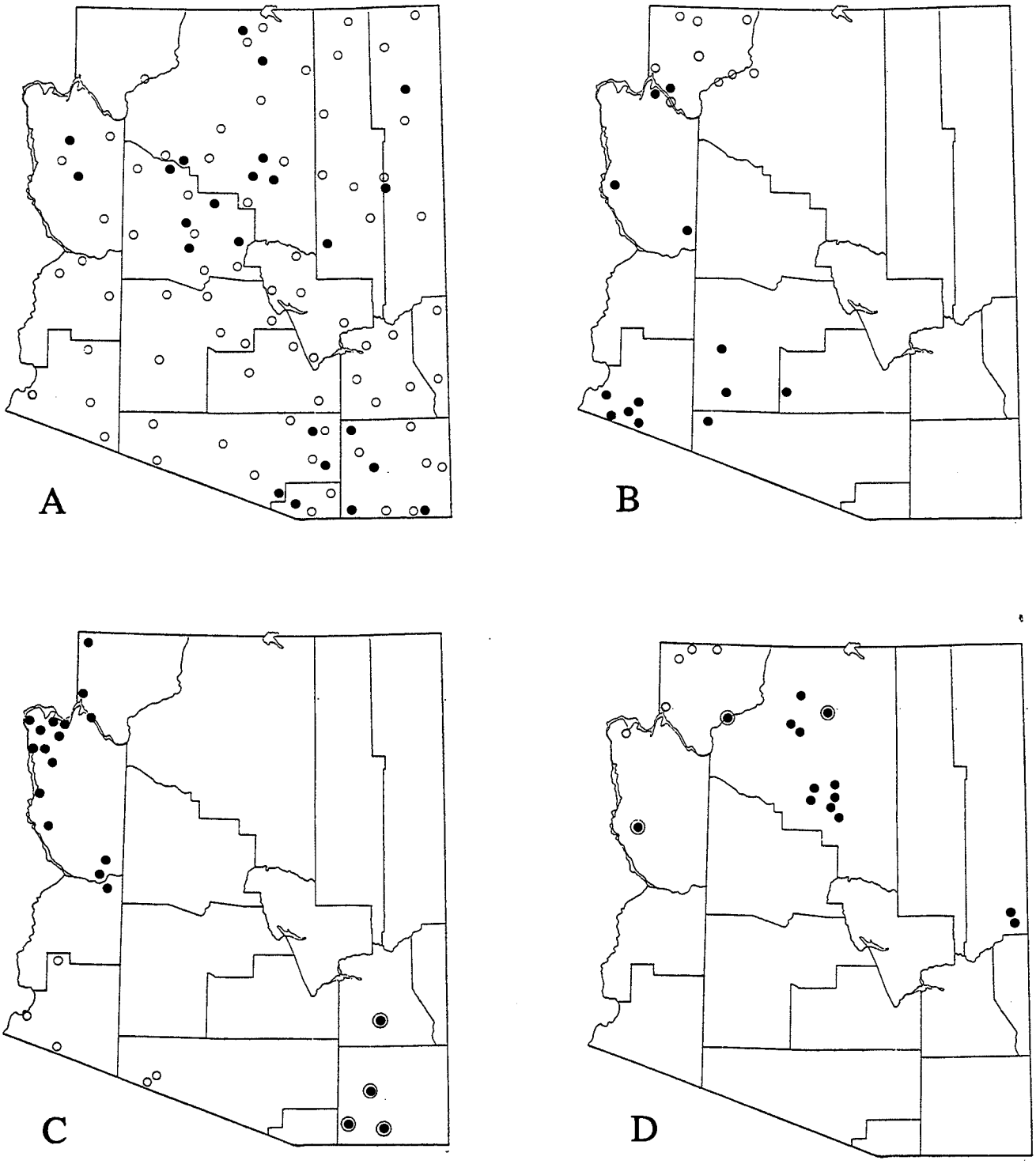

Figure 4. Distribution of: A, *Mentzelia montana* (dots), *Mentzelia multiflora* (open circles); B, *Mentzelia puberula* (dots), *Mentzelia pterosperma* (open circles); C, *Mentzelia tricuspis* (dots), *Petalonyx linearis* (open circles), *Mentzelia lindheimeri* (circled dots); D, *Mentzelia rusbyi* (dots), *Petalonyx parryi* (open circles), *Petalonyx nitidus* (circled dots).