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A novelty in the genus *Hechtia* (Hechtioideae, Bromeliaceae) from Jalisco, Mexico

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Abstract

Hechtia ibugana a new species from the municipality of Puerto Vallarta, Jalisco, is described and illustrated. The new taxon is compared with *H. pretiosa* and *H. rosea*, species that also present sepals and petals rose to reddish, as well as with *H. iltisii* and *H. santanae*, endemic species of the state of Jalisco, Mexico.

Keywords: *Hechtia*, Puerto Vallarta, Sierra Madre del Sur

Resumen

Se describe e ilustra *Hechtia ibugana,* nueva especie del municipio de Puerto Vallarta, Jalisco. El nuevo taxón se compara con *H. pretiosa* y *H. rosea*, especies que también presentan sépalos y pétalos rosados a rojizos, así como con *H. iltisii* y *H. santanae*, especies endémicas del estado de Jalisco, México.

Palabrasclave: *Hechtia*, Puerto Vallarta, Sierra Madre del Sur

Introduction

The Megamexican endemic genus *Hechtia* comprises 76 species (Espejo-Serna & López-Ferrari 2018). In Mexico 71 species are present, all endemic to the country with exception of *H. texensis* S. Watson (1885: 374) (Gouda *et al.*, cont. updated, Espejo-Serna 2012, Espejo-Serna & López-Ferrari 2018). Up to now, for Jalisco there is a record of 6 species, *H. iltisii* Burt-Utley & Utley (1993: 222), *H. jaliscana* L.B. Sm. (1964: 482), *H. pedicellata* S. Watson (1891: 155), *H. reticulata* L.B. Sm. (1937: 17), *H. santanae* I. Ramírez & P. Carrillo (2016: 262) and *H. subalata* L.B. Sm. (1937: 15). In addition to the above mentioned species, McVaugh (1989) reported for Nueva Galicia, an area that includes the entire states of Jalisco and Colima, and also part of Nayarit, Aguascalientes, Zacatecas, Guanajuato, and Michoacán, the presence of *H. podantha* Mez (1896: 549) (from Aguascalientes) and *H. laevis* L.B. Sm. (1964: 482) (endemic to Colima).

In 2013, during botanical explorations near the Ejido El Jorulllo, in the municipality of Puerto Vallarta, Jalisco, some interesting new species were found, such as *Pitcairnia singularis* Flores-Argüelles, Espejo & López-Ferr. (2017: 275), and *Hyptis cualensis* J.G.González & Art.Castro (2014: 154). There was also a bromeliad species found of the genus *Hechtia* that called our attention, but since the collected specimens were male plants only, another field trip was made during 2016 to have material of both sexes. The evaluation of male and female plants let us to conclude that this bromeliad was different from any other species in the genus, so it represents a novelty that we propose and describe here. In the description below of this new species, the terminology proposed by Scharf & Gouda (2008) has been used.

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Taxonomy

Hechtia ibugana Flores-Argüelles, Espejo & López-Ferr., *sp. nov.* (Figs. 1, 2, 3 A–C)

Diagnose: The new species is similar to *Hechtia iltisii* but it differs by its silvery lepidote blade at base (vs glabrous), smaller spine distance (3.4–13.4 vs 5–30 mm), inflorescence sterile branches absent (vs present), triangular rose petals (vs ovate green) and green anthers (vs yellow).

Type:—MEXICO. Jalisco: municipio de Puerto Vallarta, ejido El Jorullo, aproximadamente 5 km al W de Llanitos, suelo rocoso, bosque de *Quercus*, 472 m, 20° 32' 31.1" N, 105° 10' 28.8" W, 20 June 2016, *A. Flores-Argüelles & A.R. Romero-Guzmán 1032* ♂ (holotype: UAMIZ!; isotype: MEXU).

Plant terrestrial, acaulescent, cespitose, 1.9–3.2 m tall in flower, rosettes 50–60 cm in diameter. *Leaves* numerous disposed in extended rosettes, falcate, coriaceous when dried; *sheath* widely ovate, 7–7.5 × 9.5–10.7 cm, glabrous on both surfaces, the margins and the distal portion lepidote, margins spinulose; *blade* narrowly triangular, 55–62 x 6–6.5 cm, green, silvery lepidote at basal portion of the adaxial surface, densely white lepidote abaxially; spines antrorse, 0.9–8.2 × 0.6–13.8 mm, 3.4–13.4 mm apart, green-yellowish. *Inflorescence* terminal, an erect panicle. *Staminate inflorescence* ca. 2 m long; *peduncle* terete, 75–78 cm long, 1.2 cm diameter at the base, internodes 3–5.5 cm long; *lower peduncle bracts* foliaceous, sheaths 1.8–2 × 1.3–1.6 cm, margin erose spinulose, blades narrowly triangular, 6–11 cm long, 4.8–6 mm wide, rose, exceeding the internodes, sparsely lepidote adaxially, densely lepidote abaxially, margin spinulose, pungent at the apex; middle and upper peduncle bracts triangular, 2.5–3.5 × 1–1.5 cm, light brown, rose at the base, margin erose spinulose; *rachis* terete, ca. 75 cm long, rose, slightly furfuraceous lepidote, internodes 2–4.5 cm long; *primary bracts* triangular, acuminate, 1.2–3 × 0.8–1 cm, longer than the stipe of the branch, rose, glabrous adaxially, furfuraceous lepidote abaxially, margin spinulose at the apical portion; *branches* 15–20 in number, 8–14 cm long, rose, loosely disposed, angulate, furfuraceous lepidote, each one with 23–50 flowers; *floral bracts* widely ovate, 7–7.8 × 6.7–10.4 mm, rose, glabrous adaxially, densely furfuraceous lepidote abaxially, margin erose spinulose, equaling or exceeding the sepals. *Flowers* sessile to subsesile; *sepals* ovate, 5.6–7.7 × 3.4–5 mm, rose, acuminate, densely furfuraceous lepidote, entire; *petals* membranaceous, triangular, 8.2–10 × 3.3–5.3 mm, rose, acute or obtuse, glabrous, entire; *Stamen filaments* 5.2–6.7 mm long, narrowly triangular, white, flattened; *anthers* oblong, 2–5 mm long, green; *pistillode* present, less than 1 mm long. *Pistillate inflorescence* ca. 3.2 m long; *peduncle* terete, ca. 1.4 m long, 1.6 cm diameter at the base, internodes 4–7.5 cm long; lower *peduncle bracts* foliaceous, sheaths 1.9–2 × 1.3–1.5 cm, margin erose spinulose, blades narrowly triangular, 3–24 cm long, 3.4–6 mm wide, rose, exceeding the internodes, sparsely lepidote adaxially, densely lepidote abaxially, margin spinulose, pungent at the apex, reducing its size towards the distal portion of the peduncle; *primary bracts* similar to those of staminate inflorescence; *branches* 7–16 in number, 16–28 cm long, rose, loosely disposed on the rachis; rachis angulate, each one with 40–54 flowers, furfuraceous lepidote; *floral bracts* ovate triangular, 5–6 × 3–4 mm, rose, usually larger than the pedicels, glabrous adaxially, densely furfuraceous lepidote abaxially, margin slightly spinulose. *Flowers* pedicellate, *pedicels* 1.9–3 mm long, the basal ones longer (9–9.6 mm long), angulate, furfuraceous lepidote; *sepals* triangular-ovate, 5–5.6 × 3.2–3.4 mm, rose, glabrous adaxially, furfuraceous lepidote abaxially, acuminate, entire; *petals* membranaceous, triangular, 7–7.7 × 3.2–3.6 mm, rose, acuminate, entire, glabrous; *staminodes* narrowly triangular, 3–3.1 mm long, white, flattened, subequal, thinner towards the apex; *staminodes* usually absent, when present only present as a thinned dark brown portion; *ovary* narrowly ovoid, 5.5–6 mm long, 2.4–2.7 mm in diameter; *stigmatic branches* recurved, 1.3–1.4 mm long, rose-whitish; *fruit* narrowly ovoid, 1.9–2.1 cm long, 5.5–6 diameter, brown, glabrous; *seeds* fusiform, 7.5–11 mm long, bicaudate, reddish-brown.

Distribution and habitat:—*Hechtia ibugana* is only known from the mountains of the Sierra del Cuale, in the municipality of Puerto Vallarta (Fig. 2). This region is in the physiographic province Sierra Madre del Sur, which is an area with a great diversity of species (Vázquez-García *et al.* 2000). Several taxa have been described from this area, such as *Pitcairnia singularis*, *Hyptis cualensis* (Lamiaceae), *Pinus vallartensis* Pérez de la Rosa & Gernandt (2017: 234) (Pinaceae), and *Magnolia vallartensis* A. Vázquez & Muñiz-Castro (2012: 124) (Magnoliaceae).

Hechtia ibugana grows on rocky soils, forming large colonies, at 472–811 m elevation in open *Quercus* forest (Fig 1H), along with tropical species like *Cryosophila nana* Blume (1838: 53) (Arecaceae), *Conostegia xalapensis* D. Don (1823: 317) (Melastomataceae), *Cochlospermum sp.* (Bixaceae), and *Annona sp.* (Annonaceae), as well as in riparian vegetation with *Quercus aristata* Hook. & Arn. (1841: 444) (Fagaceae), *Juniperus jaliscana* Martínez (1946: 69) (Cupressaceae), *Clusia salvinii* Smith (1903: 1) (Clusiaceae), *Epidendrum ciliocciden tale* Hágsater & L.Sánchez (2008: 1110) (Orchidaceae), and *Pitcairnia micheliana* André (1901: 576). It flowers from April to June and fruits in June.

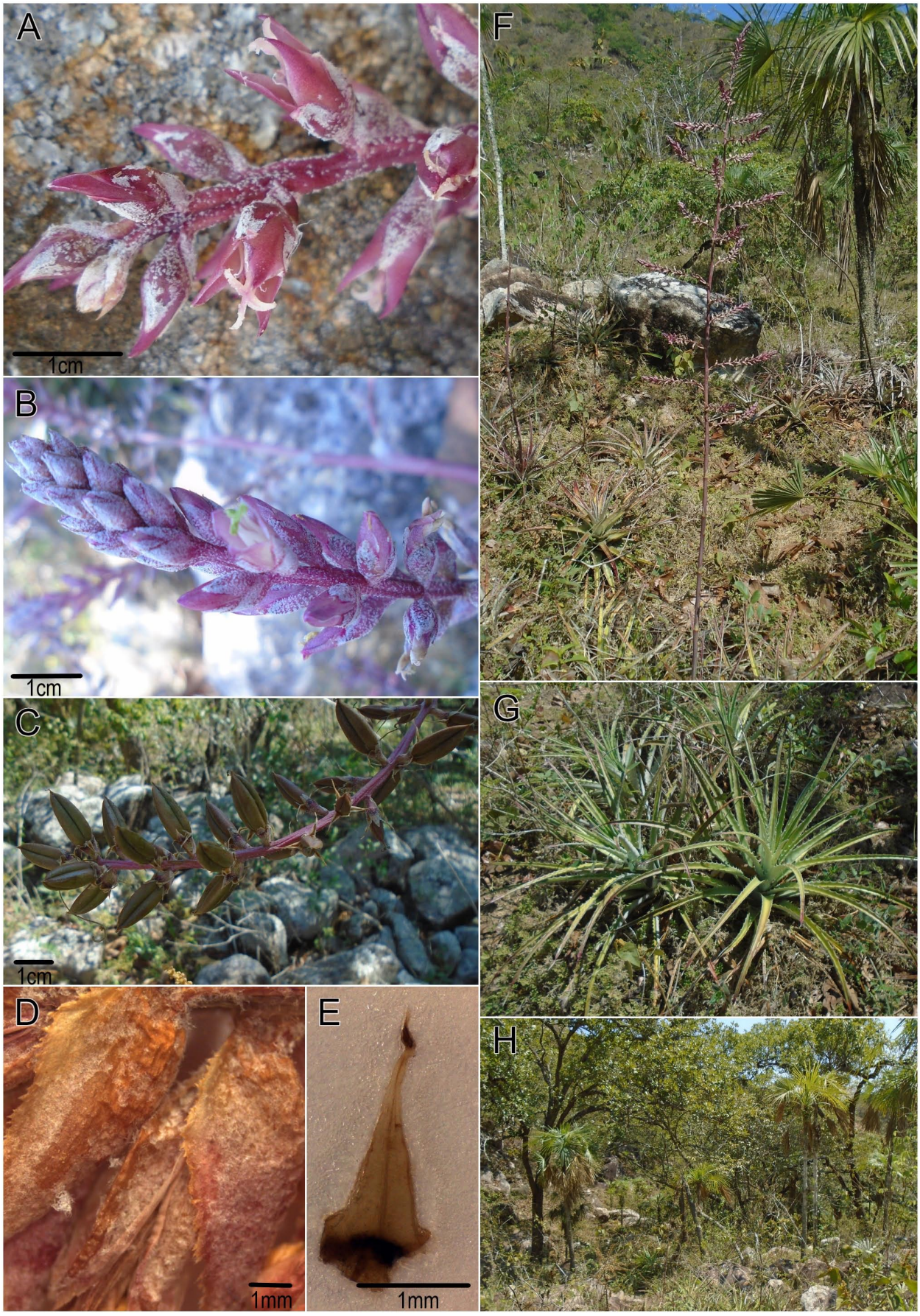

FIGURE 1. A–H. *Hechtia ibugana* Flores-Argüelles, Espejo & López-Ferr. A. Detail of pistillate flowers. B. Detail of staminate flowers. C. Fruits. D. Detail of inflorescence indumentum. E. Staminodes. F. Pistillate plant in the type locality. G. Rosettes at the type locality. H. Open *Quercus* forest with presence of *Cryosophila nana* in the type locality (Photographs by A. Flores-Argüelles).

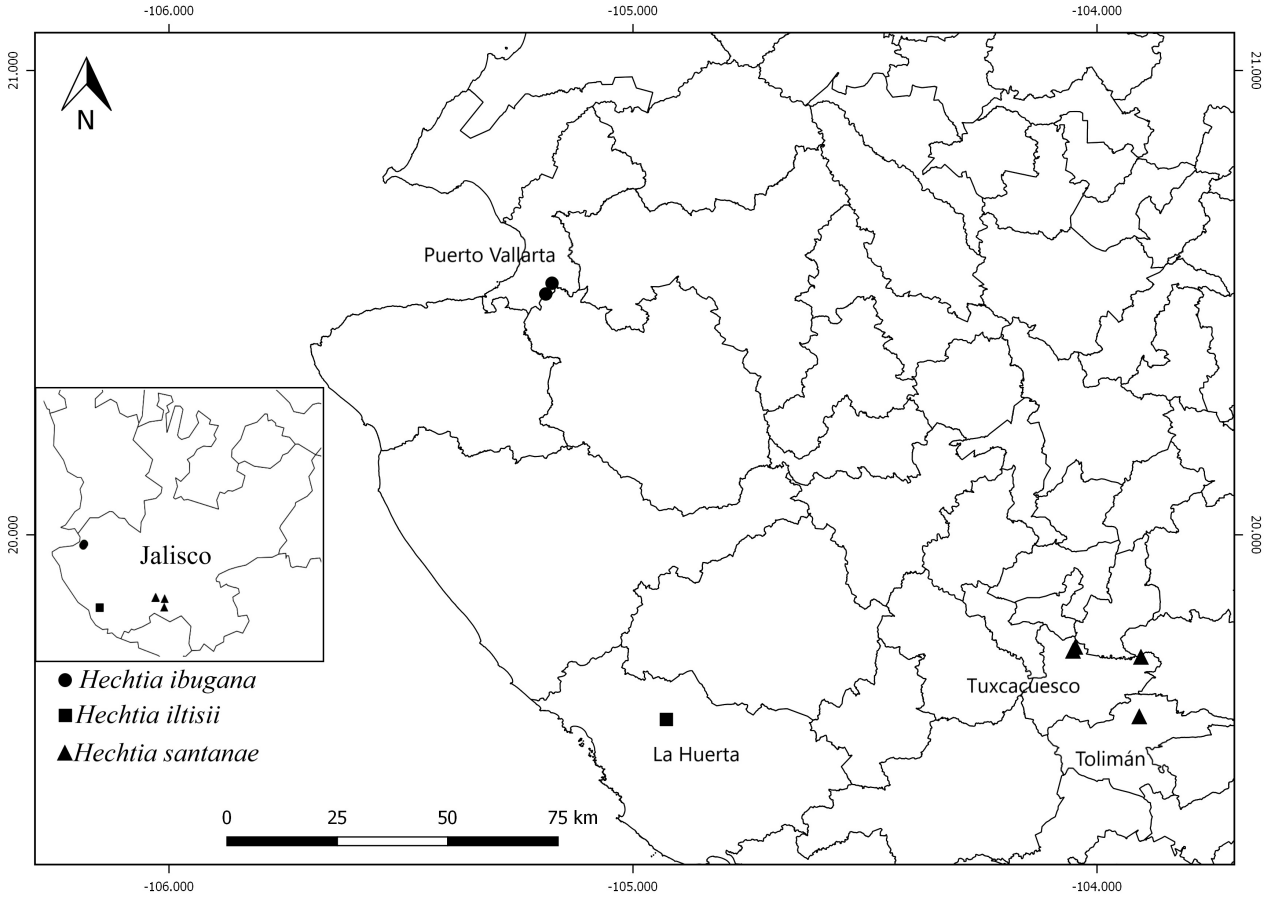

FIGURE 2. Geographical distribution of *Hechtia ibugana*, *H. iltisii* and *H. santanae*.

Etymology

The specific epithet refers to the Herbarium Luz María Villarreal de Puga (IBUG), of the Instituto de Botánica of the Universidad de Guadalajara, where the project Flora of Jalisco is being carried out and the alma mater of the first and fourth authors.

Additional specimens examined (paratypes):—MEXICO. Jalisco: municipio de Puerto Vallarta, ejido El Jorullo, aproximadamente 5 km al W de Llanitos, suelo rocoso, bosque de *Quercus*, 472 m, 20° 32' 31.1" N, 105° 10' 28.8" W, 20 June 2016, *A. Flores-Argüelles & A.R. Romero-Guzmán 1033* ♀ (UAMIZ!). Municipio de Puerto Vallarta, río Torrecillas, aproximadamente 7 km al SE de Vallejo, bosque de galería, 811 m, 20° 30' 49.5" N, 105° 11' 17.3" W, 16 May 2013, *A. Flores-Argüelles & A.R. Romero-Guzmán 727* ♂ (UAMIZ!, MEXU).

Discussion

The presence of rose-colored flowers in *Hechtia* is uncommon; most of the species have both, the male and female flowers, white to white greenish, yellowish or lilac. Of the Mexican species of the genus only *H. rosea* E. Morren ex Baker (1889: 140) [including *H. meziana* L.B.Sm. (1935: 149)], *H. pretiosa* Espejo & López-Ferr. (2008: 50), and *H. ibugana* sp. nov. have sepals and petals rose to reddish. However, these three species show clearly different characteristics. The size of the vegetative and floral parts differs in all of them, especially the leaf width and spine length, also, the indumentum differs both in the adaxial surface of the leaf and in the inflorescence, as well as the color of the anthers (Table 1, Fig 3). This new species was also compared with *Hechtia santanae* and *H. iltisii,* due to their

pink sepals and close distribution (Table 1, Fig. 2). The first mentioned is different from *H. ibugana* principally for its purple sepals and white to white purplish petals, reddish anthers and for being a smaller plant and having glabrous sepals. Although the proposed species can be confused with *H. iltisii*, it has clear differences that can distinguished it as a different species. Both species have similar vegetative and floral sizes, also, the presence of indumentum in the inflorescence and sepals is noticeable. But they differ in the adaxial indumentum of the leaf, the size and separation of the spines, the color of the petals, the color of the stamens, and *H. ibugana* does not have sterile branches or fertile branches with elongate sterile tips.

TABLE 1. Comparison of morphological and ecological characteristics between *Hechtia ibugana sp. nov.*, *H. iltisii*, *H. pretiosa*, *H. rosea,* and *H. santanae*.

Characters	*H. ibugana*	*H. iltisii*	*H. pretiosa*	*H. rosea*	*H. santanae*
Distribution: State Biogeographic province	Jalisco (Sierra Madre del Sur)	Jalisco (Pacific Lowlands)	Guanajuato (Sierra Madre Occidental)	Chiapas, Oaxaca (Sierra Madre del Sur, Pacific Lowlands)	Jalisco (Pacific Lowlands)
Vegetation type and elevation	*Quercus* forest and riparian vegetation, 472–811 m	Thorny scrub, 280–300 m	Cactus scrub, 1350–1400 m	Tropical deciduous forest, 120–750 m	Tropical deciduous forest, 780–920 m
Leaf length (cm)	55–62	42.5–62.5	30–50	25–95	12–34
Leaf width (cm)	6–6.5	3.6–6.8	2.2–3.5	2–6	1.7–2.8
Adaxial indumentum of the blade	silver lepidote at base	glabrous	glabrous	densely brownish lepidote, glabrescent at maturity	densely to sparsely silver lepidote throughout
Spines length (mm)	0.9–8.2	1.5–4.5	2.5–5	0.7–6.1	1–3
Spines separation (mm)	3.4–13.4	5–30	7–12	5.9–20.8	4–17
Inflorescence indumentum	furfuraceous lepidote	furfuraceous lepidote	minutely punctulate lepidote	minutely punctulate lepidote	sparsely lepidote
Sterile branches	absent	present	absent	absent	absent
Sepals (pistillate flowers)	5.6–7.7 × 3.4–5, ovate, lepidote, pink	4.5–8 × 3.5–4.7, ovate to ovate-triangular, lepidote, pink	6–8.5 × 2.5–3.5, oblong, lanceolate-oblong, pink, to brown-pink	4.6–5.4 × 2.9–3.2, widely ovate, glabrous, pink	2.3–2.7 × 1.8–2.3, ovate, glabrous, purple, brown at the apex
Sepals glandular trichomes	absent	absent	present	absent	absent
Petals (pistillate flowers): length × width	8.2–10 × 3.3–5.3, triangular, rose	5.5–9 × 3–4.4, ovate, green	6–8 × 3.5–4, elliptic, pink	9.3–10.4 × 4.1–5.9, elliptic, pink	4.3–4.8 × 3–3.2, elliptic, white
Stamens	filaments free, anthers green	filaments free, anthers yellow	filaments fused at the base and with the perigonal tube, anthers purple	filaments free, anthers yellow	filaments free, anthers reddish

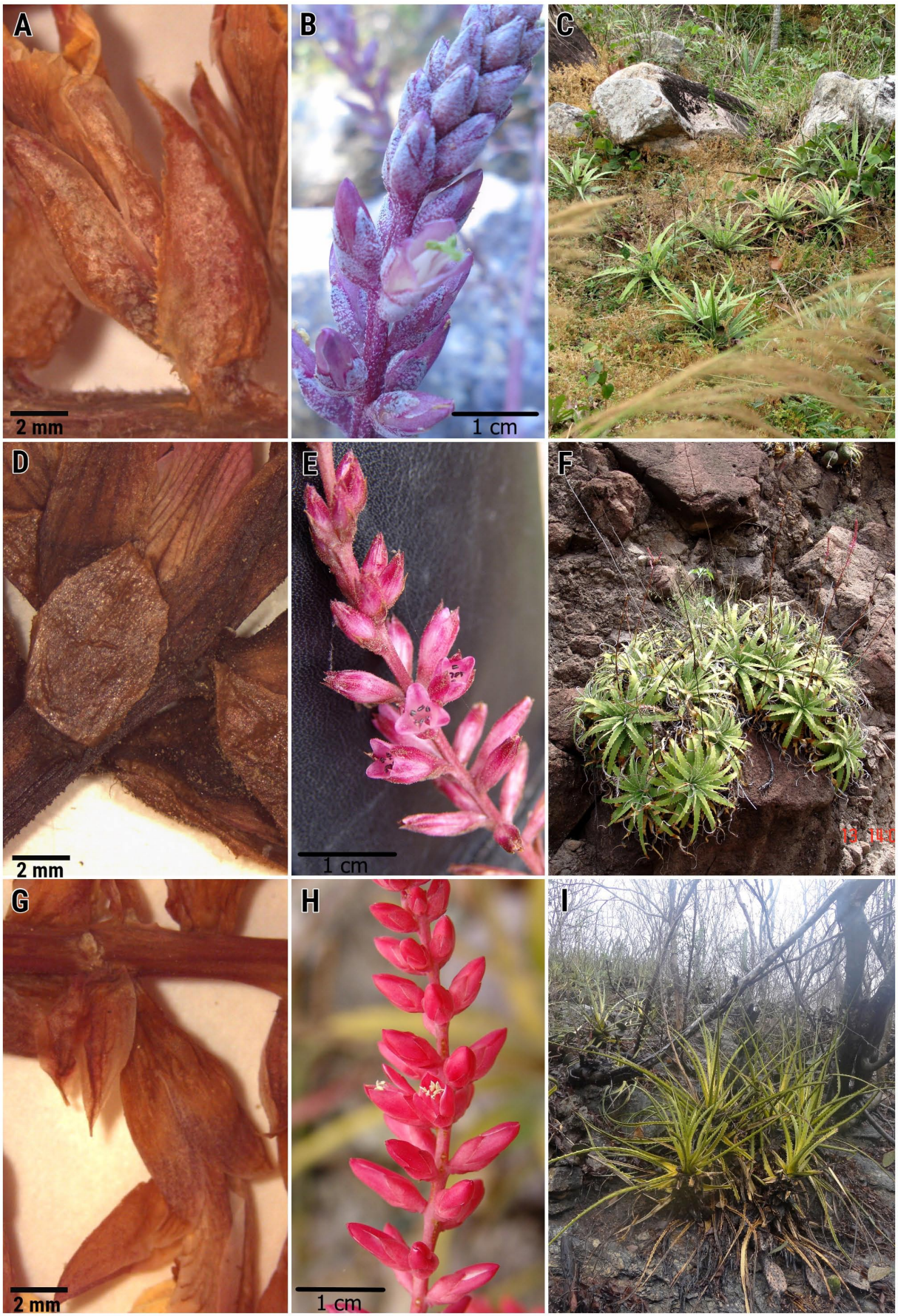

FIGURE 3. A–C. *Hechtia ibugana* Flores-Argüelles, Espejo & López-Ferr. D–F. *H. pretiosa* Espejo & López-Ferr. G–I. *H. rosea* E. Morren ex Baker. Left: Flower indumentum. Center: Staminate inflorescence branch. Right: Rosettes in habitat (Photographs: A, B, D & G by A. Flores-Argüelles; E, F, H & I by A. Espejo-Serna; C by A.R. Romero-Guzmán).

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