

Habitu exiguo, inflorescentiae axe relative subtili, distributione (habitat ad rupes gypseas), et usu medicinali *A. gypsophila* et affinibus similis et nullo dubio his speciebus proxima, praecipue differt rosulis brevioribus et rosulis surcolosis praesentibus, foliis anguste obtrullatis rigidis crassioribus et scabris, dentibus longioribus et remissioribus, inflorescentia axibus brevioribus et mollioribus.

Rosettes multiannual, surculose, 0.4–0.5 × 1.4 m, with 7–10 leaves; **mature leaves** 30–79 × 5–6.2 cm, to 5.5 cm wide at base, to 5.1 cm thick at base, linear to narrowly triangular or narrowly lanceolate, wider at base, convex below, concave above, the margin involute, generally arched and weavy, firm, rigid, rough, green to gray, or reddish-brown, glaucous cross-zoned on both sides; **margins** straight to slightly undulate, closely dentate basally and apically, with mammae 4–5 × 4–5 mm; interstitial margin straight; the teeth firm, mostly 1–2.9 mm long, 15–30 mm apart, flattened, the cups from narrow bases 1–2 mm wide, mostly curved toward the base, dark brown, interstitial denticles few or none; **spine** 5–6 mm long, usually short and conic, firm, dark brown, nondecurent; **panicles**, including the peduncles, 3–3.6 m tall, shaft 3–3.5 cm in diameter at base, the lateral branches 15–18 in the upper two thirds of the shaft; bracts triangular, the basal ones to 14 cm long, acute at the apex, spirally arranged, scabrous, 13–27 cm apart; **flowers** 80–87 per branch, 32–36 mm long, protandrous, orange; ovary 14–20 × 4–5 mm, green, the neck 2.5–5 mm long and constricted; tube 3–4 × 7–10 mm, somewhat funnelform; tepals 10–14 × 4–5 mm, triangular, fleshy, erect, the apex galeate, orange; filaments 21–29 mm long, inserted at 1–1.5 mm above base of tube, firm, orange; anthers at anthesis 6–10 mm long, centric, yellow at anthesis; **capsules** 30–32 × 14–15 mm, oblongoid, slender stipitate, apiculate, thin-walled; carpels acute, 25–28 × 13–14 mm, curving outward for dehiscence; **seeds** 4–4.5 × 3–4.5 mm, lunular, but curved on one side, flat, membranous, black. Figure 4.

Except for its surculose habit and orange rather than bright yellow flowers, *Agave kristenii* shares most of the distinctive characters of the *Marmoratae* species group (Berger 1915), such as crenate margins, small spines, small flowers with small tubes ¼ to ½ as long as the tepals and leaves cross-zoned on both sides (Table 1). *A. kristenii* is related to *A. gypsophila* from Guerrero, with which it shares brittle leaves with little fiber, restriction to limestone outcrops and similarly attributed medicinal properties. However, it differs from the latter in having a much smaller and suckering rosette, with linear to narrowly triangular or narrowly lanceolate, boat shaped, firm, thicker and rough leaves, which are not wider above mid leaf as in *A. gypsophila*. Additionally, its marginal teeth and mammillae at mid leaf are larger and more widely spaced. *A. kristenii* also has an even smaller and more delicate shaft with smaller inflorescence branches, and grows at a much lower elevation (130 m) on seaward-facing slopes of Michoacán, in thorn forest (Table 1) (Gentry 1982; McVaugh 1989; Cházaro-Bazáñez et al. 2005; Vázquez-García et al. 2007). Photographs M2, M9 and M10 (Plate M, pp. xxxvi, xxxvii) taken at southeastern Maruata, in Michoacán by J. Etter and M. Kristen, which were referred to *A. gypsophila* by Vázquez-García et al. (2007), actually correspond to *A. kristenii*.

Distribution and Ecology—*Agave kristenii* appears to be endemic to the seaward facing slopes southeast of Maruata, Michoacán, at 50–130 m. This species is reported to inhabit,

4. *Agave kristenii* A.Vázquez & M.Cházaro, sp. nov.— TYPE: MEXICO. Michoacán: Mun. Aquila, Maruata, km 113 Carretera Lázaro Cárdenas–Tecomán, 18°13'10.86" N, 103°10'27.72" W, 130 m, 5 Mar 2011 (fl & fr), J.A. Vázquez-García 9076 (holotype: IBUG; isotypes: MEXU, MICH, MO, WIS).

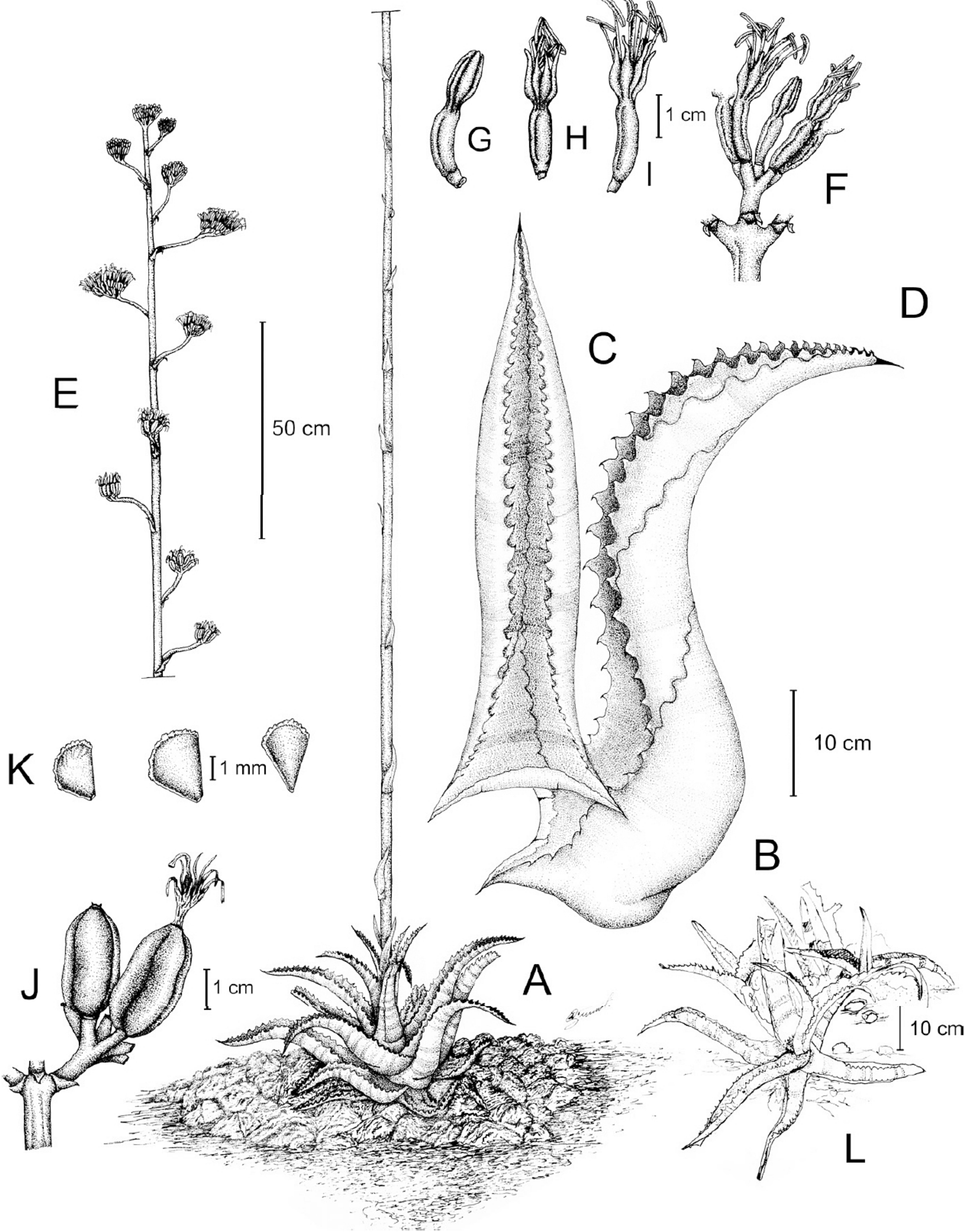


FIG. 4. *Agave kristenii* A. Vázquez & M. Cházaro. A. Habit. B. Leaf. C. Leaf teeth. D. Spine. E. Panicle, including peduncle. F. Flowers on a branch. G. Flower bud. H. Flower before anthesis. I. Flower at anthesis. J. Capsules. K. Seeds. L. Surculose habit. From Etter & Kristen s. n. (IBUG-cult.).

although without supporting collections, the vicinity of Arenas Blancas and Chocoala, Michoacán (Eleazar Garibo Cisneros, pers. comm. Playa Azul, Mar, 2010). It thrives on the limestone outcrops of the Tepalcatepec Formation (Early Albian, 112–99.6 mya & Cenomanian, 99.6–93.5 mya) (Corona-Esquivel & Henríquez 2004), in thorn forest with *A. colimana* Gentry, *Opuntia* spp., and *Cephalocereus* spp. (Table 1).

Phenology—Flowering from February to March; fruits dehiscing from March to April.

Etymology—The specific epithet honors Martin Kristen, an outstanding botanical globetrotter and photographer, whose work led to the discovery of this new species.

Ethnobotany and Conservation Status—*Agave kristenii* is locally known as “Maguey de piedra,” traditionally used as an anti-inflammatory, and applied to relieve internal contusions, tumors and cancer (Longinos Dimas Alvarado, pers. comm., March 5, 2011). However, these properties are yet to be scientifically validated. It is locally abundant and produces suckers, however, individuals or even entire colonies are extirpated for medicinal purposes. Its rhizome is easily extracted completely, due to its weak roots on shallow soils, sometimes growing barely over the surface of limestone rocks. Thus, its abundance is decreasing due to over collecting.

Potential Use and Economic Value—*Agave kristenii* is a remarkable addition to the succulent flora of western Mexico and is worthy of cultivation as an ornamental because of its wavy Aloe-like rosette, arched cross-zoned leaves, showy prominent mammillate teeth, and delicate shaft with bright orange flowers.

Additional Specimens Examined—MEXICO. Michoacán: Mun. Aquila, Maruata, km 113, on road from Lázaro Cárdenas to Tecomán, 18°13'10.86" N, 103°10'27.72" W, 130 m, Mar 2009, Etter & Kristen s.n. (cult. spec.) (IBUG); Mun. Aquila, km 113, on road from Lázaro Cárdenas to Tecomán, 130 m, 12 Mar 2011 (fl, fr), Vázquez-García 9076b (cult. spec.) (IBUG).