

**AGAVACEAE AGAVE FAMILY**  
**Part One**  
***Agave* L. Century Pant, Maguey**

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Trees, shrubs, or perennial herbs, monocarpic (flowering once and then dying) or polycarpic (flowering more than once). LEAVES alternate, simple, sessile, tending to be crowded in dense rosettes at end of a caudex or at ends of branches, the margins entire or toothed or filiferous. INFLORESCENCES axillary or terminal, open, racemose, paniculate or spicate. FLOWERS usually perfect, actinomorphic to slightly zygomorphic; tepals 6 in 2 whorls, petaloid, often thick and fleshy, distinct or fused below into a floral tube; stamens 6, distinct, adnate to tepal bases or floral tube, the anthers usually dorsifixed, introrse; pistil 3-carpeled, 3-loculed; ovary superior or inferior, usually with basal nectaries; style 1, usually terminal; stigma capitate, 3-lobed; ovules axile, 1-many per locule. FRUITS loculicidal or septicidal capsules or indehiscent, dry and spongy or baccate. SEEDS flattened, with endosperm.  $x = 30$  (characteristic size pattern of 5 large and 25 small to medium). --8 genera, ca 360 spp., chiefly subtropical, semi-arid and arid regions. Agavaceae are of considerable economic importance, providing cordage, food, alcoholic beverages, detergents, insect repellants, perfumes, and ornamentals.

1. Ovary superior; tepals distinct or nearly so, white to cream or rarely yellowish-cream; anthers included; inflorescence usually axillary.
  2. Stigma bright green, covered with white, translucent, erect, fleshy hairs; fruit a loculicidal capsule . . . . . *Hesperoyucca*
  - 2' Stigma white, glabrous to minutely papillate; fruit a loculicidal or septicidal capsule or indehiscent, dry and spongy or baccate . . . . . *Yucca*
- 1' Ovary inferior; tepals united at base into a floral tube, yellow, sometimes cream, whitish-cream, greenish-cream, or rarely red; anthers exserted; inflorescence terminal . . . . . *Agave*

***Agave* L. Century Plant, Maguey**

Perennial scapose herbs, monocarpic, frequently suckering at base and occasionally bulbiferous in the inflorescence, the caudex thick, usually very short, simple or branched, the roots fibrous, hard. LEAVES in a rosette, generally semi-succulent, firm, spine-tipped, the margins entire, filiferous, or armed with teeth, the teeth large or small, sometimes both large and smaller interstitial teeth present. INFLORESCENCE terminal, of clusters of flowers, these arranged in open panicles, racemes or spikes. FLOWERS perfect, protandrous; tepals erect to variously curved, similar or dimorphic, imbricate in bud, united at base into a funnelform to salverform tube; stamens inserted at throat or in floral tube, exserted, the anthers versatile; ovary inferior, succulent, thick-walled with numerous ovules, with a distal sterile portion (neck), this often constricted, the style elongate, filiform, the stigma capitate, 3-lobed, papillate-glandular. FRUIT a loculicidal capsule, oblong to globose. SEEDS black.  $x = 30$ . --Ca. 200 spp.; sw U.S., FL., Mex., Caribbean, C. Amer.; widely cultivated. (Greek: *Agave* = noble or admirable). Arizona agaves used for food or fiber include *A. chrysantha*, *A. delamateri*, *A. deserti* ssp. *simplex*, *A. mckelveyana*, *A. murpheyi*, *A. palmeri*, *A. parryi*, *A. parviflora*, *A. utahensis*, and *A. sp.*, an undescribed agave from the Grand Canyon. Berger, A. 1915. *Die Agaven*. Jena.; Brieitung, A. 1968. *Cactus & Succulent Journal Yearbook*; Gentry, H. S. 1982. *Agaves of Continental North America*. Univ. of Arizona Press, Tucson.

1. Inflorescence spicate, subspicate, or sometimes narrowly racemose-paniculate; flowers in pairs or small clusters (subg. *Littaea*).
2. Leaf margins entire or filiferous, sometimes with small denticulate teeth only at leaf base.
  3. Rosettes less than 15 cm high; leaves abruptly acuminate, 6-12 cm long, with the marginal fibers tightly curled; flowers 13-17 mm long, greenish to pink, the tepals 2-5 mm long . . . . . *A. parviflora*
  - 3' Rosettes 10-60 cm high; leaves acuminate to long-acuminate, 8.5-50 cm long, with the marginal fibers curled or straight, or absent; flowers 16-53 mm long, cream or yellow, the tepals 6-20 mm long.
  4. Flowers 16-38 mm long, the floral tube 3-4.5 mm high, the tepals 6-10 mm long; leaves with the marginal fibers usually conspicuous and curled, but sometimes sparse or absent; c AZ . . . . . *A. toumeyana*
  - 4' Flowers 29-53 mm long, the floral tube 8-14 mm high, the tepals 10-20 mm long; leaves with the marginal fibers erect or spreading, or absent; s AZ.
  5. Leaves narrowly linear, 7-12 mm wide; marginal fibers conspicuous; inflorescence spicate, the lateral branchlets to 2 mm long; flowers 29-42 mm long, the ovary neck markedly longer on one side making the flower appear curved, the tepals light yellow, suberect . . . . . *A. schottii* var. *schottii*
  - 5' Leaves linear to linear-lanceolate, 12-30 mm wide; marginal fibers absent (the margin sometimes separating on pressed dried leaves) or sparse, short and ragged; inflorescence subspicate to narrowly racemose-paniculate, the lateral branchlets 4-40 mm long; flowers 35-53 mm long, the sides of ovary neck of equal length or one side somewhat longer, the tepals golden-yellow, sometimes unequally reflexed.
    6. Leaves linear to linear-lanceolate, 15-30 mm wide, straight-ascending or slightly incurved, light green to green, without white bud imprinting; flowers in clusters of 4-6; Organ Pipe Cactus National Monument, Pima Co . . . . . *A. deserti* ssp. *simplex* × *A. schottii* var. *schottii*
    - 6' Leaves linear, 12-25 mm wide, falcate, usually dark green with white bud imprinting; flowers usually in pairs but sometimes in clusters of 3-6; Pima, Cochise cos . . . . . *A. schottii* var. *treleasei*
- 2'. Leaf margins armed with obvious teeth.
  7. Leaves with the horny margin extending from the terminal spine to below mid-blade; flowers cylindric, the tepals not connivent but clasping filaments, the filaments inserted midway in floral tube; c AZ . . . . . *A. ×arizonica*
  - 7' Leaves with horny margin extending only from the terminal spine to upper marginal teeth; flowers urceolate, the tepals connivent, the filaments inserted near bottom of floral tube; n AZ . . . . . *A. utahensis*
- 1' Inflorescence paniculate with large umbellate clusters (subg. *Agave*).
  8. Mature rosettes to 2 m tall; leaves 1 m or more long; flowering stalk 4.5-9 m tall; tepals 26-32 mm long . . . . . *A. americana* var. *expansa*
  - 8' Mature rosettes to 1.4 m tall; leaves generally less than 1 m long; flowering stalk 2-7 m tall; tepals 11-24 mm long.
    9. Leaves narrowly-spathulate, dark green to glaucous-green, the terminal spine to 2 cm long, thick, conical, the teeth uniform, 3-4 mm long, porrect; plants always producing bulbils in the inflorescence, regardless of whether or not stalk is damaged . . . . . *A. murpheyi*
    - 9' Leaves deltoid, lanceolate, oblanceolate, or obovate, the colors various, the terminal spine greater than 2 cm long, subulate, the teeth variable in size and orientation; plants producing bulbils in inflorescence only if stalk is damaged.

10. Rosettes compact, the leaves numerous, lanceolate to broadly ovate, closely imbricate, with the largest teeth towards apex; inflorescence congested, with 20-36 lateral branchlets in upper  $\frac{1}{2}$  of flowering stalk . . . . . *A. parryi*
- 10' Rosettes more open, the leaves several to many, linear-lanceolate to lanceolate or oblanceolate, not closely imbricate, with the largest teeth distributed along mid-blade; inflorescence open, not congested, generally with 6-26 lateral branchlets restricted to upper  $\frac{1}{4}$  to  $\frac{1}{2}$  of flowering stalk.
11. Floral tube shallow, much shorter than tepals, the filaments inserted at base of tepals or on rim of tube; tepals ascending or spreading, sometimes erect, equal or subequal, soon wilting after anthesis.
12. Leaves deltoid-lanceolate to linear-lanceolate, broadest at base, 25-60 cm long, 5-10 cm wide, the teeth friable; inflorescence in upper  $\frac{1}{3}$  of flowering stalk; flowers 30-60 mm long; tepals 13-20 mm long . . . . .  
 . . . . . *A. deserti* ssp. *simplex*
- 12' Leaves linear-lanceolate or lanceolate, broadest at middle, 17-25(-40) cm long, 2.8-5 cm wide, the teeth firmly attached; inflorescence in upper  $\frac{1}{3}$  to  $\frac{1}{2}$  of flowering stalk; flowers 30-40 cm long; tepals 11-13 mm long . . . .  
 . . . . . *A. mckelveyana*
- 11' Floral tube deep, frequently equaling or exceeding tepals in length, the filaments inserted below rim of floral tube, frequently midway in tube; tepals erect, unequal, persisting and becoming leathery during and after anthesis.
13. Flowers golden-yellow; leaves lanceolate to broadly-lanceolate, the teeth 4-10 mm long, 1-3 cm apart, the interstitial teeth (0-)1-3(-5) on upper  $\frac{2}{3}$  of leaf margin on one side of leaf . . . . . *A. chrysantha*
- 13' Flowers greenish-cream to cream, with tepal tips and filaments flushed maroon; leaves linear-lanceolate to lanceolate or oblanceolate, the teeth generally less than 7 mm long, 0.2-2.5 cm apart, the interstitial teeth (2-)3-12 on upper  $\frac{2}{3}$  of leaf margin on one side of leaf.
14. Leaves erect or erect-ascending, conspicuously incurved at apex, glaucous-gray, the interstitial teeth (3-)6-12 on upper  $\frac{2}{3}$  of leaf; filaments inserted at same level on tube . . . . . *A. delamateri*
- 14' Leaves ascending to spreading, not conspicuously incurved at apex but flaring out, variously colored, the interstitial teeth (2-)3-7 at upper  $\frac{2}{3}$  of leaf; filaments inserted at two levels or subequally.
15. Plants usually solitary, rarely offsetting; marginal teeth uniform, 0.5-1.2 cm apart, reflexed or porrect, firmly attached; flowering stalk 3.5-7.2 m tall, usually broadly paniculate; flowers 46-64 mm long; filaments inserted at two levels on tube; sc, s AZ . . . . .  
 . . . . . *A. palmeri*
- 15' Plants offsetting profusely; marginal teeth variable, 1-2.5 cm apart, variously flexed, friable; flowering stalk 2.75-3.4 m tall, narrowly paniculate; flowers 74-81 mm long; filaments inserted subequally; Grand Canyon National Park, Coconino Co. . . *A. sp.*

**Agave americana** L. (of America). Century Plant. --Rosettes freely suckering, open, ca. 1-2 m tall, 2-3.7 m broad. LEAVES numerous, 10-20 dm long, 1.5-2.5 dm wide, lanceolate, acuminate to abruptly acuminate, narrowed above thickened base, rigid, plane or guttered or convex, light gray glaucous to light green, sometimes with cross-zoned or variegated patterns, the margins undulate to crenate to straight; teeth regular or variable, the larger ones 5-10 mm long, the smaller ones 3-5 mm

long, straight or curved, 1-6 cm apart, brown to pruinose gray, interstitial teeth absent; terminal spine 2-5 cm long, conic to subulate, shallowly grooved above, shiny brown to pruinose gray. INFLORESCENCE with scape 5-9 m tall, open, of 15-35 long lateral horizontal branchlets in upper  $\frac{1}{2}$ - $\frac{1}{3}$  of flowering stalk, the stalk thick, gray-green to glaucous. FLOWERS 70-100 mm long, long-pedicellate, fragrance unknown; tepals unequal, erect, thick, involute, pale yellow, the outer ones 25-38 mm long, thick linear-lanceolate, the apex sometimes red-tipped, the inner ones 2-3 mm shorter; filaments 60-90 mm long, inserted near mid-tube, light yellow, the anthers 30-36 mm long; ovary 30-45 mm long with constricted, grooved neck, green, the style 55-72 mm long when stigma is receptive, yellow; floral tube 8-20 mm long, 16-20 mm wide, deeply grooved, green. CAPSULES 4-5 cm long, short-stipitate, short-beaked; seeds 7-8 mm long, 5-6 mm wide.  $2n = 60, 120, 180$ . [*A. complicata* Trel. ex Ochoterana; *A. gracilispina* Engelm. ex Trel.; *A. melliflua* Trel.; *A. zonata* Trel.; *A. felina* Trel.; *A. rasconensis* Trel.; *A. subzonata* Trel.]. --2 subspp., 5 vars., 1 in AZ; widely cultivated escaping into disturbed habitats.

Var. **expansa** (Jacobi) Gentry. --Rosettes to 6 dm long. LEAVES 12-15 dm long, 18-24 cm wide, abruptly acuminate, straight, guttered, glaucous gray; margins crenate with teeth along the mid-blade on sharply angled bases; teeth 5-8 mm high, 1-4 cm apart; spine conical, 2-3 cm long. INFLORESCENCE with scape 7-9 m tall, of 20-30 branchlets. FLOWERS 70-85 mm long; tepals 26-32 mm long; filaments 65-70 mm long, inserted 8-9 mm above base of tube, the anthers 28-32 mm long; floral tube 13-14 mm long, 12-20 mm wide. CAPSULES and seeds unknown.  $2n = [119]120$ . [*A. expansa* Jacobi; *A. abrupta* Trel.]. --Open grassland: Santa Cruz Co.; 1200 m (3700 ft); Jul; sw U.S. to Jalisco, Mex.

**Agave ×arizonica** Gentry & J. Weber (of Arizona). Arizona Agave. --Rosettes single or sparingly caespitose, globose, ca. 20-35 cm high, 30-40 cm broad. LEAVES several, 13-31 cm long, 2-3.2 cm wide, broadest at or just above middle, linear-lanceolate, acuminate, spreading, rigid, dark green, shallowly concave towards apex, thickly convex at base, the margins straight, with a broad red-brown to gray border, this continuous nearly to base; teeth variable, when present the larger ones 2-5 mm long; interstitial teeth absent; terminal spine 1-2.5 cm long, subulate, shallowly grooved above, dark brown, aging gray, decurrent with border. INFLORESCENCE with scape 2.5-4 m tall, subspicate to narrowly racemose-paniculate, of 30-40 short lateral branchlets in upper  $\frac{1}{4}$ - $\frac{1}{3}$  of flowering stalk, the stalk slender, green. FLOWERS 25-32 mm long, durable, cylindric-urceolate, short-pedicellate, in close-set clusters of 10-20; tepals unequal, 8-11 mm long, 2.5-3 mm wide, somewhat overlapping and clasping the filaments but not connivent, erect to ascending, ovate-lanceolate with blunt tips, wilting soon after anthesis, yellow; filaments 16-30 mm long, inserted equally 4 mm above base of tube, yellow, the anthers 7-11 mm long, light yellow; ovary 10-15 mm long, with constricted neck 4-6 mm long, lime-green, the style light yellow; floral tube 3.5-7.5 mm long, 8-9 mm broad, shallow, broadly ascending, light lime-green. CAPSULES 15-22 mm long, 8-13 mm broad, elliptic to obovoid, strongly beaked; seeds 4.5 mm long, 3.3 mm wide.  $2n = 60$ . [*A. arizonica* Gentry & Weber]. --Open rocky slopes in chaparral or juniper grassland: Gila, Maricopa, Yavapai cos; 1100-1750 m (3600-5800 ft); May-Jul. Of recent hybrid origin involving *A. chrysantha* × *A. toumeyana* var. *bella*. Only 50-60 clones or plants known. See note below.

**Agave chrysantha** Peebles (golden-yellow). Golden-flowered Agave. --Rosettes single or infrequently caespitose, open, ca. 0.5-1.2 m high, 0.8-1 m broad. LEAVES highly variable, numerous, 40-82 cm long, (4.1-)4.8-11 cm wide, broadest at middle, lanceolate, acuminate, spreading-ascending, rigid, deeply concave towards apex, thick and convex towards base, glaucous gray to yellowish green to deep green, the margins straight to repand; teeth variable, brown to gray, the larger ones 4-10 mm long, straight, reflexed, or deflexed, firmly attached, (0.8-)1-3(-4) cm apart; interstitial teeth (0-)1-3(-5) on upper  $\frac{2}{3}$  of leaf margin; terminal spine 2.5-4.5 cm long, slender, openly grooved above, brown to gray, decurrent for 5-15 cm to upper teeth. INFLORESCENCE with scape 4-7 m tall, narrowly to

broadly paniculate, of (6-)11-17 lateral ascending branchlets in upper  $\frac{1}{4}$ - $\frac{1}{3}$  of flowering stalk, the longer ones 20-39 cm long, the shorter ones 3.2-12.2 cm long, the stalk thick, green to glaucous. FLOWERS congested in umbels, 35-67 mm long, durable, cylindric-urceolate, with a strong sweet-musky fragrance at anthesis; tepals erect, clasping the filaments, thick, drying leathery, persisting erect, unequal, the outer ones 8-18 mm high, 5-10 mm broad, the inner ones 6-14 mm high, 3-9 mm broad, golden-yellow with brown-corneous hooded tips; filaments 32-55 mm long, inserted at 2 levels, 3-10 mm and 4-11 mm above base of tube, light yellow, the anthers 7-17(-20) mm long, yellow; ovary 14-33 mm long, slender, rounded, with short, constricted neck 0.2- 4(-8) mm long, lime-green, the style 21-52 mm long when stigma is receptive, light yellow; floral tube 6-18 mm long, (7-)12-21(-25) mm wide, bulging somewhat at base of tepals, light lime-green. CAPSULES congested, 35-50 mm long, 13-15 mm broad, linear oblong to obovoid, apiculate; seeds 6-7 mm long, 4.5-5 mm broad, with marginal wing,  $2n = 60$ . [*A. palmeri* Engelm. var. *chrysantha* (Peebles) Little ex L. D. Benson]. --Open rocky slopes in high desert scrub, chaparral, and juniper grassland: Cochise, Gila, Graham, Maricopa, Pima, Pinal, Yavapai cos.; 700-2150 m (2300-7000 ft); May-Aug. A complex showing great variation in leaf and inflorescence characters, but is stable in flower color and fruit characteristics. Hybridizes with *A. murpheyi* in Gila Co., *A. palmeri* in Pima and Cochise cos., *A. parryi* var. *couesii* in Gila, Maricopa, and Yavapai cos., and *A. delamateri* in Yavapai Co.

**Agave delamateri** Hodgson & Slauson (for R. DeLamater). Tonto Basin Agave. --Rosettes caespitose, ca. 1 m high, 1 m broad. LEAVES numerous, 50-63(-74) cm long, 7.5-9 cm wide, broadest near or above middle, lanceolate to oblanceolate, acuminate, erect-ascending, becoming inwardly arcuate at apex, deeply concave above, thick and convex toward base, easily cut, bluish-gray glaucous with purple-maroon tinge and green cross-banding, the margins straight to repand; teeth somewhat variable, dark brown to gray, the larger ones 3.5-5 mm long, usually reflexed, firmly attached, 1.5-11(-40) mm apart; interstitial teeth (3-)6-12 on upper  $\frac{2}{3}$  of leaf margin; terminal spine 2.8-3.5(-4.9) cm long, slender, openly grooved above, brownish-gray, decurrent for 9-14 cm to upper teeth. INFLORESCENCE with scape 4.5-6 m tall, broadly paniculate, open, of 12-17 widely spaced, long horizontal branchlets in upper  $\frac{3}{5}$ - $\frac{5}{8}$  of flowering stalk, the stalk thick, purple-maroon. FLOWERS in clusters of 14-20, 47-67(-70) mm long, durable, with a strong musky but sweetish fragrance at anthesis; tepals persistently erect, clasping the filaments, becoming leathery or wood-like with age, unequal, light cream-green, the outer ones ovate-lanceolate, 14-18 mm long, 6-7 mm wide, with maroon-rust rugose hooded tips, the inner ones broadly lanceolate, 9-15 mm high, 5-7 mm wide, strongly keeled, the tips slightly hooded; filaments 30-53 mm long, inserted equally 6-8 mm above base of tube, maroon, the anthers 11-20 mm long, bright yellow; ovary slightly angled longitudinally, 21-29 mm long, thick, stout, with slightly constricted neck 1-3.5 mm long, cream-green, the style 35-49 mm long when stigma is receptive, cream flecked with maroon; floral tube 11-16 mm long, 11-16 mm broad, bulging at base of tepals, light cream-green. CAPSULES and seeds unknown. --Usually in vicinity of major drainage systems on open hilly slopes in desert scrub, rarely in chaparral or juniper-grassland: Gila, Maricopa, Yavapai cos.; 700-1550 m (2350-5100 ft); Jun-Jul. Only 90 clones or plants known, in direct or indirect association with Mogollon or Salado agricultural and settlement features, probably having been cultivated by pre-Columbian people. Hybridizes with *A. chrysantha* in Yavapai Co.

**Agave deserti** Engelm. (of the desert). --Rosettes mostly solitary to prolifically caespitose, mostly 30-70 cm tall, 40-80 cm broad. LEAVES variable, 25-70 cm long, 4.5-10 cm wide, narrowly triangular lanceolate, lanceolate, to linear-lanceolate, acuminate to long-acuminate, thick, deeply concave towards apex, broad and convex towards base, rigid, ascending, grayish-white, gray, or blue-glaucous to green or yellowish green, often with lighter cross-zone patterns, the margins straight, undulate, or crenate; teeth variable, the larger ones 5-10 mm long, the smaller ones 2-3 mm long, slender, variously curved to reflexed, loosely to firmly attached, 1-3 cm apart, brown to pruinose gray, sometimes with

brown ring at base; interstitial teeth absent; terminal spine 2-4 cm long, stout, subulate to aciculate, openly grooved, decurrent to first or second teeth to mid-blade. INFLORESCENCE with scape 2.5-6 m tall, open, usually narrowly to somewhat broadly paniculate, of 6-15 lateral ascending branchlets in upper  $\frac{1}{4}$  to  $\frac{1}{5}$  of flowering stalk, the stalk slender to thick, green to glaucous. FLOWERS in small to large congested clusters, 30-60 mm long; tepals erect to spreading, linear, thin, wilting with anthesis, equal to subequal, 13-20 mm high, 4-6.5 mm wide, yellow to light yellow; filaments 27-42 mm long, unequally inserted 2.75-3.75 mm above base of tube, or subequally inserted at base of tepals, pale yellow, the anthers 13-21 mm long, yellow; ovary 15-30 mm long, with a slightly narrowed to constricted neck 4-6 mm long, yellow to pale green, the style 24-29 mm long when stigma is receptive, pale yellow; floral tube short, 3-10 mm long, 9-15 mm wide, shallow, open-funnelform, angular pale green to yellow. CAPSULES 3.5-5.5 cm long, 1.2-2 cm broad, ovoid to oblong or obovoid, short-stipitate, beaked or rounded to rostrate at apex; seeds 5-6 mm long, 4-4.5 mm wide.  $2n = 60, 120$ . [*A. consociata* Trelease]. --3 subspp; 1 in AZ; CA; Baja C. and Son., Mex.

Subsp. **simplex** Gentry (simple, referring to solitary rosette). --Rosettes mostly single, compact. LEAVES 25-60 cm long, 4.5-10 cm wide, lanceolate, moderately acuminate, light green to light glaucous gray; teeth friable; terminal spine subulate, 3-4 cm long. INFLORESCENCE with scape 4-6 m tall, narrow-paniculate, of 8-15 short lateral branchlets in upper  $\frac{1}{3}$  of flowering stalk. FLOWERS in small clusters; ovary greenish; floral tube (3-)5-10 mm long; filament insertion 2.5-3.75 mm above base of tube. CAPSULES oblong to obovate, rounded to rostrate at apex.  $2n = 60$ . --Low desert scrub: La Paz, Maricopa, Mohave, Pima, Pinal, Yuma cos.; 350-1200 m (1180-4000 ft); May-Jul; se CA. Hybridizes with *A. schottii* ssp. *schottii* in Pima Co., and possibly *A. mckelveyana* in Yavapai Co.

**Agave deserti** ssp. **simplex**  $\times$  **A. schottii** var. **schottii**. Ajo Mountain Agave. --Rosettes single or more commonly caespitose, ca. 19-40 cm high, 25-45 cm broad. LEAVES several, 16-34 cm high, 1.5-3 cm wide, broadest below the middle, linear-lanceolate, acuminate, usually spreading to slightly falcate, rigid, light green, sometimes with lighter green mid-stripe, fibrous, shallowly concave towards apex, thickly convex at base, the margins straight, with narrow reddish-brown and white border continuous to base; teeth absent except for small teeth near base of leaf; terminal spine 1.5-2.5 cm long, subulate, shallowly grooved above, reddish-brown, aging gray, decurrent with border. INFLORESCENCE with scape 2.5-3.5 m tall, subspicate to narrowly racemose-paniculate, of 30-40 lateral branchlets in upper  $\frac{1}{3}$  of flowering stalk, these 0.4-2.7(-3.5) cm long, the stalk slender, green. FLOWERS (32-)35-53 mm long, durable, in close-set clusters of (3-)4-6, with a strong, sweet fragrance, long-lingering even when dried; tepals slightly unequal, 10-20 mm long, (2-)3-8 mm wide, erect to ascending, unequally spreading to reflexed at anthesis, broadly lanceolate with blunt tips, wilting shortly after anthesis, golden-yellow; filaments (17-)20-30 mm long, inserted equally or subequally high in tube at 6-16 mm above base, light yellow, the anthers 9-14 mm long, yellow; ovary 10-17 mm long, thick, with constricted, somewhat angled neck 2-6 mm long, making the flower somewhat zygomorphic, chartreuse-green, the style 19-27 mm long when stigma is receptive, yellow; floral tube (4-)6-21 mm long, 8-13 mm wide, deeply funnelform, narrowed below, chartreuse-green. CAPSULES 16 mm long, 12 mm wide, elliptic, apiculate; seeds unknown.  $2n = 90$ . --Open rocky slopes in desert scrub: Pima Co., Bull Pasture, Ajo Mountains; 900-1050 m (3000-3400 ft); Jun-Jul. Only 28 clones or plants known in km<sup>2</sup>.

**Agave mckelveyana** Gentry (for S. D. McKelvey). --Rosettes 20-45 cm tall, single or caespitose, open. LEAVES few, 17.5-40 cm long, 2.8-5 cm wide, linear or lanceolate, broadest in the middle, acuminate, convex towards apex, thickish and deeply concave towards base, rigid, firm, spreading to ascending, light glaucous green, yellow-green to dark green, usually with light cross-zoned patterns; margins nearly straight or undulate; teeth mostly 4-8 mm long at mid-blade, flexed upward or downward, mostly 1-3 cm apart, grayish with red-brown tips, sometimes with brown ring at base; interstitial teeth absent; terminal spine 1.5-4 cm long, subulate, with shallow open groove at base,

decurent to first or second teeth, gray. INFLORESCENCE narrowly paniculate, with scape 2-5 m tall, of 10-19 lateral ascending branchlets in upper  $\frac{1}{3}$ - $\frac{1}{2}$  of flowering stalk, the stalk slender, green. FLOWERS in small congested clusters, 30-40 mm long; tepals spreading, soon wilting after anthesis, equal to subequal, 11-13 mm long, 2.5-4 mm wide, linear conduplicate, abruptly hooded at tips, yellow; filaments 25-30 mm long, inserted near or at top of tube, light yellow, the anthers (7-)9-16 mm long, yellow; ovary 16-22 mm long, stoutish, with constricted neck 2-2.5 mm long, light green to green, the style 25-38 mm long when stigma is receptive; floral tube shallow, open, 2-4.5 mm long, 8-10 mm broad, light green to light yellow. CAPSULES linear to oblong, 30-45 mm long, 10-14 mm wide, stipitate, obtuse to apiculate, striate; seeds 5-6.5 mm long, 4-4.5 mm broad. --Open rocky slopes in upper desert scrub, chaparral and juniper woodland: Mohave, Yavapai cos; 850-2200 m (2800-7200 ft); May-Jul. May hybridize with *A. deserti* ssp. *simplex* in Yavapai Co. and *A. utahensis* ssp. *utahensis* in Mohave Co.

**Agave murpheyi** Gibson (for W. C. Murphey). Hohokam Agave. --Rosettes caespitose, ca. 0.6-1.2 m high, 0.8-1.4 m broad. LEAVES numerous, 50-80 cm long, 6-10 cm wide, linear-spathulate, broadest just above middle, short-acuminate, ascending, firm, thin, shallowly concave towards apex, thickish and convex towards base, easily cut, light glaucous green to yellowish-green, often with light cross-zoned patterns, the margins undulate; teeth small, 3-4 mm long, mostly porrect to leaf edge to upwardly flexed, mostly 1-2 cm apart, dark brown to black or gray; interstitial teeth absent; terminal spine short, thick, 12-20 mm long, conical, dark brown to pruinose gray, decurrent 3.4-5 cm down to uppermost teeth. INFLORESCENCE with scape 3-4 m tall, narrowly paniculate, compact, of 10-16 short, ascending lateral branchlets in upper  $\frac{1}{4}$  of flowering stalk, the stalk thickish, green. FLOWERS in congested umbels, thick, stout, 51-75 mm long; tepals persistently erect, slightly clasping filaments, leathery, unequal, cream, the outer ones 15-19 mm long, 5-7 mm wide, with roughened, thick, brownish hooded tip, the inner ones 14-17 mm long, 4-5 mm wide; filaments (33-)45-50 mm long, inserted unequally, (6.5-)8-12 mm above base of tube, cream or pale yellow, the anthers (16-)22-26 mm long, yellow; ovary (18-)22-40 mm long, with a scarcely narrowed neck 0.5-3(-5) mm long, pale cream-green, waxy, the style 3.4-5 cm long when stigma is receptive, cream-yellow; floral tube deep, 14-20 mm long, (11-)14-19 mm broad, slightly bulging at base of tepals, pale cream-green. CAPSULES 5-6.9 cm long, 2-2.8 cm broad, narrowly obovate to oblong or ovate-oblong, long stipitate and beaked; seeds thin, (7-)9-11 mm long, 6-7 mm broad; bulbils always produced on pedicels.  $2n = 60$ . --Usually in close proximity of major drainage systems on open hilly slopes or alluvial terraces in desert scrub with pre-Columbian agricultural and settlement features, having been cultivated by the Hohokam: Gila, Pinal, Maricopa, Yavapai cos; 400-900 m (1350-2950 ft); Mar-Jul; Son., Mex. Hybridizes with *A. chrysantha* in Gila Co.

**Agave palmeri** Engelm. (for E. Palmer). Palmer Agave. --Rosettes generally single, 4-13 dm tall, 7-13 dm broad, open. LEAVES numerous, 35-92 cm long, 3.5-19 cm wide, linear-lanceolate to lanceolate, widest near middle, acuminate to long-acuminate, ascending to spreading, rigid, somewhat concave towards apex, thick and convex towards base, light glaucous green, pale green to deep green, often with reddish-maroon tinge, the margins straight or somewhat undulate; teeth mostly uniform, slender, firmly attached, mostly reflexed or porrect, the larger teeth 4-6 mm long, closely set, 5-12 mm apart, dark brown or reddish brown, to pruinose gray; interstitial teeth 4-6 on upper  $\frac{2}{3}$  of leaf; terminal spine 3-6 cm long, strong, acicular, openly grooved above base, red-brown or brown to gray, decurrent to first (or second) teeth. INFLORESCENCE with scape (1.75-)4.2-6.5(-7.2) m high, broadly paniculate, of (8-)11-26(-32) lateral horizontal branchlets in upper  $\frac{1}{3}$  of flowering stalk, the longer ones 6-38 cm long, the stalk thick, glaucous-green or purple-maroon. FLOWERS in congested umbels, reddish in bud, durable, 46-64 mm long, erect, cylindric-urceolate, with a strong musky-sour fragrance at anthesis; tepals persistently erect, clasping the filaments, leathery, cream, pale yellow, light green or pinkish-maroon, becoming darker towards tip, unequal, the outer ones 12-18 mm long, 6-11 mm

wide, the inner ones (6.5-)9-14 mm long, 9-14 mm wide; filaments 40-58 mm long, inserted at 2 levels, 5-9 mm and 4-8 mm above base of tube, cream, light yellow or pinkish, with pink or maroon blush, especially towards apex, the anthers 11-25 mm long, yellow; ovary 18-36 mm long, stout, thickish, with slightly constricted neck 0.5-4(-6) mm long, angled to roundish, light to medium green, the style 39-62 mm long when stigma is receptive, cream or light yellow, usually with maroon blush; floral tube 10-18 mm long, 10-26 mm wide, slightly bulging at base of tepals, cream or light to medium green, sometimes with maroon blush. CAPSULES 3.5-6 cm long, 1.8-2 cm wide, linear-oblong to oblong or pyriform, short and broadly stipitate, short- to long- apiculate; seeds 5-7 mm long, 4-5 mm wide, thin.  $2n = 60$ . --Open hills and slopes of oak woodland and grassland: Cochise, Gila, Graham, Pima, Pinal, Santa Cruz cos.; 1000-1950 m (3300-6400 ft); Jun-Oct; NM; Son., Mex. Hybridizes with *A. chrysantha* in Cochise and Pima cos.

**Agave parryi** Engelm. (for C. C. Parry) Parry Agave. --Rosettes 15-75 cm high, 25-85 cm broad, compact, flat-topped or globose. LEAVES numerous, closely imbricate, 10-65 cm long, 4.5-20 cm wide, lanceolate to broadly ovate, widest just below middle, short-acuminate to truncate, rigid, thick, nearly flat to concave towards apex, rounded below, little constricted above base, glaucous gray to light green, the margins nearly straight to repand or undulate; teeth small, the largest above mid-blade 3-8 mm long, mostly 1-2(-3) cm apart, mostly straight to reflexed, dark brown to grayish; interstitial teeth absent; terminal spine 15-30 mm long, openly grooved, dark brown aging to gray, decurrent to the first or second teeth. INFLORESCENCE with scape 4-6 m tall, congested, of 20-36 lateral, slightly ascending branchlets on upper ½ of flowering stalk, the stalk thick, glaucous-green to gray. FLOWERS pink to red in bud, in congested clusters, 43-81 mm long, with little to no fragrance; tepals subequal, 13-27 mm long, 2-7 mm wide, linear, ascending to erect, soon involute and wilting, greenish yellow to deep yellow; filaments (35-)40-58(-65) mm long, inserted 4-11 mm above base of tube, yellow, the anthers 12-34 mm long, yellow; ovary 20-48 mm long, usually with a neck (2-)6-9 mm long, slightly angled longitudinally or rounded, green, the style 52-70 mm long when stigma is receptive; floral tube 6-12 mm long, 11-21 mm wide, deep green. CAPSULES 3.5-5 cm long, 1.5-2 cm wide, oblong to obovate, stout-pedicellate, short-stipitate, beaked; seeds 7-8 mm long, 5-6 mm wide.  $2n = 120$ . --4 vars., 3 in AZ; NM; Chih., Dur., Son., Zac., Mex.

Var. **couesii** (Engelm. ex Trel.) Kearney & Peebles (for E. Coues). Coues Agave. --Rosettes 35-55 cm high, 40-65 cm broad. LEAVES 25-42(-47) mm long, 6.5-11 cm wide. FLOWERS 43-58(-60) mm long; tepals 13-21 mm long; filaments 33-44 mm long, inserted 4-8 mm above base of tube; ovary 20-34 mm long, the style 52-62 mm long when stigma is receptive; floral tube 6-9 mm high, 11-15(-21) mm wide.  $2n = 120$ . --Open slopes of grassland, chaparral, pine-oak woodlands: Coconino, Gila, Yavapai cos.; 1100-2100 m (3650-7000 ft); May-Jul. Hybridizes with *A. chrysantha* in Gila Co.

Var. **huachucensis** (Baker) Little ex L. D. Benson (Huachuca, for the Huachuca Mts.). --Rosettes 45-75 cm high, 75-85 cm broad. LEAVES 32-65 or more cm high, 10-20 cm wide. FLOWERS 62-81 mm long; tepals 20-27 mm long; filaments 46-58 mm long, inserted 6-8 mm above base of tube; ovary 34-47 mm long; floral tube 8-9 mm high, 14-17 mm wide. [*A. huachucensis* Baker]. --Open oak woodland, pine forests: Cochise, Santa Cruz cos.; 1550-2150 m (5000-7000 ft); Jun-Jul; Son., Chih., Mex.

Var. **parryi**. --Rosettes (35-)40-60 cm high, 60-75 cm broad. LEAVES (18-)25-50 cm long, (4.5-)8-12 cm wide, linear-ovate. FLOWERS 60-77 mm long; tepals (17-)19-24 mm long; filaments 40-54 mm long, inserted 6-11 mm above base of tube; ovary (27-)30-47 mm long, the style 60-70 mm long when stigma is receptive; floral tube 9-12 mm high, 14-18 mm wide. [*A. chihuahuana* Trel., *A. patonii* Trel.]. --Open slopes of grassland, chaparral, and pine-oak woodland: Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Santa Cruz cos.; 1200-2800 m (4000-9200 ft); Jun-Jul;



NM; Chih., Dur., Guan., Mex. Hybridizes with *A. chrysantha* in Gila Co. and *A. schottii* var. *schottii* in Pima and Cochise cos.

**Agave parviflora** Torrey (small flowers). --Rosettes single or caespitose, 10-15 cm high, 15-20 cm broad. LEAVES numerous, dimorphic in one variety, 6-10 cm long, 0.8-1 cm wide, or 15-18 cm long, 1.2 cm wide, oblong-linear, widest at or above middle, short-acuminate, planar above, convex towards base, the margins straight, with conspicuous white fibers, minutely toothed towards base, dark green with white budprinting above and below; terminal spine weak-subulate, 5-8 mm long, brown to white. INFLORESCENCE with scape 10-25 dm tall, the inflorescence in upper ½ of flowering stalk, the stalk slender, green or often reddish. FLOWERS in clusters of 1-4, 13-17 mm long; tepals 2-5 mm long, subequal with outer ones slightly longer than inner ones, broadly lanceolate, obtuse, erect to incurved, or flexed downward, cream to pale yellow; filaments 9-15 mm long, inserted at base of tube or 1 mm above base, cream, the anthers 5-8 mm long, yellow; ovary 6-9 mm long with short neck, cream to pale yellow or yellow, the style 10 mm long when stigma is receptive, straight to deflexed; floral tube 3-7 mm long, 3-5.5 mm wide, pale cream to yellow, urceolate. CAPSULES 6-10 mm long, 6-10 mm wide, orbicular, sessile to short pedicellate, non-stipitate, apiculate; seeds 3 mm long, 2.5 mm wide, much thickened on curved side. --2 subspp., 1 in AZ; Son., Mex.

Subsp. **parviflora**. --LEAVES 6-10 cm long, 0.8 cm wide, not dimorphic. INFLORESCENCE with scape 10-18 dm tall. FLOWERS in clusters of 2-4, 14-17 mm long; tepals 2-3.5 mm long, erect to incurved; filaments 9-14 mm long, inserted 1 mm above base of tube; ovary 6-7 mm long; floral tube 5-7 mm long, 4.5-5.5 mm wide. --Open slopes of desert grassland and oak woodland: Pima, Santa Cruz cos.; 1100-1400 m (3600-4600 ft); May-Aug; Son., Mex.

**Agave schottii** Engelm. (for A. Schott). Shindagger Agave, Amole, Amoliyo. --Rosettes densely caespitose, 30-60 cm high, 60-120 cm broad. LEAVES several to numerous, 20-40(-50) cm long, 6-25 mm wide, narrowly linear to linear, widest at the base, straight, incurved or falcate, pliant to rather stiff, flat or somewhat convex towards apex, convex to deeply convex towards base, yellowish green to deep green, the margins with a narrow brown and white border with or without, white brittle threadlike fibers; teeth absent; terminal spine 8-20 mm long, brown to gray, fine or stoutish, weak and brittle to somewhat firm, close-grooved for most of its length. INFLORESCENCE with scape 1.3-2.5 m tall, spicate, subspicate, or narrowly racemose-paniculate, frequently crooked with numerous branchlets in upper ⅓-¼ of flowering stalk, the stalk slender, green. FLOWERS 30-50 mm long, single or usually in clusters of 2-3(-6), with a strong, sweet fragrance; tepals subequal, (7-)11-16 mm long, 4-6 mm wide, spreading unequally at anthesis, suberect to reflexed, bright yellow to deep yellow; filaments 15-22 mm long, inserted high in tube at 1 or 2 levels, the outer ones (5-)6-10 mm above base of tube, the inner ones 5-11 mm above base of tube, pale yellow to bright yellow, the anthers (7.5-)10-17 mm long, pale yellow to deep yellow; ovary 8-15 mm long with constricted curved neck 3-9 mm long, greenish-yellow to lime-green, the style 20-26 mm long when stigma is receptive, yellow; floral tube deeply funnelform, (8-)9-14 mm long, 5-8 mm wide, becoming very narrow towards base, lime-green to yellow. CAPSULES 10-22 mm long, obovoid, rounded to apiculate; seeds 3-3.5 mm long.  $2n = 60, 120$ . --2 vars., 2 in AZ; sw NM; Son., Mex.

Var. **schottii**. --LEAVES numerous, 7-12 mm wide, narrowly linear, pliant, usually falcate, yellowish green with conspicuous bud imprinting; terminal spine 8-12 mm long, fine, weak and brittle, gray. INFLORESCENCE with scape 1.6-2.5 m tall, 6-14 mm in diameter, spicate. FLOWERS 29-42 mm long, single or in clusters of 2-3; tepals light yellow, zygomorphic, unequally spreading; filaments inserted high in tube, 6-13 mm above base; ovary 8-15 mm long with a strongly curved neck 3-9 mm long; floral tube 8-11(-14) mm long, 5-8 mm wide.  $2n = 60, 120$ . [*A. geminiflora* var. *sonorae* Torrey, *A. schottii* var. *serrulata* Mulford, *A. mulfordiana* Trel.]. --Low and high desert scrub, grassland, juniper and oak woodlands: Cochise, Graham, Pima, Santa Cruz cos; 900-2000 m (3000-

6500 ft); May-Jul; sw NM; Son., Mex. Hybridizes with *A. deserti* subsp. *simplex* in Pima Co., *A. palmeri* or *A. parryi* var. *parryi* in Cochise Co., and possibly *A. chrysantha* in Cochise and Pima cos.

Var. *treleasei* (Toumey) Kearney & Peebles (for W. Trellease). --LEAVES several, 12-25 mm wide, linear, deep green, without bud imprinting, somewhat stiff, incurved to slightly falcate; terminal spine 12-19 mm long, rather stout and firm, brown. INFLORESCENCE with the scape 2-4 m tall, 2.6-3.3 cm in diameter, subspicate to narrowly racemose-paniculate, the longer branchlets 27-40 mm long, the shorter ones 0.7-1.2 mm long. FLOWERS 35-50 mm long, usually 2(-6) per cluster; tepals 12 mm long, deep yellow, unequally spreading; filaments inserted 8 mm above base of tube; ovary 16 mm long with a somewhat curved neck 8 mm long; floral tube 11 mm high, 13 mm wide. [*A. treleasei* Toumey]. --High desert scrub, grassland, juniper and oak woodlands: Pima, Cochise cos; 1100-2000 m (3600-6500 ft); May-Jul.

**Agave toumeyana** Trel. (for J. W. Toumey). Toumey's Agave. --Rosettes (3-)10-50 cm high, 15-60 cm wide, densely caespitose. LEAVES several to numerous, 8.5-46 cm long, 0.6-2.4 cm wide, linear to linear-lanceolate, straight, falcate, or upcurving, planar towards apex, thickly convex towards base, rather rigid, light green to yellowish-green to dark green, bud-imprinted above and below; margins with a fine brown margin and white threadlike fibers, sometimes serrulate at base or denticulate  $\frac{2}{3}$  down leaf to base; spine 0.6-2 cm long, subulate to filiform, with a short narrow groove above, brown to gray. INFLORESCENCE with scape 1.5-3 m tall, subspicate, laxly or densely flowered in upper  $\frac{1}{3}$  of flowering stalk, the stalk slender, green or red. FLOWERS generally in pairs on short pedicels, 16-28 mm long, flexed downward, fragrance not discernable; tepals subequal, 7-10 mm long, 2.25-4 mm wide, cream to light chartreuse green, clasping the filaments; filaments 11-16 mm long, inserted 1-3.5 mm above base of tube, white, the anthers 7-13 mm long, yellow-cream; ovary 8-16 mm long with constricted, angled neck 3-7 mm long, cream-green, the style 18-24 mm long when stigma is receptive; floral tube 3-4.5 mm high, 6-10 mm wide, angled, cream-green. CAPSULES 9-15 mm long, 9-10 mm wide, sessile, short-beaked; seeds 3 mm long, 2 mm wide, thickish.  $2n = 60, 120$ . --2 vars., only in AZ.

Var. *bella* Breitung (pretty). --LEAVES numerous, 100 or more, (3-)9-20(-27) cm long, 0.6-1.2 cm wide, of equal length giving rosette a flat-topped appearance, the margins with a brown border replaced by small teeth  $\frac{1}{2}$  to  $\frac{2}{3}$  down leaf towards base. FLOWERS 16-21 mm long; tepals 6.5-7 mm long, 2.5-3 mm wide; filaments 11-13 mm long; ovary 8-12 mm long with neck 2-6 mm long.  $2n = 60$ . --Open rocky, often limestone or basalt slopes of desert scrub, chaparral, and pinon-juniper woodland: Gila, Maricopa, Yavapai cos.; 800-1700 m (2700-5600 ft); May-Jun. Hybridizes with *A. chrysantha* in Gila, Maricopa, and Yavapai cos.

Var. *toumeyana*. --LEAVES several, ca 40-70, 19-46 cm long, 1.2-2 cm wide, of unequal length, the margins with brown border continuous to leaf base or only to small teeth near and at base. FLOWERS 21-28 mm long; tepals 8-10 mm long, 3-4 mm wide; filaments 12-17 mm long; ovary 10-16 mm long with neck 3-7 mm long.  $2n = 120$ . --Open rocky, often limestone or basalt slopes of desert scrub, chaparral, and pinon-juniper woodland: Gila, Graham, Maricopa, Pinal cos.; 600-1500 m (2000-5000 ft); May-Aug.. Hybridizes with *A. chrysantha* in Gila and Maricopa cos.

**Agave utahensis** Engelm. (of Utah). Utah Agave. --Rosettes 15-60 cm high, 20-100 cm broad, open to dense and compact, single to caespitose. LEAVES several to numerous, 12-50 cm long, 2.5-5.5 cm wide, linear-lanceolate to lanceolate, attenuate to long-attenuate, stiff, straight, falcate, or upcurving, planar to concave towards apex, convex below, yellow-green, green, or bluish-gray glaucous, the margins straight; teeth 2-5 mm long, 1-4 cm apart, blunt, thick, light gray to white, with conspicuous brown ring at base, friable, or rarely absent; interstitial teeth absent; terminal spine 2-20 cm long, subulate, decurrent to upper teeth, openly grooved above, light gray or white. INFLORESCENCE with scape 1.5-5 m tall, spicate, racemose, or narrowly paniculate, with several

to numerous conspicuously flattened lateral branchlets up to 10 cm long in upper  $\frac{1}{2}$ - $\frac{2}{3}$  of flowering stalk, the stalk slender to thickish, green. FLOWERS in clusters of 2-12, 23-43 mm long, urceolate, fragrance not discernable; tepals subequal, 7-12 mm long, 3-5(-7) mm wide, linear, conduplicate, the outer ones strongly overlapping the inner ones, all persistently erect, connivent, strongly clasping the filaments, deep yellow; filaments 13-24 mm long, inserted at base of tube or 1-3 mm above the base, white, the anthers 5-12 mm long, deep yellow, aging yellowish-orange; ovary 12.5-29 mm long with a constricted neck 3.5-8.5(-10) mm long, yellowish-green to chartreuse-green, the style 18-21 mm long when stigma is receptive, white; floral tube 1-4 mm high, 6.5-11.5 mm wide, bulging at tepal bases, urceolate, yellowish-green to chartreuse-green. CAPSULES ovoid to oblong, 1-2.5 cm long, 1-1.5 cm broad, short-beaked, the seeds 2-4 mm long, 3-4 mm wide, thick.  $2n = 60$ . --2 subspp., both in AZ; CA, NV, UT.

Subsp. **kaibabensis** (McKelvey) Gentry (of the Kaibab Plateau). --Rosettes (20-)30-60 cm high, 40-100 cm broad, single or sparingly caespitose. LEAVES numerous, (25-)27-50 cm long, 3-5.5 cm wide, lanceolate, usually straight or upcurved, dark green to bluish gray glaucous; teeth 2-4 cm apart, the terminal spine 2-4 cm long. INFLORESCENCE with scape 3.5-5 m tall, 4.5-7 cm in diameter, narrowly paniculate, moderately to very dense, with several to numerous lateral branchlets, the longer ones 7-10 cm long, the flowering stalk thickish. FLOWERS in clusters of 4-12, (26-)29-43 mm long; ovary 16-29 mm long.  $2n = 60$ . [*A. kaibabensis* McKelvey, *A. utahensis* Engelm. var. *kaibabensis* Breitung]. --Open rocky, usually limestone slopes of Mohave and Great Basin desert scrub and Great Basin conifer woodland: Coconino, Mohave cos.; 700-2400 m (2300-7800 ft); May-Jul.

Subsp. **utahensis** --Rosettes small, 15-30(-35) cm high, 15-40 cm wide, freely caespitose. LEAVES several, 12-30 cm long, 1-2.5 cm wide, linear-lanceolate, usually upcurved or falcate, light green to bluish gray glaucous; teeth 1-2.5 cm apart, the terminal spine 2-20 cm long. INFLORESCENCE with scape 1-3/4-4 m tall, 2.5 cm or less in diameter, spicate, racemose, or very narrowly-paniculate, lax or somewhat dense with few to several flower clusters, the branchlets usually 5 cm or less in length, the flowering stalk slender. FLOWERS in clusters of 2-8, 23-32 mm long; ovary 12.5-22 mm long. --3 vars., 1 in AZ.

Var. **utahensis** --Leaves light to dark green, the terminal spine 2-4 cm long. [*A. newberryi* Engelm., *A. haynaldii* Tod. var. *utahensis* Terrac., *A. scaphoidea* Greenm. & Roush, *A. utahensis* Engelm. var. *discreta* M. E. Jones]. --Open rocky, usually limestone slopes of Mohave and Great Basin desert scrub and Great Basin grassland: Coconino, Mohave cos; 1100-1700 m (3600-5500 ft); May-Jun; se NV, sw UT. Plants near Burro Creek, Mohave Co., are unusual and may represent hybridization involving this taxon (or *A. utahensis* ssp. *kaibabensis*) and *A. mckelveyana* in Mohave Co.

**Agave sp.** Grand Canyon Agave. --Rosettes caespitose, open, ca. 0.75-1 m high, 0.75-1 m broad. LEAVES numerous, 78 cm long, 11 cm wide, broadest just below middle, lanceolate, acuminate, ascending to spreading, firm, concave towards apex, thickish and convex towards base, easily cut, slightly glaucous green to dark green, with cross-zoned very light patterns; margins straight or undulate; teeth variable, 4-7 mm long, upturned or reflexed, weakly attached, red-brown aging to gray, 1.2-2.4 cm apart; interstitial teeth (2-)3-7 on upper  $\frac{2}{3}$  of leaf; terminal spine 2.5-3 cm long, slender, openly grooved, dark brown to gray, decurrent for 7.2 cm to upper teeth. INFLORESCENCE with scape 2.7-3.4 m high, narrowly paniculate, open, with 9-12 short lateral branchlets in upper  $\frac{1}{2}$  of, and perpendicular to, flowering stalk, the stalk somewhat slender, maroon-glaucous pruinose. FLOWERS in dense clusters of 32-36, 76-81 mm long, thick, durable, fragrance unknown; tepals leathery, persistingly erect, clasping filaments, very unequal, the outer ones 20-21.5 mm high, 5-8 mm wide, broadly lanceolate, cream with tinge of light green, with brown-maroon felt-like rugose hooded tips, the inner ones 15.5-19 mm high, 4-5 mm wide, strongly keeled; filaments 48-50 mm long, inserted subequally 7.5-9 mm above base of tube, cream, flecked with maroon, the anthers 22-25 mm long,

yellow; ovary 33-46 mm long, thick, with slightly constricted neck 4-6 mm long, chartreuse-green, the style 60-70 mm long when stigma is receptive; floral tube 15.5-17 mm long, 15-18 mm wide, very thick, bulging at base of tepals, chartreuse-green. CAPSULES and seeds unknown.  $2n = 120$ . --Mohave desert scrub: known only from Grand Canyon, Coconino Co.; 700-900 m (2300-2900 ft). Sep. May have been cultivated by pre-Columbian people.

#### NOTES FOR COLLECTORS

Herbarium specimens should include descriptions of rosette (solitary or caespitose), leaf number (few, several, or numerous), leaf color, inflorescence size and shape, flower color, odor, and measurements, taken preferably during or immediately following anthesis. A specimen should also include a leaf with marginal teeth (if present) and terminal spine, cross-section of mid-blade and base of leaf, inflorescence bracts, flowers (including longitudinal sections), and photos.

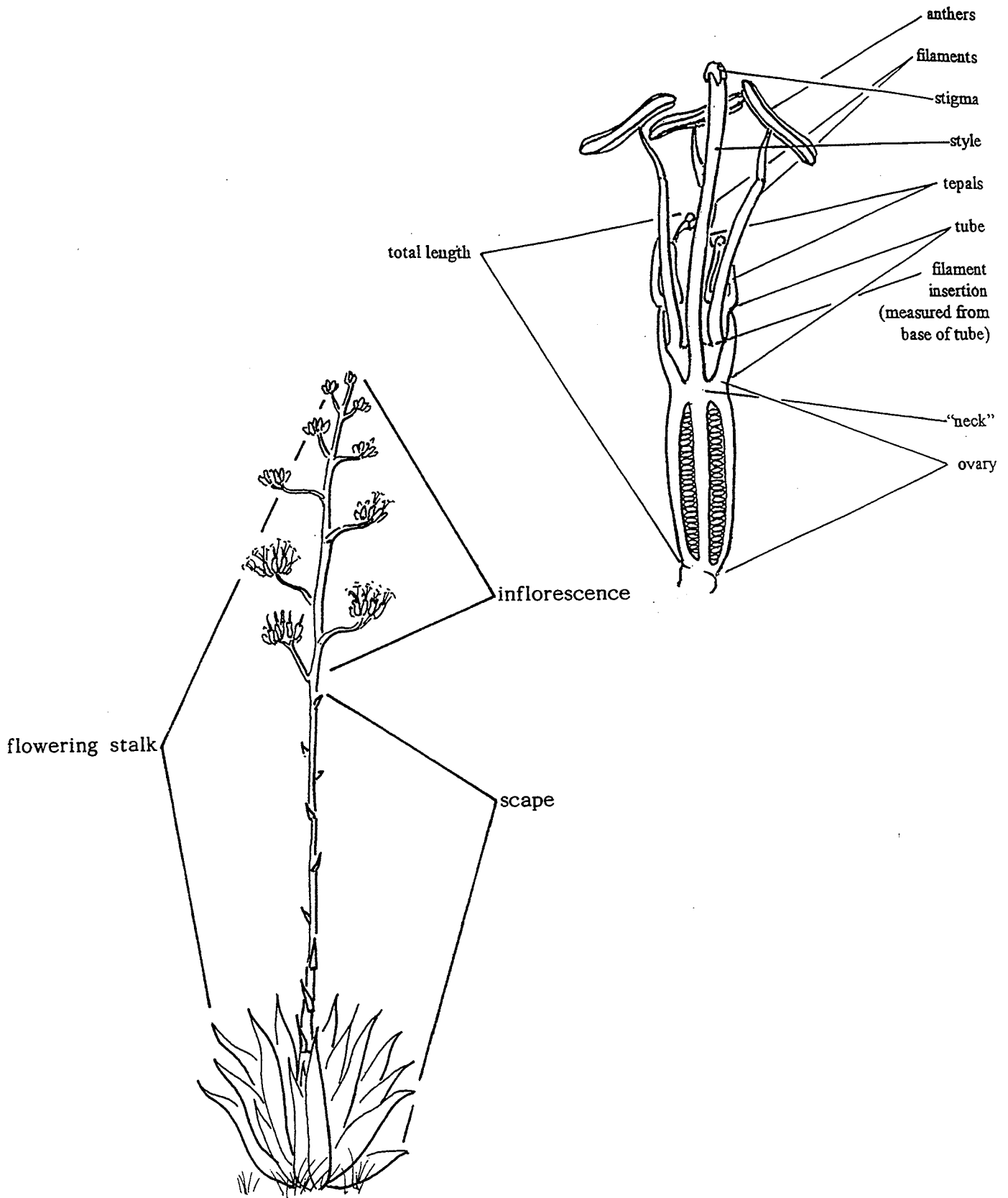
#### NOMENCLATRURAL NOTE

The following nomenclatural change is necessary in support of this treatment:

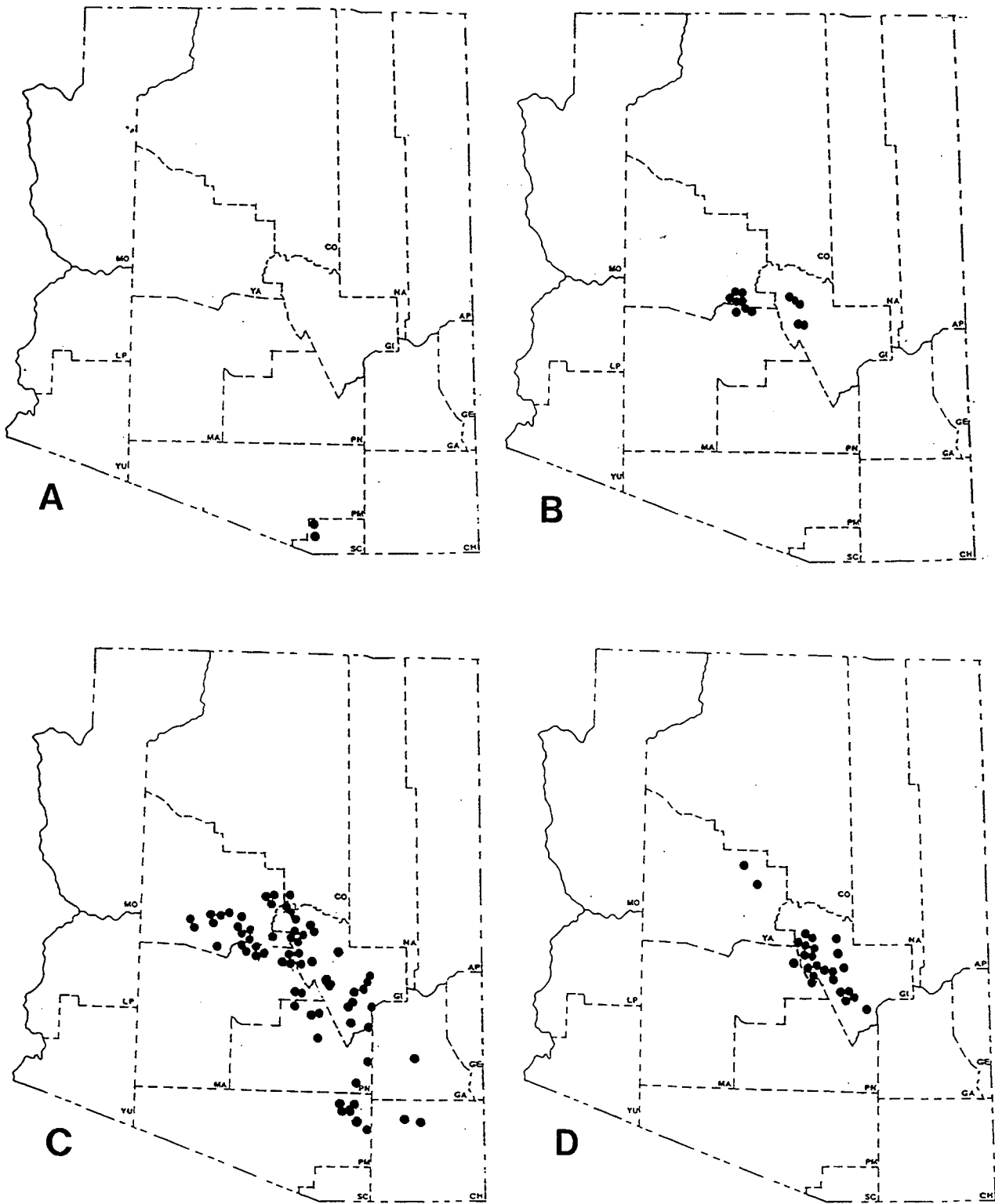
*Agave* × *arizonica* Gentry & J. Weber, pro sp. Basionym: *Agave arizonica* Gentry & J. Weber, *Cact. Succ. J.* (Los Angeles) 42:223, 1970. Holotype: Arizona. Grown at the Desert Botanical Garden, Phoenix; introduced from near summit of the New River Mountains, near Maricopa-Yavapai co. line, Weber s. n. (US). [*Agave chrysantha* Peebles × *Agave toumeyana* Trel.].

#### ACKNOWLEDGMENTS

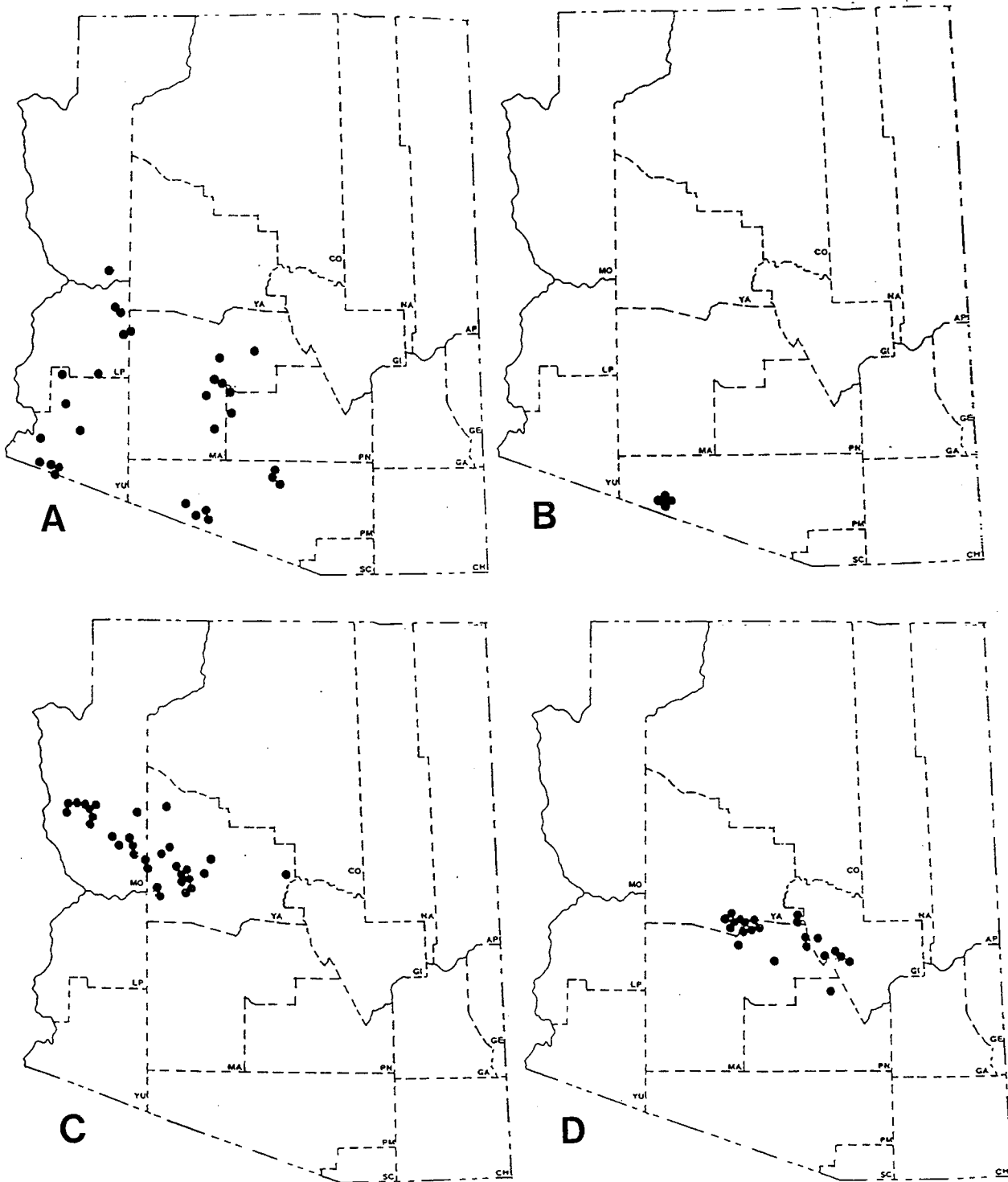
I thank Dr. Donald Pinkava for his kind assistance and guidance. I am grateful to the curators or directors of the following herbaria: ARIZ, ASC, ASU, CAS, CM, GCNP, GH, MINN, NMA, MO, and US, and to the staff at Organ Pipe Cactus National Monument and Grand Canyon National Park.



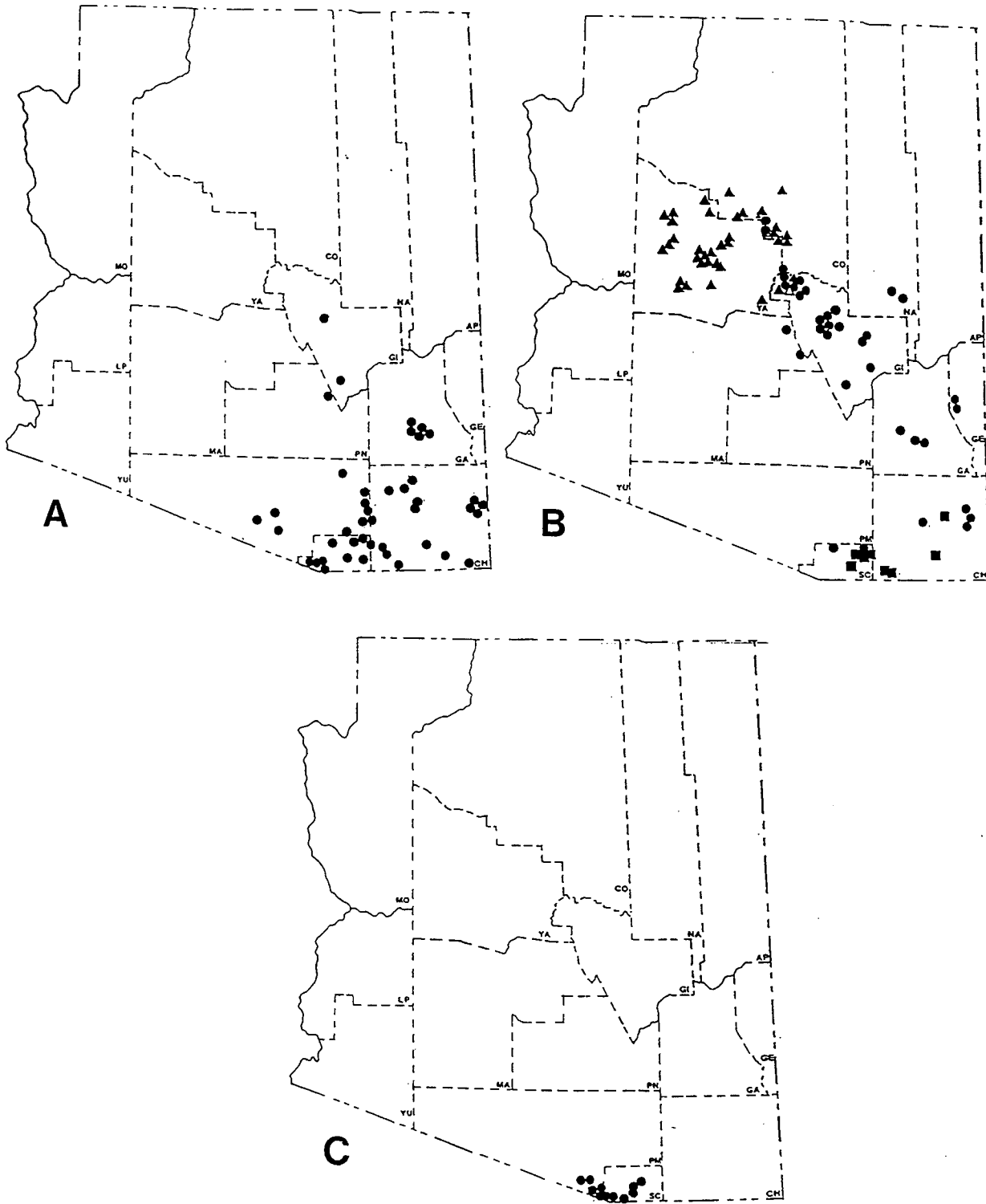
Agavaceae Fig. 1. Features of an *Agave* plant and flower.



Agavaceae Fig. 2. Distribution of: A, *Agave americana* var. *expansa*; B, *Agave*  $\times$ *arizonica*; C, *Agave chrysantha*; and D, *Agave delamateri*.

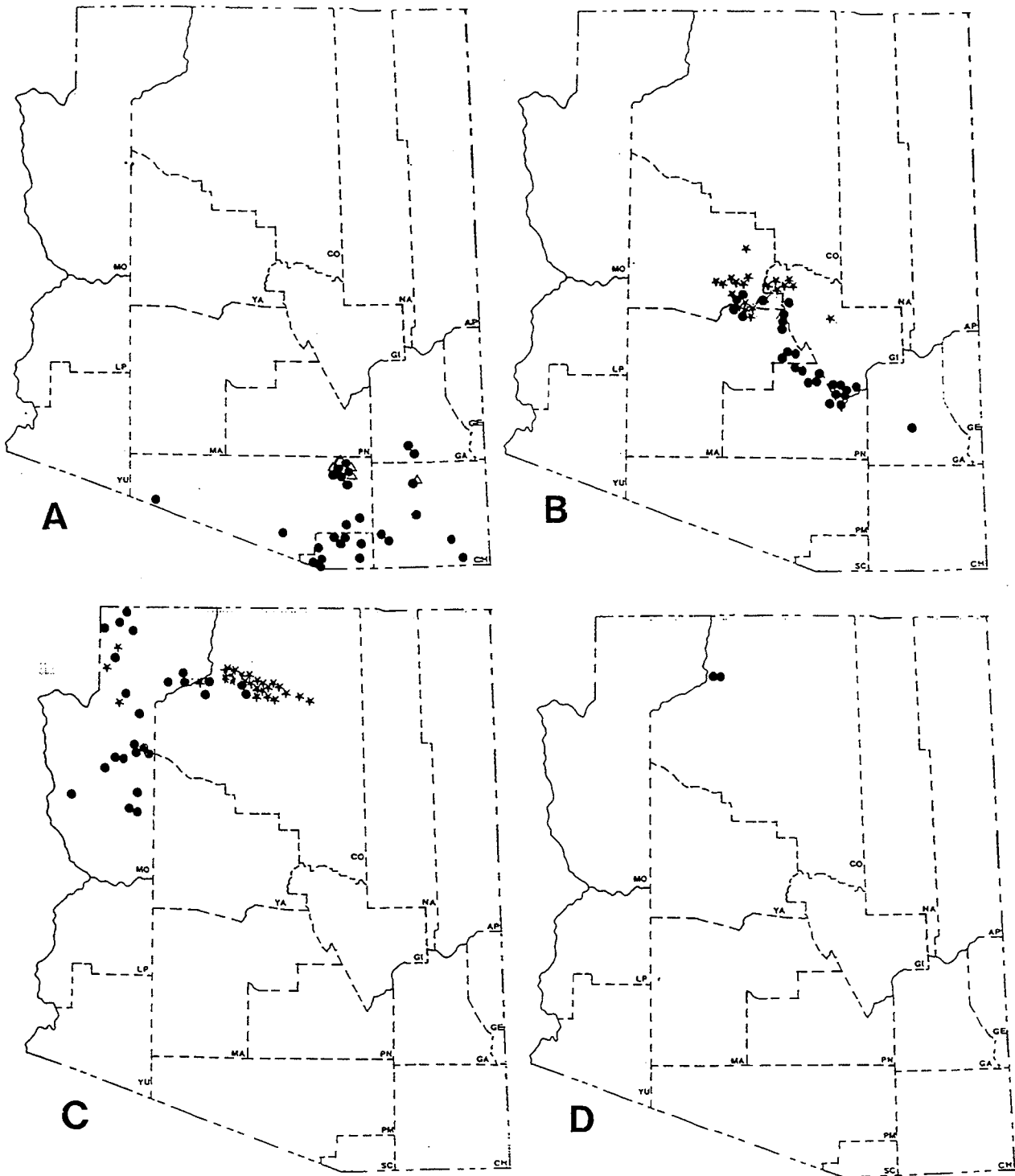


Agavaceae Fig. 3. Distribution of: A, *Agave deserti* ssp. *simplex*; B, *Agave deserti* ssp. *simplex* × *Agave schottii* var. *schottii*; C, *Agave mckelveyana*; and D, *Agave murpheyi*.

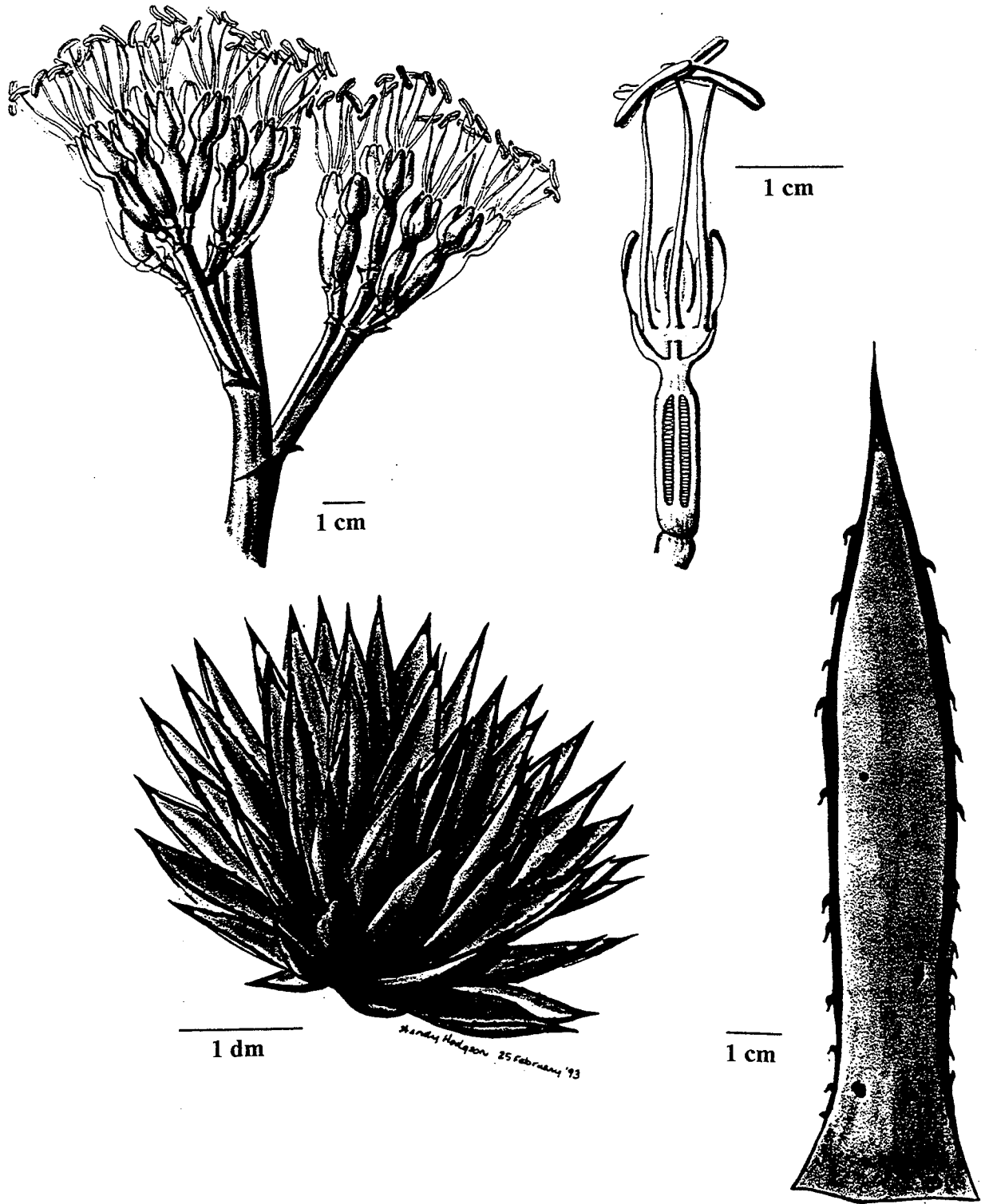


Agavaceae Fig. 4. Distribution of: A, *Agave palmeri*; B, *Agave parryi* var. *couesii* (triangles), *Agave parryi* var. *huachuensis* (squares), *Agave parryi* var. *parryi* (dots); and C, *Agave parviflora* ssp. *parviflora*.

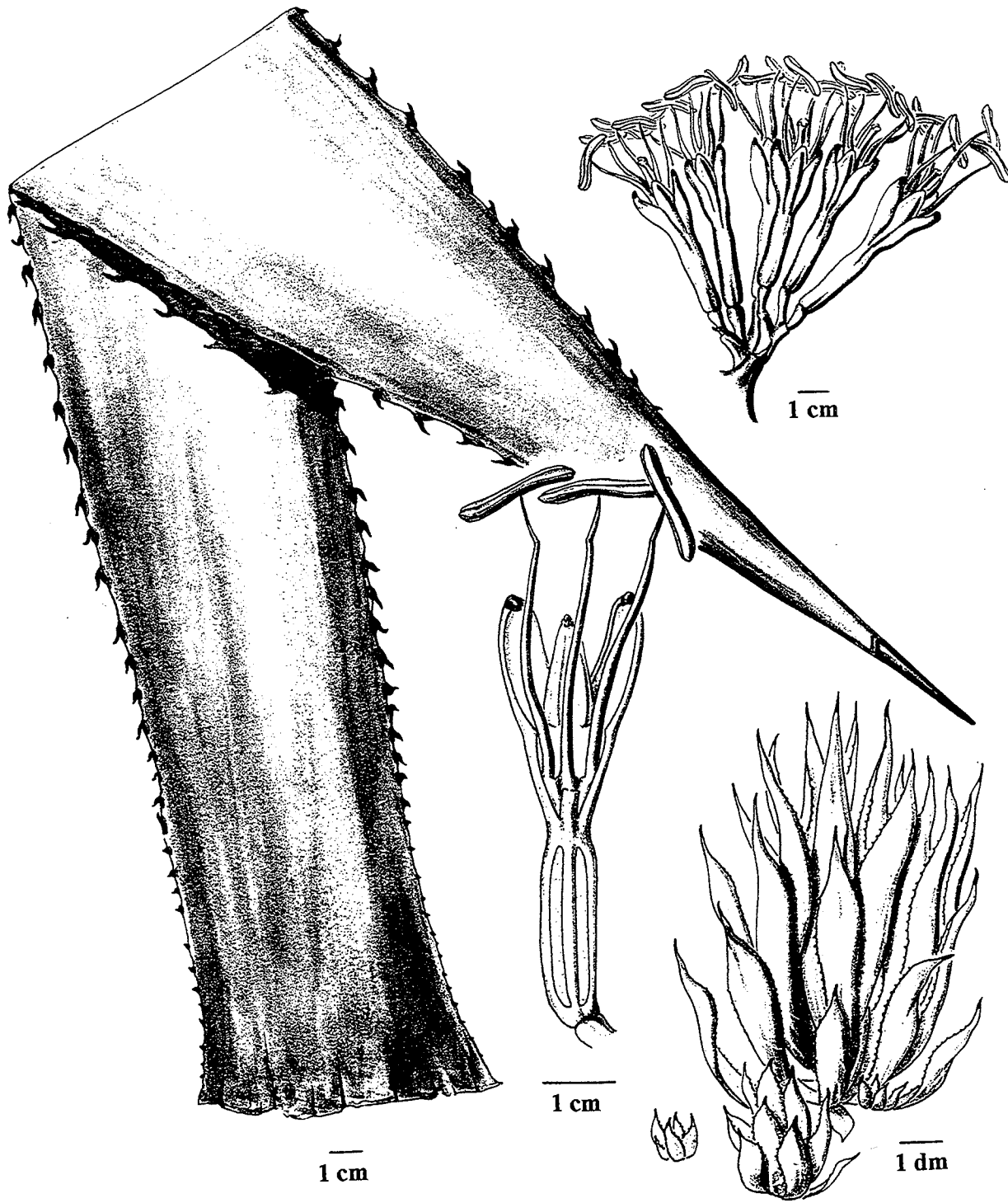




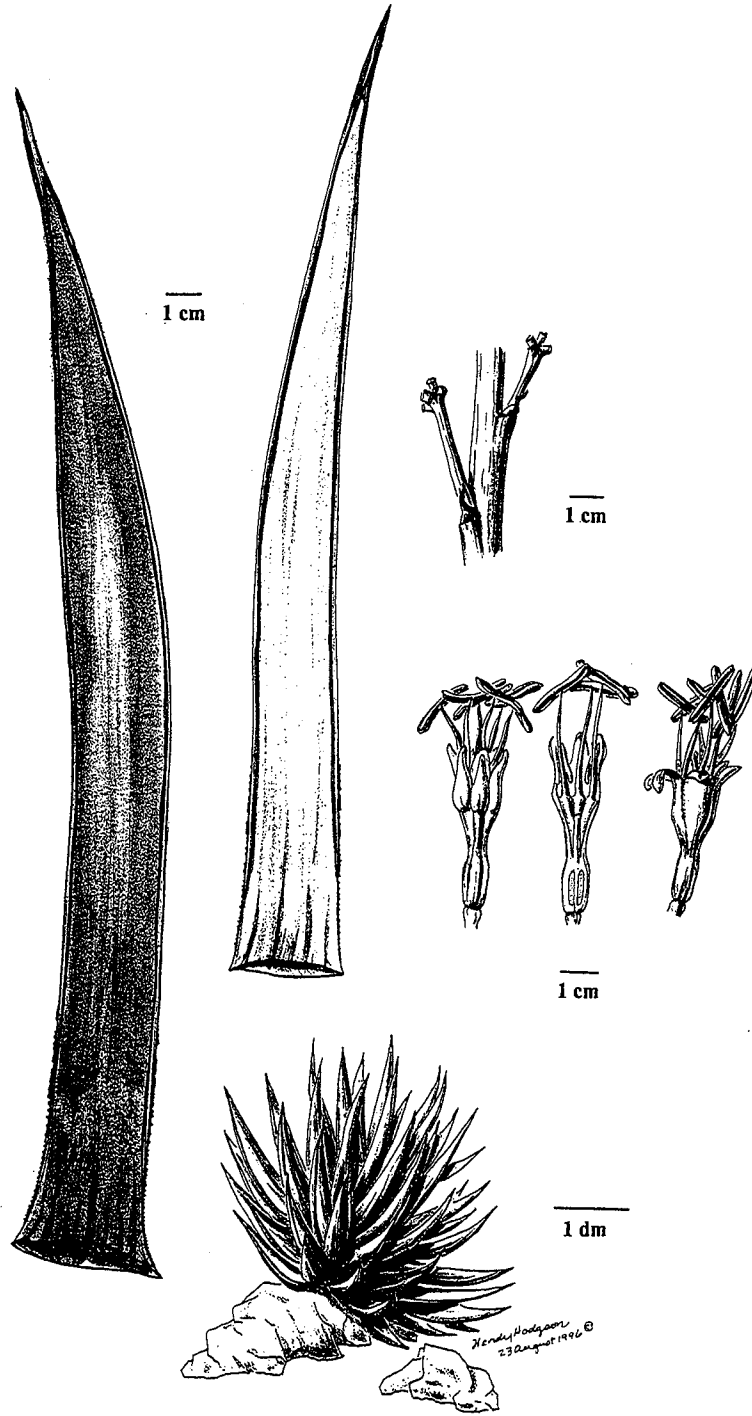
**Agavaceae** Fig. 5. Distribution of A, *Agave schottii* var. *schottii* (dots), *Agave schottii* var. *treleasei* (triangles); B, *Agave toumeyana* var. *bella* (stars), *Agave toumeyana* var. *toumeyana* (dots); C, *Agave utahensis* ssp. *kaibabensis* (stars), *Agave utahensis* ssp. *utahensis* var. *utahenesis* (dots); and D, *Agave* sp.



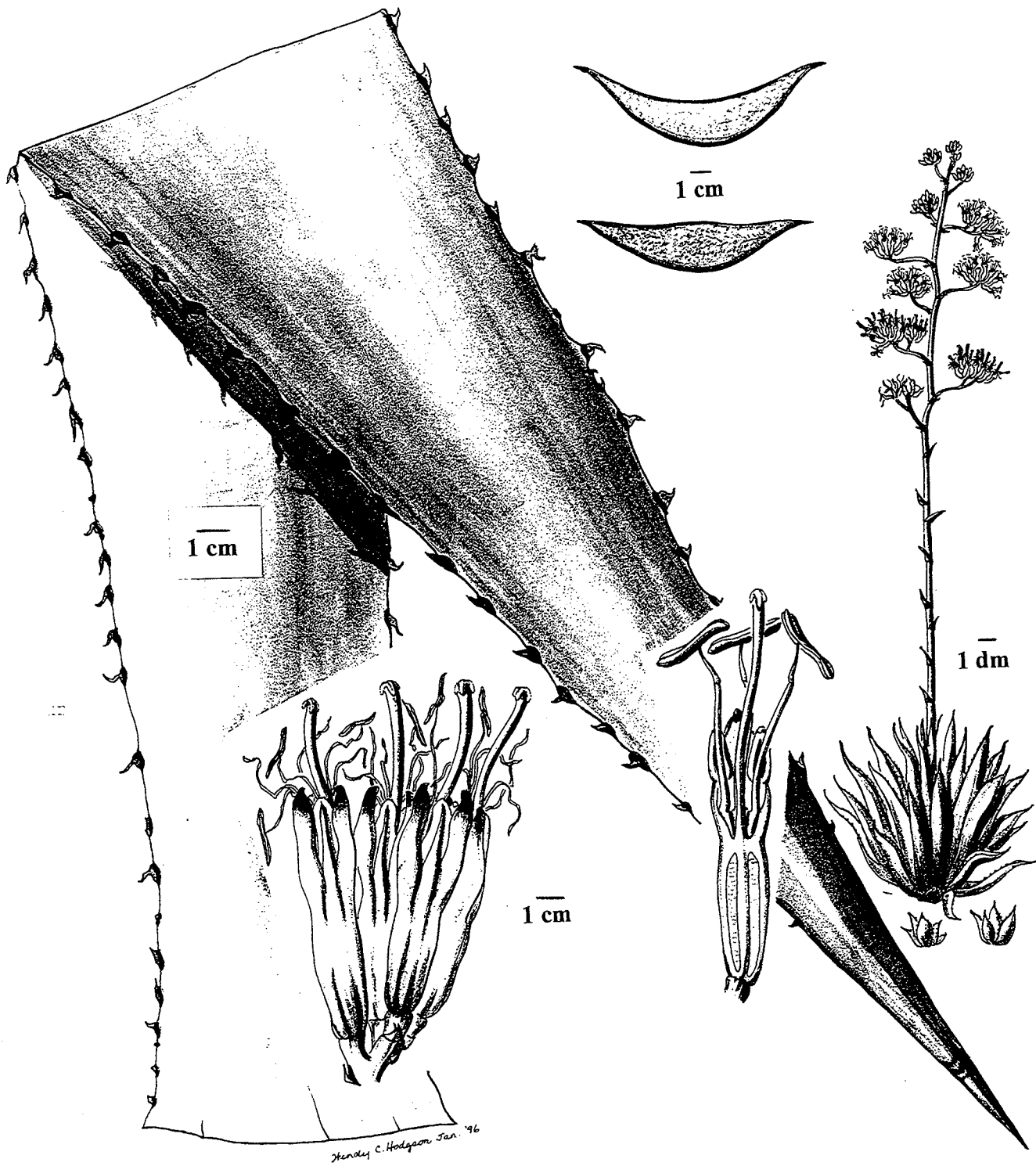
Agavaceae Fig. 6. *Agave ×arizonica*: habit,  $\times 0.3$ ; leaf,  $\times 0.1$ ; inflorescence,  $\times 1$ ; flower,  $\times 3$ .



Agavaceae Fig. 7. *Agave delamateri*: habit,  $\times 0.15$ ; leaf,  $\times 0.6$ ; flower cluster,  $\times 0.6$ ; flower,  $\times 1.3$ .



Agavaceae Fig. 8. *Agave deserti* ssp. *simplex* × *Agave schottii* var. *schottii*: habit, ×0.15; leaf, ×0.6; flowers, ×0.8; flower stalk, ×0.8.



Agavaceae Fig. 9. *Agave* sp.: habit,  $\times 0.0$ ; leaf,  $\times 0.7$ ; cross-section of mid-leaf (upper) and base (lower),  $\times 0.7$ ; flower cluster,  $\times 0.7$ ; flower,  $\times 0.7$ .