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Agave maria-patriciae (Polycephalae Group: Asparagaceae), a new species from Central Coastal Veracruz, Mexico

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Abstract

Agave maria-patriciae Cházaro & Arzaba is described and illustrated here as a new species from the central coast of the state of Veracruz in Mexico. It belongs to the subgenus *Littaea* and Polycephalae group, which contains tropical and subtropical species from the American continent. *Agave maria-patriciae* is closely related to *A. pendula*, but differs from the latter by having smaller rosettes, shorter and suberect stems and smaller and subsessile flowers. It is only known from a small population in the oak forest from the mountains of Sierra de Monte de Oro in the municipality of Alto Lucero in eastern Mexico.

Keywords: *Agave*, endemic, new species, Polycephalae, Veracruz

Resumen

Agave maria-patriciae Cházaro & Arzaba es descrita e ilustrada como una nueva especie de la costa central del estado de Veracruz en México. Pertenece al subgénero *Littaea* y al grupo Polycephalae, el cual contiene especies tropicales y subtropicales del continente americano. *A. maria-patriciae* está estrechamente relacionado con *A. pendula* pero difiere de ésta última al poseer rosetas más pequeñas, tallos más cortos y suberectos y flores de menor tamaño y subsésiles. Solo se conoce de una pequeña población en bosque de encino en la Sierra de Monte de Oro, en el municipio de Alto Lucero, en el oriente de México.

Palabras-clave: *Agave*, endémica, nueva especie, Polycephalae, Veracruz

Introduction

Agave Linnaeus (1753: 323) (Asparagaceae) is a New World genus with 276 accepted taxa (Smith & Figueiredo 2014). In Mexico, there are 160 accepted species of *Agave* according to Villaseñor (2016). In the most comprehensive taxonomic treatment of *Agave* performed by Gentry (1982), this author recognized two subgenera, *Agave* and *Littaea* (Tagliabue 1819: 106) Baker (1888: 164) based on the morphology of inflorescences. Subgenus *Agave* contains 12 groups and subgenus *Littaea* eight. One of these is the Polycephalae group, a small group of eight species adapted to subtropical conditions of the Sierra Madre Oriental, Central Chiapas and adjacent Guatemala (Cházaro-Basáñez & Vázquez-García 2013, Gentry 1982). The Polycephalae group is distinguished by its mainly polycarpic habit, broad, softly succulent and fleshy leaves, margins usually with closely placed denticles, tepals grooved, with the same length or twice as long as the tube and 3-angled ovary (Thiede 2001). It is morphologically and molecularly well supported (Gil-Vega *et al.* 2007). So far, six species of this group are known for the state of Veracruz, including the latest novelties: *A. gomezpompae* Cházaro & Jimeno-Sevilla (2010: 5), *A. jimenoii* Cházaro & A. Vázquez (2013: 55), *A. obscura* Schiede (1830: 464), *A. pendula* Schnittspahn (1857:7), *A. warelliana* Baker (1877: 264) and *A. wendtii* Cházaro (1995: 94). Here, *Agave maria-patriciae* is described and illustrated as a new species from the Sierra de Monte de Oro, a low

elevation mountainous system at the eastern extreme of the Trans-Mexican Volcanic Belt in Mexico, near the coast of the Gulf of Mexico. It occurs in the tropical oak forest of the coast plain of Veracruz, considered as a Priority Terrestrial Region for Conservancy (Arriaga *et al.* 2000).

Material and methods

The morphological description was prepared from plants collected at the type locality in 2016. Flowers and fruits were preserved in 70% ethanol–water solution 1:1. Measurements and drawings were made using a stereoscopic microscope. Data for comparison were obtained from sheets of the herbaria CHAPA, ENCB, MEXU and XAL.

Taxonomy

Agave maria-patriciae Cházaro & Arzaba *sp. nov.* Figures 2 and 3.

Agave maria-patriciae is most similar to *A. pendula* by sharing lanceolate to oblong leaves with a central yellow stripe, but it differs in its shorter leaves, stems and floral scape; presence of continuous reddish margins along the leaves, thicker terminal spine and larger denticles, its smaller and succulent flowers with reflexed and not broadly cucullate tepals and sessile capsules.

Type:—MEXICO. Veracruz: municipality of Alto Lucero, summit of Cerro La Bandera, NE of La Yerbabuena village, 660 m, 07 January 2016 (fl. & fr.), C. Arzaba 451 *et al.* (holotype XAL!; isotypes CHAPA!, MEXU!).

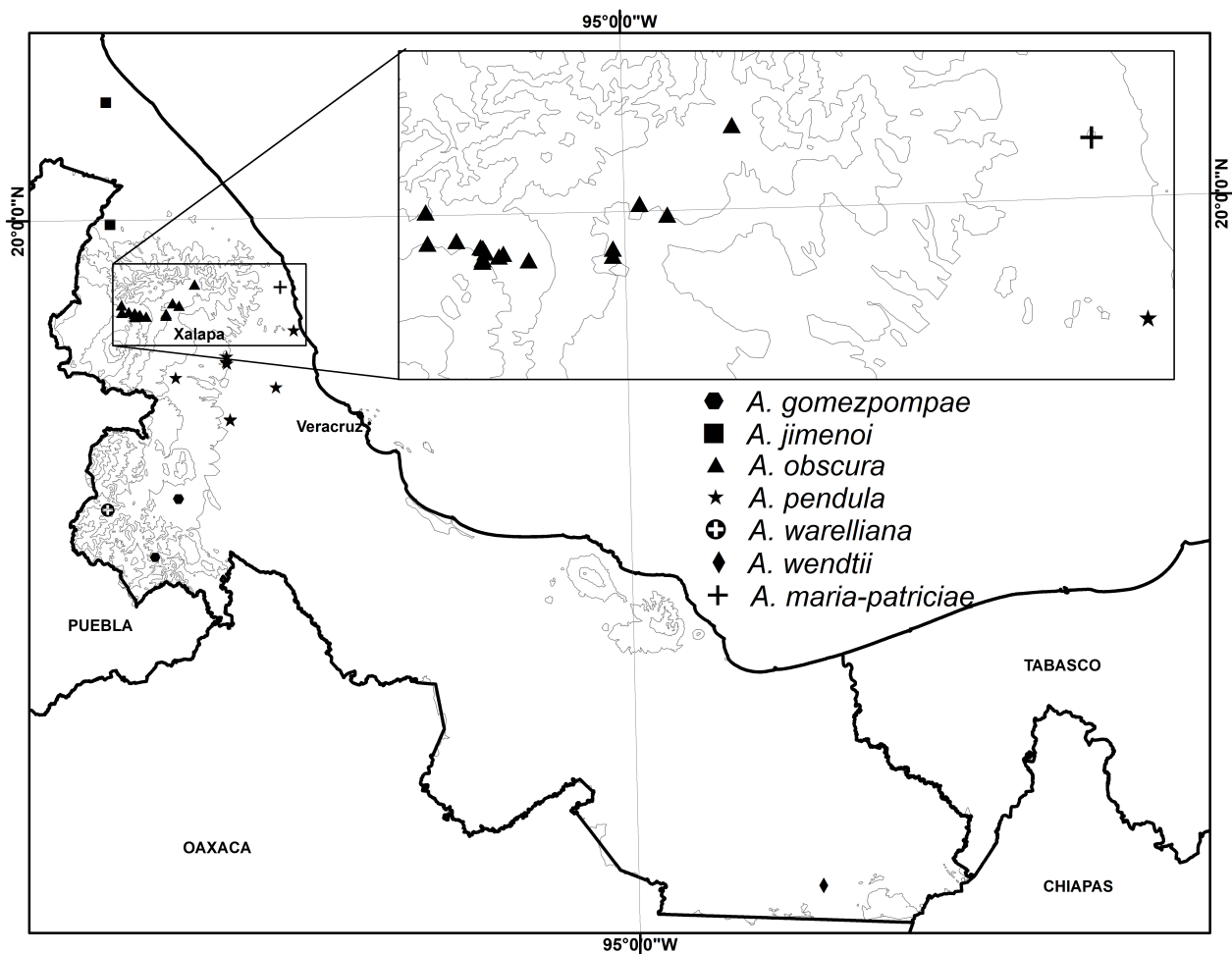


FIGURE 1. Distribution of *Agave* (Polycephalae group) in Veracruz state, Mexico.

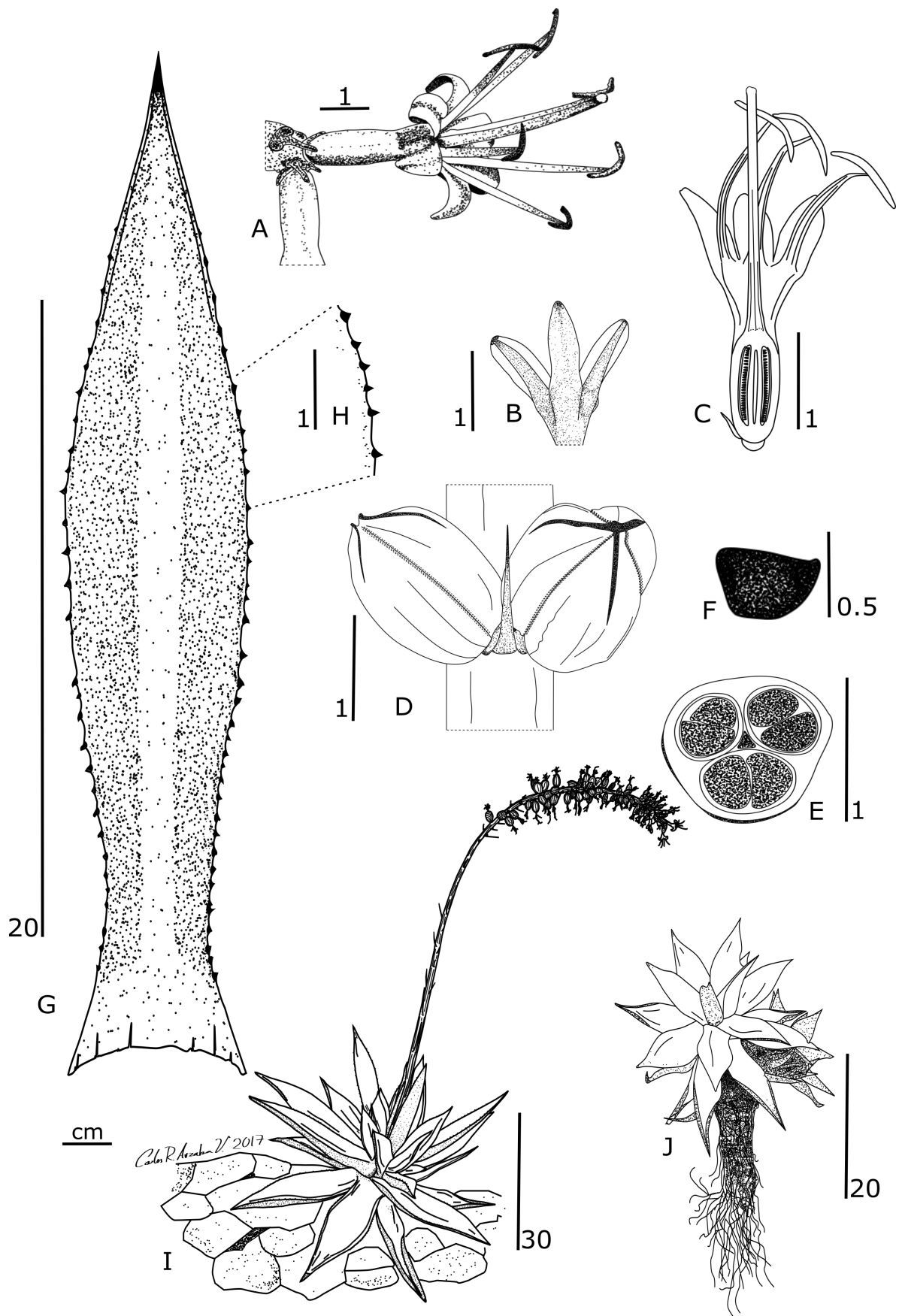


FIGURE 2. *Agave maria-patriciae*. A. Flower, B. Tepals, C. Sagittal view of flower, D. Capsules and bracteole, E. Transversal section of the capsule, F. seed, G. Leaf, H. Denticles at margin, I, J. Habit. Illustration by first author from *C. Arzaba et al. 451*, XAL—holotype. The numbers beside barscales denote centimeters.

Perennial **herb** with basal rosette, up to 100 cm tall including the floral scape. Stems bifurcated, 10–20 cm long, usually 2–3 rosettes per plant. **Leaves** 25–29 × 3.5–6.8 cm, lanceolate to oblong, 13–18 per rosette, light green with pale and blurred yellow central stripe, fleshy, frequently not flexible with red coloration along the margin, denticles 2–3 mm long, absent in 4–5 cm below the terminal spine, dark brown or reddish brown. Terminal spine 0.5–0.9 cm long, dark brown. **Inflorescence** stem 105 cm long, emerging from the main rosette, apex recurved, flowers inserted on the upper half of shaft. Scape bracts 3.0–9.6 × 3.0–2.0 cm, subulate, narrowly triangular, pale green, reddish only at the base, lower bracts with thickened terminal spine. Bracteoles 2.0–2.6 cm long, linear-triangular, ascending, apex acicular, discolorous, reddish brown at base, dark brown at apex, the upper bracteoles with a ferruginous longitudinal line. **Flowers** 2.4–2.6 cm long, succulent, neck 0.2–0.3 × 0.3–0.4 cm. Floral tube 0.7–0.8 × 0.8 cm. Tepals lanceolate, fleshy, reflexed, dimorphic, the inner tepals 1.1 × 0.5 cm, membranaceous with a conspicuous brownish keel on the abaxial face, apex obtuse, scarcely cucullate; the outer tepals 1.2 × 0.4 cm, abaxial face green brownish, adaxial face pale green; apex obtuse, scarcely cucullate. Stamens exserted, filaments 1.8 cm long, greenish pale yellow with reddish notes at the apex. Anthers 1.0–1.3 × 0.2 cm, brown. Style 2.7–3.0 cm long, same color of the filaments. Ovary 1.3 × 0.6 cm, smooth. **Capsules** 1.5–1.8 × 0.5 cm, trigonous, yellow green when unripe, brown when ripe; pedicels ca. 0.1 cm long. **Seeds** numerous, 3–4 × 2–3 mm, lunate to auriculate, shiny black (Figure 3).

Habitat and geographic distribution:—Unlike the related taxa (Table 1), this species is only known from a small population in oak forest (*Quercus oleoides* Schlechtendal & Chamisso (1830: 79) and *Q. sapotifolia* Liebmann (1854: 185) (Fagaceae) with *Bejaria aestuans* Mutis ex Linnaeus (1771: 242) and *Lyonia squamulosa* M. Martens & Galeotti (1842: 542) (Ericaceae) at the top of Cerro La Bandera (ca. 650 m elev.) at the southern slope of Sierra de Monte de Oro (Figure 1). *Agave maria-patriciae* grows on volcanic substrate and it is exposed to seasonal north winds and constant humidity of the Gulf of Mexico. This taxon occurs with *Dioon edule* Lindley (1843: 59) (Zamiaceae), *Pitcairnia* sp L’Her (1788: 5) and *Tillandsia* aff. *juncea* (Ruiz & Pavón) Poirét (1817: 309) (Bromeliaceae). In spite of all botanic studies in the region, Sierra de Monte de Oro remains mostly unexplored. Other populations of this taxon could probably exist in nearby hills with the same vegetation type, such as La Paila, La Cruz and Cerro Azul in the same municipality of Alto Lucero.

TABLE 1. Morphological comparison of *Agave maria-patriciae* and the related species of *Agave* in Veracruz.

| | <i>A. maria-patriciae</i> | <i>A. pendula</i> | <i>A. jimenoii</i> |
|----------------------------|---|---|---|
| Stem length | 10–20 cm | ca. 200 cm | 34–90 cm |
| Stem habit | Suberect with sheaths of leaves persistent | Pendulous or creeping with sheaths of leaves persistent | Pendulous with sheaths of leaves not persistent |
| Leaf shape | Lanceolate to oblong | Lanceolate to oblong | Oblanceolate |
| Leaf length | 25–29 × 3.5–6.8 cm | 50–93 × 4.8–11 cm | 39–42 × 8.4–8.5 cm |
| Leaf central stripe | Pale and blurred yellow | Pale yellow | Absent |
| Leaf denticulation pattern | Absent at least 4 cm below the spine | Absent in the 12–16 cm below the spine | Absent in the 6 cm below the spine |
| Inflorescence length | 105 cm | 130–180 cm | 132–140 cm |
| Flower arrangement | Upper half of the shaft | Upper third of the shaft | Upper half of the shaft |
| Flower length | 2.4–2.6 cm | 2.8–5.2 cm | 2.8–3.0 cm |
| Flowering | December to January | January to March | April to June |
| Capsules | 1.5–1.8 × 0.9–1.3 cm | 2.0–2.6 × 1.0–1.6 cm | 1.6–2.2 × 1.0–1.3 cm |
| Pedicels | Less than 0.1 cm | 0.5 cm | 0.4–0.5 cm |
| Habitat | Oak forest | Tropical deciduous forest | Tropical subperennial forest |
| Distribution | Central Veracruz: endemic to Sierra de Monte de Oro | Central Veracruz: Volcanic cliffs and ravines | Central Veracruz: Totonacapan region |

Phenology:—*Agave maria-patriciae* was found flowering at the beginning of January. Probably, blooming starts at least one month before. Many unripe fruits were collected in the same month.

Etymology:—The species name is dedicated to Mrs. María Patricia Hernández, wife of the second author, who in the 1980s and early 1990s was a great companion in numerous field trips even to remote areas. As a result, several hundreds of botanical specimens are labeled as “M. Cházaro & P. Hernández”, deposited in the main herbaria of Mexico and the USA. She also mounted hundreds of exsiccata at the WIS and IBUG herbaria, as well as coauthored several papers on succulent plants of Mexico.

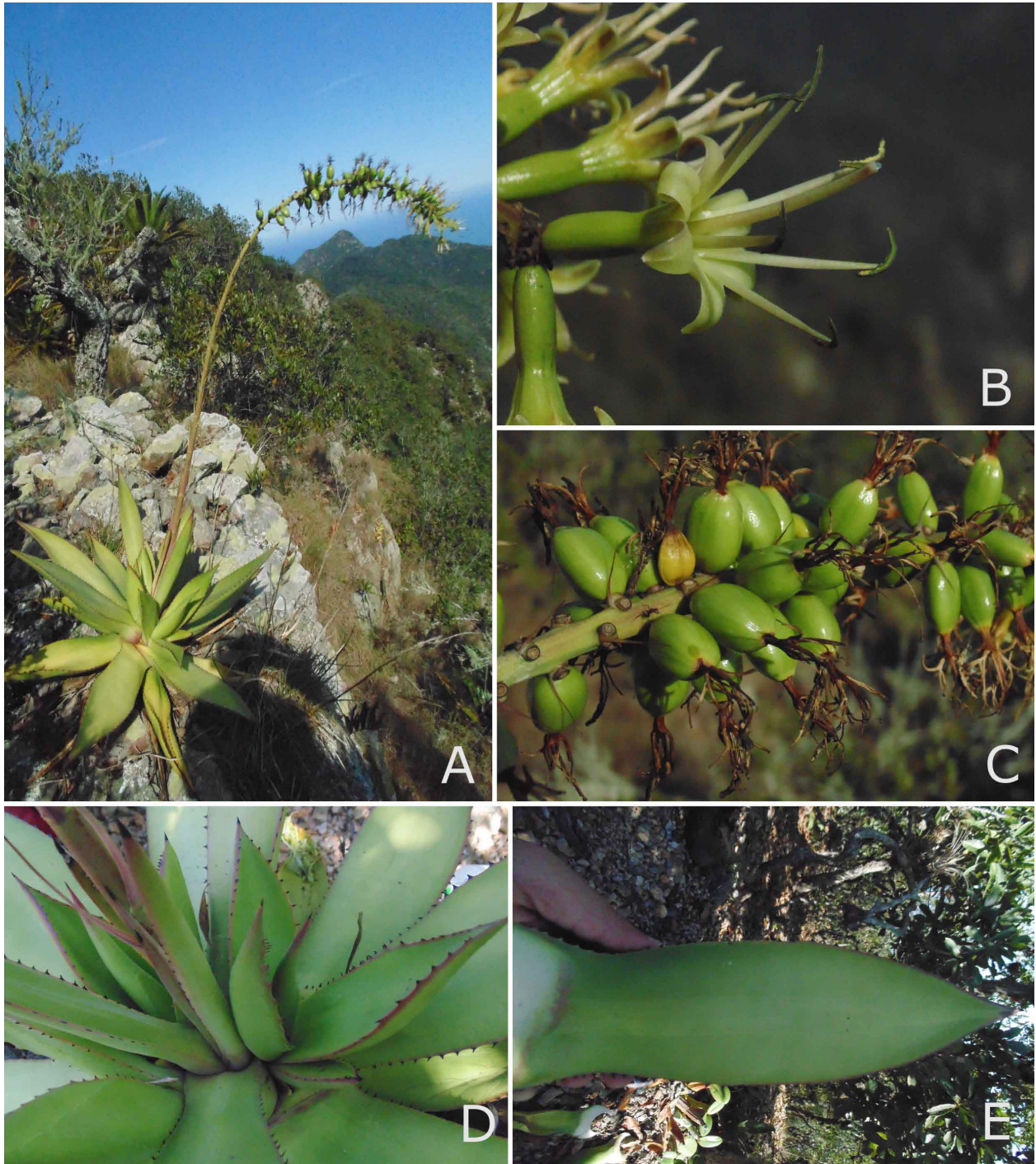


FIGURE 3. *A. maria-patriciae*: A. habit, B. Flower, C. unripe fruits, D. detail of the rosette, E. leaf with central stripe.

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