



Hechtia BROMELIACEAE

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Hechtia Klotzsch (Allg. Gartenzeitung 3: 401, 1835). **Type:** *Hechtia stenopetala* Klotzsch. — **Hechtioideae** — **Lit:** Mez (1896: synopsis); Mez (1935: 351–360, synopsis); Smith & Downs (1974: 577–604, Fl. Neotropica); McVaugh (1989: Fl. Novo-Galiciana); Utley & Burt-Utley (1994: Fl. Mesoamericana); Espejo-Serna & al. (2005: Fl. Veracruz); Espejo-Serna & al. (2010a: Fl. Bajío); Ramírez Morillo & al. (2014a: growth patterns). **Distr:** S USA (Texas), Mexico (widespread) and N C America (Guatemala, Honduras, El Salvador, Nicaragua, Belize). **Etym:** For Julius Gottfried Conrad Hecht (1771–1837), German botanist and counselor to the King of Prussia.

Incl. *Bakeria* André (1889) (*nom. illeg.*, Art. 53.1). **Type:** *Bakeria tillandsioides* André.

Incl. *Bakerantha* L. B. Smith (1934). **Type:** *Bakeria tillandsioides* André.

Incl. *Niveophyllum* Matuda (1965). **Type:** *Niveophyllum caeruleum* Matuda.

Perennial xerophytic rosette plants, dioecious, polycarpic or monocarpic, caespitose or rarely solitary, terrestrial and frequently saxicolous;

Ros stemless or sometimes shortly to distinctly caulescent (*H. mooreana*, *H. myriantha*), rarely rhizomatous (*H. caulescens*) or more rarely stoloniferous (*H. pretiosa*); **Ros** small to medium or rarely very large (*H. myriantha*), dense; **L** long-lived, succulent and xeromorphic, narrowly triangular to linear, lepidote throughout or only abaxially, tip pungent, rarely soft (*H. lundelliorum*, *H. purpusii*, *H. tillandsioides*); **L** margins strongly spiny or more rarely minutely serrate (*H. lundelliorum*, *H. purpusii*, *H. tillandsioides*); **Sp** uncinatate, retrorse, antrorse and/or divaricate; **Inf** erect or ascending to rarely pendent, paniculate, rarely racemose, 0.5–4 m (= overall size, i.e. peduncle and floriferous part), 1–3× branched, terminal or seemingly lateral by reduction of the floriferous rosette; lower peduncular **Bra** similar to innermost rosette leaves, diminishing in size upwards; peduncle long to short, cylindrical to complanate; **Inf** branches long racemose to capitate; **Fl** actinomorphic, unisexual (and plants dioecious), sessile to long pedicellate; **Ped** frequently articulated with the rhachis; **Per** campanulate, very rarely tubular (*H. pretiosa*), usually white, greenish or yellowish, rarely rose, lilac, red or reddish; **Sep** 3, free, sepaloïd; **Pet** 3, free or rarely basally connate (*H. pretiosa*), petaloïd, naked; **male Fl** with **St** longer or shorter than the petals, equal to subequal, **Fil** white, rarely greenish, filiform or linear to triangular and flattened, **Anth** dorsifixed, oblong, **Ov** vestigial; **female Fl** with **Ov** superior to $\frac{3}{4}$ inferior, rarely inferior (*H. epigyna*, *H. malvernii*), ovoid to long ovoid or ellipsoid, glabrous to lepidote, 3-locular, ovules numerous, **Sty** absent or rarely present

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(*H. guatemalensis*), **Sti** 3-branched erect to recurved branches, **Fil** of the staminodes flattened, triangular, antheroids present or sometimes absent; **Fr** dehiscent septicidal and loculicidal capsules, ellipsoid to ovoid, sometimes triquetrous, sepals, petals and stigma branches persistent at the apex; **Se** numerous, fusiform, circuncumulate and bicaudate.

A genus with 69 species, 63 (92.5%) of them endemic to Mexico (Espejo-Serna 2012), and entirely endemic to the region termed “Mega-mexico 3” by Rzedowski (1991). The genus is still not well known, and not less than 17 species (28% of the genus) have been described in the past 7 years, and several more remain to be described. No subgeneric classification has been established, and no phylogenetic analysis is available at this time, even though some subgroups like the *H. podantha*, *H. glomerata*, *H. tillandsioides*, and *H. zamudioi* complexes, can be circumscribed.

Dioccy, as exhibited by *Hechtia*, is unique in the family with the exception of andromonoecy in *Cryptanthus* and a few isolated taxa of *Aechmea*, *Androlepis* and *Catopsis*, and gynomonoccy in a few isolated taxa of *Dyckia*. There is no sexual dimorphism in the vegetative characters, but the male and female flowers can appear quite different (e.g. *H. confusa*).

Flowering is always terminal, but the flowering rosette is pushed into a seemingly lateral position in some species, and appears completely lateral when the flowering rosette is prematurely overtopped by the offset it produces before starting to flower. Truly lateral flowering, as discussed by Ramírez Morillo & al. (2014a), does not occur in the genus.

All taxa exhibit \pm succulent leaves, varying from rigid (*H. podantha*, *H. roseana*) to soft and flexible (*H. tillandsioides*), and the genus is thus covered in its entirety below. *Hechtia* species inhabit xeric vegetation from arid shrublands to tropical deciduous and semideciduous forests, with few taxa from humid places such as oak forests or canyons and river sides.

The following names are of unresolved application but are referred to this genus: *Bromelia antiacantha* Bertoloni (1824) \equiv *Agallostachys antiacantha* (Bertoloni) Beer (1856); *Hechtia*

cordylinoides Baker (1881); *Hechtia longifolia* hort. ex Baker (1889); *Hechtia striata* Lemaire (1846); *Hechtia suaveolens* E. Morren ex Mez (1896).

H. aquamarina I. Ramírez & Jiménez (Phytotaxa 2012(33): 1, 2012). **Type:** Mexico, Puebla (*Ramírez & Carnevali* 1689 [CICY, B, G, K, MEXU, MO, SEL, UAMIZ, XAL, WU]). — **Lit:** Espejo-Serna & al. (2007: as *Hechtia* sp. 3); Ramírez Morillo & Jimenez-Nah (2012: as *H. pueblensis*). **Distr:** C Mexico (SE Puebla, NW Oaxaca); xerophytic shrublands, >900 m.

\equiv *Hechtia pueblensis* I. Ramírez & Jiménez (2012) (*nom. illeg.*, Art. 53.1).

Caespitose, flowering \pm 80 cm tall; **Ros** 35–60 cm \varnothing ; **L** 12–16, sheaths pale brown, transversely oblong, 3–3.5 \times 3.5–5 cm, entire, glabrous, **L** lamina glaucous, 22–30 \times 2–2.5 cm, densely white-lepidote abaxially and white-lepidote adaxially, **Sp** antrorse, 4–5 mm, 1–1.5 cm apart; **male Inf** 2 \times branched, with \pm 55 primary **Br** 10–23 cm long, secondary **Br** 2, basal, present only on the basal primary branches; floral **Bra** brownish, ovate, 2.2–2.4 \times 1.1–1.3 mm, acuminate, shorter than the sepals; **Ped** 1.2–1.4 mm; **Fl** fragrant; **Sep** green, ovate oblong, 2.1–2.2 \times 1.8–2 mm, acute; **Pet** pale green, elliptic, 4–5 \times 2.3–2.5 mm; **St** subequal, longer than the petals; **Fil** 4.3–5 mm; **Anth** green, 1.8–2 mm, mucronate; **female Inf** 1 \times branched, with \pm 15 primary **Br** 18–20 cm long; floral **Bra** brownish, widely triangular, 1–1.4 \times \pm 1.4 mm, minutely serrate, shorter than the sepals; **Ped** 15–17 \times 6–7 mm \varnothing ; **Fl** fragrant; **Sep** pale green, triangular, \pm 2.2 \times \pm 2 mm, obtuse; **Pet** green, long triangular, 3.7–4.5 \times \pm 2 mm; **Ov** pale rose, ellipsoid, \pm 7 \times \pm 2.8 mm; **Fr** light brown, 6–9 \times 3.5–5.8 mm; **Se** brown, 2.8–5.7 \times 0.87–1.2 mm.

H. bracteata Mez (in A. & C. de Candolle, Monogr. Phan. 9: 550, 1896). **Type:** Mexico, Veracruz (*Müller* 813 [W?, B, NY]). — **Lit:** Espejo-Serna & al. (2005); Burt-Utley & Utley (2011). **Distr:** C Mexico (Puebla, Veracruz); shrubland and tropical deciduous forests on calcareous soils, 1880–2050 m.

Caespitose, flowering 2–3 m tall; **Ros** globose, to 70 cm high and 50 cm \varnothing ; **L** numerous, sheaths

pale yellow to light brown, widely ovate to square or transversely elliptic, 6–7.5 × 6.6–12 cm, serrate, densely lepidote at the apical portion on both faces, **L** lamina light green, 37.6–60 × 1–3.5 cm, glabrous adaxially, white-lepidote abaxially, **Sp** dark brown to black, uncinatae, antrorse, 3–4 mm, 1.5–2 cm apart; **Inf** floccose-tomentose, 2 × branched; **male Inf** with ±21 primary **Br** 2.5–8 cm long, secondary **Br** 2, basal; floral **Bra** light brown, ovate to widely ovate, 4–8 × ±2.4 mm, acuminate, erose, glabrous, longer than the sepals; **Fl** polystichous, divaricate, 3.6 × 1.9–3.1 mm, densely arranged; **Ped** 2–2.5 mm, lepidote; **Sep** brown, ovate to broadly ovate, 2.5–4 × 1.2–2 mm, entire, glabrous, acute; **Pet** shortly connate at the base, yellowish, oblong to elliptic, 3.5–5 × 1.6–2 mm, entire, rounded; **St** equal, shorter than the petals; **Fil** 3–3.1 mm; **Anth** yellow, 1–2 mm; **female Inf** with 60 or more primary, short to capituliform primary **Br** 2–3.5 cm long; secondary **Br** 2, basal; floral **Bra** brown, ovate, 4.5–6.9 × 1.1–4.2 mm, acute, entire, glabrous, longer than the sepals; **Ped** 2.4–4.3 mm, lepidote; **Sep** brownish, ovate, 3–4.5 × 1.4–2 mm, entire, acute; **Pet** yellowish, triangular, 3.9–4.2 × 1.4–1.6 mm, entire, acute; **Ov** green, ovoid, ±8.5 × ±6.2 mm Ø; **Fr** brownish, 7–9.9 × 4.4–6.9 mm Ø; **Se** 2.5–3 mm.

Easily distinguished on account of the caespitose growth and the tall inflorescences, as well as by the long and broad floral bracts that cover the flowers. — The type number was originally erroneously given as “Müller 803”.

H. carlsoniae Burt-Utley & Utley (Syst. Bot. 13(2): 276–279, ill., 1988). **Type:** Mexico, Guerrero (*Burt-Utley & Utley* 7492 [MEXU, BH, CAS, F, MICH, MO, NY, US]). — **Lit:** Pulido-Esparza & al. (2004). **Distr:** S Mexico (Guerrero: Taxco, Iguala, Buenavista de Cuéllar); tropical deciduous forest, crevices or cliffs, 800–1050 m.

Caespitose, flowering to 1.4 m tall; **L** 10–15 per rosette, frequently falcate, sheaths broadly ovate or elliptic to reniform, 2.3–4.8 × 1.9–6.4 cm, margin finely spiny, glabrous and lustrous on both faces, becoming densely lepidote for ½ their length, **L** lamina 17–62 × 1–2.1 cm, appressed cinereous-lepidote on both faces, **Sp** antrorse,

red-brown, thin, 1.5–2.5 mm, 6–10 mm apart; **male Inf** 1 × branched, with ±12–13 primary **Br** 7.5–20 cm long; floral **Bra** narrowly ovate, ovate-elliptic or ovate-triangular, 2–4.5 × 0.8–2 mm, attenuate-acuminate, entire to distally erose; **Fl** divaricate, sometimes appearing verticillate; **Ped** 0.2–1.8 mm; **Sep** white-greenish with apical purple little dots, ovate to ovate-triangular, 2.5–3.3 × 1.5–2 mm, glabrous, acute, margin distally erose; **Pet** white with apical purple little dots, elliptic to ovate-elliptic, 4.2–5 × 2–3 mm, rounded to acute, margin distally erose; **St** longer than the petals; **Fil** 4.5–5.5 mm; **Anth** green, 1–1.6 mm; **female Inf** simple or 1 × branched, with 2–7 primary **Br** 4–17.5 cm long; floral **Bra** narrowly triangular to oblong, 2–8 × 0.8–3 mm, attenuate-acuminate to apiculate, margin erose, shorter or longer than the pedicels; **Ped** 2.5–4 mm; **Sep** green, purple at the apex, narrowly ovate-triangular, 2.5–4 × 2–2.5 mm, acuminate or rarely apiculate, margin distally erose, glabrous; **Pet** white, ovate-triangular, 4.2–7.5 × 2.5–3.5 mm, acuminate; **Ov** purple, ovoid to ellipsoid, 7–8 mm × ±4 mm Ø; **Fr** nutant, 9.5–16.5 × 4.5–8 mm, triquetrous, glabrous; **Se** dark brown, 7–8 × ±1.5 mm.

H. caudata L. B. Smith (Phytologia 8: 5, t. 1, figs. 1–5, 1961). **Type:** Mexico, Oaxaca (*Foster & Van Hyning* 2999 [US, US]). — **Distr:** Mexico (Oaxaca: Santiago Lachiguiri, Tehuantepec); xerophytic shrubland, saxicolous, 300–400 m; known only from the type material.

Growth habit unknown, flowering to 1.3 m tall; **L** ±25, sheaths brown to dark brown, lustrous, suborbicular, 4–7 × 3–8 cm, slightly serrulate, lepidote distally, **L** lamina reddish adaxially, 50–80 × 3–5.5 cm, glabrous adaxially, appressed cinereous-lepidote abaxially, **Sp** antrorse, 2–4 mm, 5–15 mm apart; **Inf** seemingly lateral, 1 × branched, glabrous; peduncular **Bra** ovate with long linear, caudate, subentire, lepidote lamina, the upper much reduced and without lamina; lower primary **Bra** like the peduncular bracts, caudate; **male Inf** with ±30 primary **Br** 3.5–8 cm long, slightly compressed at the base; floral **Bra** stramineous, ovate, 2.6–4 mm, acuminate, as long as or slightly longer than the pedicels; **Fl** divaricate to ascending; **Ped** slender, 1–1.3 mm; **Sep** white, elliptic to

ovate, $2.5\text{--}3 \times \pm 1.7$ mm, obtuse; **Pet** white, elliptic to ovate, $4.3\text{--}4.6 \times 2.3\text{--}2.5$ mm, obtuse; **St** longer than the petals; **Fil** ± 3.9 mm; **Anth** green, ± 1.6 mm; **female Inf** with ± 40 primary **Br** $4\text{--}10$ cm long; floral **Bra** stramineous, ovate, ± 2 mm, acuminate; **Fl** divaricate, laxly disposed; **Sep** triangular, $1.3\text{--}1.4 \times 1.3\text{--}1.4$ mm, acute; **Pet** white, narrowly triangular, $4.5\text{--}4.7 \times 1.9\text{--}2.3$ mm, acuminate; **Ov** ovoid; **Fr** light brown, $6.4\text{--}11 \times \pm 4$ mm \emptyset ; **Se** light brown, $3\text{--}4$ mm.

H. caulescens López-Ferrari & al. (Novon 19 (2): 197–200, ills., 2009). **Type:** Mexico, Puebla (Martínez & al. 58 [UAMIZ, IEB, MEXU]). — **Distr:** C Mexico (Morelos, Puebla, Oaxaca); arid scrub and tropical deciduous forests, on the ground or on rocks, 1200–1600 m.

Caespitose, flowering 0.8–1.9 m tall; stems cylindrical, long rhizomatous, prostrate or decumbent, $3\text{--}3.7$ cm \emptyset ; **Ros** regular, ± 40 cm \emptyset ; **L** numerous, sheaths light brown, depressed ovate, $3.2\text{--}4.7 \times 4.9\text{--}6$ cm, lustrous and white-lepidote at the apex on both faces, **L** lamina green to dark green, $29\text{--}40 \times 1.8\text{--}3$ cm, densely white-lepidote on both faces, **Sp** brown, curved, antrorse or some retrorse, $1.9\text{--}4$ mm, $1.5\text{--}1.9$ cm apart; **Inf** $2 \times$ branched; peduncle $4\text{--}12$ mm \emptyset ; peduncular **Bra** foliaceous, entire, glabrous, becoming gradually shorter upwards; **male Inf** with $18\text{--}20$ ascending to erect primary **Br** $10\text{--}22$ cm long; secondary **Br** ascending, $4.5\text{--}7$ cm long; floral **Bra** light brown, triangular, $2.2\text{--}2.5 \times 1.3\text{--}1.7$ mm, entire, acuminate; **Fl** ascending to divaricate, sessile or subsessile, densely disposed; **Sep** light brown to brown basally, ovate-triangular, $2.1\text{--}2.2 \times 1.6\text{--}1.8$ mm; **Pet** white, elliptic, $3.5\text{--}4 \times 2\text{--}2.5$ mm; **St** subequal, longer than the petals; **Fil** $2.8\text{--}3$ mm; **Anth** white to whitish-yellow, ± 1 mm; **female Inf** with $20\text{--}30$ ascending primary **Br** $0.6\text{--}2.3$ cm long; secondary **Br** $2.5\text{--}9$ cm long; floral **Bra** light brown, triangular, $\pm 2 \times \pm 1.8$ mm, slightly erose, acuminate; **Fl** ascending to appressed; **Ped** $1.3\text{--}1.7$ mm; **Sep** greenish-brown, triangular, $2.7\text{--}3.7 \times 1.3\text{--}1.7$ mm; **Pet** white, narrowly triangular, $3.4\text{--}3.8 \times 1.1\text{--}1.4$ mm; **Ov** green, ovoid to long ovoid, $3.3\text{--}3.9 \times 1.2\text{--}1.5$ mm, glabrous; **Fr** $8.5\text{--}10 \times 3.2\text{--}4.3$ mm; **Se** $2.8\text{--}4$ mm.

H. chichinautzensis Martínez-Correa & al. (Syst. Bot. 35(4): 746, ills. (pp. 747–748), 2010). **Type:** Mexico, Morelos (Martínez-Correa & al. 37 [UAMIZ, CICY, IEB, MEXU]). — **Distr:** C Mexico (Morelos: Cuernavaca, Tepoztlán), rosette-rich scrub on igneous rocks of lava flows, on rocks, 2000–2500 m.

Caespitose, flowering 0.6–1.7 m tall; **L** numerous, sheaths yellow to brown, ovate to square, glabrous basally and sparsely lepidote at the apex on both faces, $2.5\text{--}4.3 \times 2\text{--}6.4$ cm, **L** lamina green, $10\text{--}36 \times 1\text{--}4$ cm, glabrous adaxially, sparsely lepidote abaxially, **Sp** divaricate to antrorse, $2\text{--}6.3$ mm, $0.6\text{--}1.4$ cm apart; **Inf** lepidote, $2 \times$ branched; peduncle $4.5\text{--}15$ mm \emptyset ; peduncular **Bra** foliaceous, lepidote, serrate, $4\text{--}12.3$ cm, gradually becoming shorter upwards; **male Inf** with up to 57 ascending primary **Br** $0.6\text{--}5.4$ cm long; **Fl** fragrant, laxly arranged, $3.2\text{--}4.7 \times 2\text{--}3$ mm \emptyset ; **Ped** $1.6\text{--}2.4$ mm; floral **Bra** brown, triangular, entire, glabrous, $1.5\text{--}3.5 \times 0.4\text{--}0.7$ mm; **Sep** brown, ovate, $2\text{--}3.1 \times 1.3\text{--}1.7$ mm, entire, acute; **Pet** green with a longitudinal brown line abaxially, oblong, $3\text{--}4.4 \times 1.8\text{--}2.4$ mm, rounded; **St** equal, longer than the petals; **Fil** $3.2\text{--}4.2$ mm; **Anth** brown to black, $0.8\text{--}1.7$ mm; **female Inf** with up to 35 ascending primary **Br** $2.2\text{--}5.5$ cm long; floral **Bra** brown, triangular, entire, glabrous, $1.5\text{--}2.4 \times 0.7\text{--}1.2$ mm; **Fl** fragrant, laxly arranged, $3.8\text{--}6.8 \times 2\text{--}3.5$ mm \emptyset ; **Ped** $1.5\text{--}4.4$ mm; **Sep** brown, triangular, $1.6\text{--}2.8 \times 0.9\text{--}1.8$ mm, entire, acute; **Pet** green with a brown longitudinal line abaxially, triangular, $2.2\text{--}4.4 \times 1.3\text{--}2$ mm, entire, acute; **Ov** ovoid, $4\text{--}7 \times 2\text{--}2.4$ mm \emptyset ; **Fr** $10\text{--}14 \times 3\text{--}7$ mm; **Se** $2.4\text{--}5.5$ mm.

H. colossa Martínez-Correa & al. (Syst. Bot. 35(4): 746–747, ills. (pp. 752–753), 2010). **Type:** Mexico, Oaxaca (Espejo & al. 6872 [UAMIZ]). — **Distr:** S Mexico (Puebla, Oaxaca); tropical deciduous forest, limestone slopes, 1400–1900 m.

Caespitose, flowering 1.9–2 m tall; **L** numerous, sheaths yellow adaxially, brown abaxially, widely ovate to square, $7.5 \times 9.7\text{--}11.3$ cm, glabrous basally and lepidote at the apex on both faces, serrulate, **L** lamina light green, $45\text{--}55 \times 5\text{--}6.3$ cm, glabrous adaxially, sparsely lepidote abaxially, **Sp** divaricate to antrorse, $4.3\text{--}5.5$ mm,

1.3–2 cm apart; **Inf** 2× branched; peduncle ±20 mm Ø; peduncular **Bra** foliaceous, ±14 cm, lepidote, spiny, the apical ones narrowly triangular, lepidote, entire; **male Inf** 1.25–1.94 m, with up to 60 ascending primary **Br** 9.8–12 cm long; floral **Bra** brown, triangular, 4.9–5.7 × ±0.9 mm, entire, glabrous, attenuate; **Fl** divaricate, densely disposed; **Ped** 2.1–3 mm, glabrous; **Sep** brown, triangular, 3.2–3.8 × 1.7–2.1 mm, entire, acute; **Pet** green, elliptic to oblong, 5.8–6.2 × 2.6 mm, rounded, glabrous, entire; **St** equal, longer than the petals; **Fil** 4.5–4.6 mm; **Anth** yellow, 1.1–1.2 mm; **female Inf** with ±47 ascending primary **Br** ±17.5 cm long, secondary **Br** ascending, 7.5–9.5 cm; floral **Bra** brown, triangular, ±4.8 × 1.7 mm, entire, glabrous; **Fl** divaricate to ascending, densely disposed; **Ped** ±5 mm, glabrous; **Sep** brown, ovate, 2.5 × 1.5 mm; **Pet** green, triangular, ±4.8 × ±2.1 mm, glabrous, entire; **Fr** ±15 × ±5.3 mm Ø; **Se** ±5.4 mm.

H. complanata Burt-Utley (Phytoneuron 2012 (69): 6–10, ill., 2012). **Type:** Mexico, Oaxaca (Utley & Utley 8823 [MEXU, BM, CAS, GH, MICH, MO, US, USF]). — **Distr:** S Mexico (Oaxaca); thorn scrub and tropical deciduous forest, on the ground or on rocks on talus slopes.

Solitary, flowering to 2.3 m tall; **Ros** 1–1.2 m Ø, forming long rhizomes to 30 cm, ±4 cm Ø; **L** numerous, reflexed in the apical portion, sometimes the tips strongly curled, sheaths stramineous to castaneous, semiorbicular to transversely elliptic, 6–7.5 × 9.5–16 cm, margins finely spinulose, floccose at the apex, glabrous and lustrous on both faces, becoming densely lepidote distally, **L** lamina green, occasionally pink-tinged, 45–75 × 5–6 cm, very densely white-lepidote on both faces, most conspicuous on the lower 1/3, glabrescent adaxially at the apical portion, **Sp** castaneous to dark brown, antrorse and retrorse, or rarely divaricate, 3.5–7.5 mm, 2.7–5.3 cm apart; **Inf** finely lepidote to glabrous; peduncle 12–30 mm Ø; peduncular **Bra** rose-greenish, linear to narrowly triangular, 31–33 cm, becoming progressively reduced distally and exceeding the internodes, pungent; **male Inf** 2× branched, with 1–14 divaricate to ascending primary **Br** (8–) 11.5–32 cm long; floral **Bra** shorter than to

equalling the sepals, ovate to narrowly triangular, 0.9–2 × 0.3–0.8 mm, finely spinulose-serrulate, attenuate-acuminate, lepidote, acute; **Fl** divaricate, sometimes appearing verticillate; **Ped** articulated, stout, conical, 0.3–1.5 mm, lepidote; **Sep** ovate to deltoid, 1.2–1.6 × 1–1.6 mm, apiculate, occasionally finely serrulate-spinulose or erose, lepidote; **Pet** pale yellow, ovate to elliptic, 2.5–4.5 × 1.3–2.2 mm, apiculate, glabrous; **female Inf** 1× or infrequently 2× branched, with up to 34 divaricate to ascending primary **Br** (8.5–) 13–23.5 cm long; floral **Bra** triangular, 1–1.5 × 0.4–0.7 mm, apiculate, finely serrulate-spinulose, lepidote to occasionally glabrous; **Fl** divaricate, laxly disposed, sometimes appearing verticillate; **Ped** articulated, stout, conical, 0.5–1 mm, lepidote to occasionally glabrous; **Sep** triangular, 0.8–1.2 × 0.8–1.2 mm, entire to irregularly finely serrulate, lepidote to occasionally glabrous; **Pet** green, triangular, 2.1–2.9 × 1–1.8 mm, entire, apiculate to acute, glabrous; **Ov** lepidote; **Fr** dark brown but drying olive-green, 7.5–8.5 × 3–4 mm Ø, finely lepidote; **Se** not known.

H. confusa L. B. Smith (Contr. Gray Herb. 117: 22, t. 1, figs. 71–72, 1937). **Type:** Mexico, Puebla (Pringle 7479 [GH, VT]). — **Lit:** Smith (1938); Espejo-Serna & al. (2007); Burt-Utley & Utley (2011). **Distr:** C Mexico (Puebla, Oaxaca); rosette-rich scrub and thorn scrub, limestone hills and slopes, and on calcareous bluffs on rocks, 1900–2600 m. — Figs. 1 and 2.

Caespitose, flowering to 1.3 m tall; **Ros** ±25 × ±20 cm Ø; **L** numerous, sheaths yellow to brownish, ovate, 2–6 (7–) × 1.3–6 (–9) cm, serrate, glabrous basally, lepidote on both faces, **L** lamina dark green, recurved, 9–35 (–50) × 0.35–0.9 cm, pungent, glabrous adaxially, densely cinereous-lepidote abaxially, **Sp** retrorse or divaricate, some antrorse, 1.5–8 mm, 0.5–1.7 cm apart; **Inf** 2× branched; basal peduncular **Bra** foliaceous, caudate, sparsely lepidote, serrate, 3.7–12.8 cm, the apical ones triangular, erose; **male Inf** with up to 38 primary **Br**; floral **Bra** brownish, widely ovate, 3.8–7.3 × 1.7–4.5 (–6) mm, erose, lepidote, acute; **Fl** sessile, 3–6.9 × 2.1–3.1 mm Ø; **Sep** brownish, ovate, 2.4–4.6 × 1.4–3.2 mm, entire, rounded; **Pet** green-yellowish, oblong to

Fig. 1 *Hechtia confusa* (male flowers). (Copyright: A. Espejo-Serna)



Fig. 2 *Hechtia confusa* (female flowers). (Copyright: A. Espejo-Serna)

elliptic, 2.5–5.7 × 1.6–4 mm, entire, rounded; **St** equal, longer than the petals, triangular, flattened; **Fil** 2.4–4.4 mm; **Anth** yellow, 0.8–2.2 (–2.8) mm; **female Inf** with up to 38 primary **Br**; floral **Bra** brownish, widely ovate, 4.3–7.9 × 1.5–4.8 mm, erose, lepidote, acute; **Fl** sessile, densely disposed,

6.6 (–9.5) × 2.4 mm Ø; **Sep** brownish, ovate, 2.7–5.1 × 1.2–3.1 mm, acute; **Pet** green-yellowish, triangular 3.5–5.1 × 1.2–3 mm, entire, rounded; **Ov** ovoid, 6–7 × 2.1–2.5 mm Ø; **Fr** brownish, 6.5–10 × 3–8 mm Ø; **Se** 2.2–3.6 mm.

H. konzattiana L. B. Smith (Contr. Gray Herb. 117: 19, t. 1, fig. 56, 1937). **Type:** Mexico, Oaxaca (*Conzatti & Gómez* 3501 [US, MEXU]). — **Distr:** S Mexico (Oaxaca, Puebla); oak forest, ±1300 m.

Flowering to ±1 m tall; **L** numerous, sheaths brown, ovate, ±4 cm long, **L** lamina 15–40 × 1–1.3 cm, sparsely pale-lepidote adaxially, soon becoming glabrous, prominently nerved and lepidote abaxially, largely acuminate; **Sp** divaricate to barely antrorse, ±2 mm, 0.8–1 cm apart; **Inf** glabrous; peduncular **Bra** red with prominent hyaline margins, linear from a triangular-ovate base, lepidote, becoming progressively reduced distally; **male Inf** 1 × branched with ±35 primary divaricate **Br** 4–11 cm long; floral **Bra** brownish, elliptic, 2–2.5 mm, erose, longer than the pedicels; **Fl** divaricate, densely disposed; **Ped** ±1.5 mm; **Sep** pale brown, blackish punctate, broadly elliptic, ±2 mm, entire to faintly erose, obtuse; **Pet** white, elliptic, 2–2.3 × 2.5–4 mm, obtuse; **St** longer than the petals; **Fil** 3–3.2 mm; **Anth** yellow, ±1.5 mm; **female Inf**, **Fl** and **Fr** unknown.

H. deceptrix I. Ramírez & Hornung (Phytotaxa 221(2): 158, Figs. 1, 2, 3a, 3e, 2015).

Type: Mexico, Hidalgo (*López-Ferrari & al.* 3309 [UAMIZ, IEB]). — **Distr:** Mexico (Hidalgo: Actopan, Atotonilco El Grande, Cardonal); xerophilous scrub on calcareous cliffs, 1700–1800 m.

Caespitose, flowering to 2.5 m tall; **Ros** 50–60 cm Ø; **L** 50–80, sheaths light brown, broadly ovate, 4–6 × 4–5 cm, margins erose, lustrous and glabrous adaxially, densely white-lepidote abaxially, **L** lamina green, narrowly triangular, 26–50 × 1–3.5 cm, densely white-lepidote abaxially, glabrous adaxially, **Sp** light green or occasionally purple, antrorse, 1.5–2.5 mm, 0.4–1 cm apart; **male Inf** 1 × branched, with ±30 **Br**, occasionally the lower ones with a pair of secondary basal branches; peduncular **Bra** foliaceous, sheaths light brown, triangular, 2.5–4 × 3–4 cm, margins entire to erose, lamina green, narrowly triangular, 4–6 × 0.6–1.2 cm, margins spinose, glabrous adaxially, densely white-lepidote abaxially; **Br** ascending, 4–17 cm; floral **Bra** green with light brown apex, ovate-elliptic, 6–7 × 2.6–3 mm, margins erose, glabrous; **Fl** polystichous; **Ped** 4–5 mm; **Sep** green with light brown apex, triangular, 3.5–3.8 × 1.8–2 mm, entire, glabrous; **Pet** light green, widely elliptic, 4.2–4.5 × 3.3–3.5 mm, rounded; **St** unequal; **Fil** 1.9–3.5 mm; **Anth** green, 0.9–1.5 mm; **female Inf** 1 × branched, with 7–16 **Br**, occasionally the lower ones with a pair of secondary basal branches; peduncular **Bra** foliaceous, sheaths green, triangular, 2.5–4 × 3–4 cm, margins entire to erose, lamina green, narrowly triangular, 7–9 × 0.6–1 cm, margins spinose, glabrous adaxially, densely white-lepidote abaxially; **Br** ascending, 5–14 cm; floral **Bra** green, ovate-elliptic, ±8 × 4–5 mm, margins erose, glabrous; **Fl** polystichous; **Ped** <1 mm; **Sep** green, triangular, 4–5 × 2–2.5 mm, entire, glabrous; **Pet** green, elliptic, 4–5.2 × 2–2.8 mm, rounded; **Ov** oblong to ellipsoid, 5–7 mm; **Fr** brown, ellipsoid, 10–14 mm; **Se** brown to reddish-brown, ±3 mm.

H. dichroantha Donnell Smith (Bot. Gaz. 42: 299–300, 1906). **Type:** Guatemala, Baja Verapaz (*Cook* s.n. [US]). — **Distr:** Guatemala (Baja Verapaz, Chiquimula), Honduras (Francisco Morazán, El Paraíso); ±1600 m, terrestrial.

Growth habit unknown, flowering to 1.5 m tall; **L** numerous, sheaths ample, 3.5–5 cm wide, spiny, **L** lamina 15–100 × 2.3–4 cm, lepidote to glabrous adaxially, white-lepidote abaxially, long filiform-attenuated, **Sp** yellow, divaricate to antrorse, 1–3 mm, 0.5–1 cm apart; **Inf** terminal, 1–2 × branched, glabrous; peduncle ±1 cm Ø; peduncular **Bra** red, linear-lanceolate, 7–9 cm, densely white-lepidote abaxially, serrulate; **male Inf** with numerous primary **Br** 4–20 cm long; floral **Bra** linear-lanceolate, 6–19 mm, acuminate, equalling the sepals; **Fl** divaricate, tightly arranged; **Ped** 2–4 mm; **Sep** red, ovate-lanceolate, 4–6 mm, acuminate to mucronate; **Pet** white, ovate-lanceolate to oblong-lanceolate, 5–7 mm, acute; **St** equal or slightly shorter than the petals; **female Inf** with numerous primary **Br** 2.5–7 cm long; floral **Bra** linear-lanceolate, 4–9 mm, attenuate-acuminate; **Fl** sessile; **Sep** 4–5 mm, acuminate to mucronate; **Pet** white to white-reddish, 4–6 mm; **Ov** almost wholly inferior; **Fr** 8–15 mm, glabrous; **Se** brownish.

H. edulis I. Ramírez & al. (Novon 21: 362–367, ill., 2011). **Type:** Mexico, Chihuahua (*Ramírez & Carnevali* 1527 [CICY, MO, UAMIZ]). — **Lit:** Kopfstein (2015). **Distr:** Mexico (Chihuahua: Uruáchi, Batopilas); tropical deciduous forest and pine-oak forest, on steep rocks, 650–1850 m.

Caespitose, flowering to 1 m tall; **Ros** small, ±25–40 cm Ø; **L** numerous, sheaths oblong, ±1.2 × ±2 cm, dentate, thin, white-lepidote on both faces, **L** lamina 14–20 × 0.9–1.2 cm, glabrous and lustrous adaxially, white-lepidote abaxially, **Sp** antrorse, retrorse or divaricate, 1.2–2 mm, 5–7 mm apart; **Inf** erect, 1 × branched, glabrous; peduncle 3–4 mm Ø; peduncular **Bra** narrowly triangular, acute to long acuminate, 3–9 × 0.8–1 cm, decreasing in length further up; **male Inf** with 11–17 ascending primary **Br** (1–) 3–7 cm long; floral **Bra** light brown, oblong, asymmetrical, 3–3.5 × 3.8–4 mm, acute, irregularly serrate; **Fl** ascending, sessile, ±11 × ±3 mm Ø; **Sep** basally connate with the petals for ±1 mm, ovate, 3–3.5 × 2.2–2.3 mm, slightly dentate at the apex, sinuose to erose; **Pet** widely elliptic, 4.5–5 × 3.4–3.5 mm, obtuse, margin irregular; **St** subequal, 3 adnate to the petals, 3 free; **Fil** ±3.8 mm; **Anth** ±1 mm; **female Inf**

with 10–16 ascending primary **Br** (2–) 4–6 cm long; floral **Bra** light brown, rectangular, asymmetrical, $3\text{--}3.5 \times \pm 2.8$ mm, irregularly erose; **Fl** ascending, almost sessile; **Ped** green, conical, stout, 1–1.5 mm; **Sep** basally green, apically light brown, widely triangular, $2\text{--}2.5 \times 3\text{--}3.2$ mm, obtuse, slightly erose; **Pet** green, widely elliptic to ovate, $4\text{--}4.5 \times 2.8\text{--}3$ mm, acute; **Ov** wholly superior, green, ovoid, $4\text{--}5 \times \pm 2.3$ mm; **Fr** dark brown, $7\text{--}10 \times 2\text{--}3$ mm.

This species is called “chikana” by the Raramuri people from the Sierra Tarahumara. The leaves can be eaten raw after the marginal spines are removed, or they can be used to make a paste that, combined with chili pepper and salt, is eaten with tortillas (Kopfstein 2015).

H. elliptica L. B. Smith (Contr. Gray Herb. 117: 20, t. 1, figs. 61–62, 1937). **Type:** Mexico, Coahuila (*Palmer* 205 [GH, BM, C, F, K, NY, UC, US]). — **Distr:** Mexico (Coahuila); xerophilous scrub, on the ground or on rocks, 1000–1600 m.

Densely caespitose, flowering to 50 cm tall; **Ros** ± 20 cm \varnothing , asymmetrical; **L** numerous, sheaths yellowish to brown, ovate to subquadrate, $2.2\text{--}2.5 \times 2\text{--}2.2$ cm, glabrous, serrulate, **L** lamina green to green tinged with rose, $17\text{--}27 \times 1\text{--}2$ cm, glabrescent adaxially, densely appressed-lepidote abaxially, **Sp** dark brown, divaricate or rarely slightly antrorse or retrorse, ± 4 mm, $1.5\text{--}2.3$ cm apart; **Inf** seemingly lateral, white-lepidote; peduncle basally compressed, glabrous, $3\text{--}6.3$ mm \varnothing ; peduncular **Bra** ovate, $1\text{--}1.7 \times 0.55\text{--}0.6$ cm, acuminate, longer than the internodes, the upper ones shorter than the internodes; **male Inf** 1 \times branched, with 8–19 ascending primary **Br** 1–8 cm long; primary **Bra** stramineous, ovate, 4.5–7 mm, margins hyaline, acute; floral **Bra** brownish to rose with broad hyaline margins, suborbicular, ± 4 mm, erose, apiculate, \pm equalling the sepals; **Fl** ascending, subsessile; **Sep** brownish, with broad hyaline margins, elliptic, ± 5 mm, obtuse; **Pet** basally connate for ± 3 mm, white, elliptic, ± 8 mm, lepidote abaxially, obtuse; **St** shorter than the petals; **Fil** ± 7 mm, **Anth** yellow, ± 2 mm; **female Inf**, **Fl** and **Fr** unknown.

H. epigyra Harms (Notizbl. Bot. Gart. Berlin-Dahlem 12: 531–532, 1935). **Type:** Mexico,

Tamaulipas (*Viereck* 81 [B?]). — **Lit:** Espejo-Serna & al. (2010b). **Distr:** Mexico (Hidalgo, Tamaulipas); rosette-rich and juniper-palm scrub on limestone cliffs, 750–1800 m.

Caespitose, flowering to 4 m tall; **Ros** 30–80 cm \varnothing ; **L** numerous, sheaths light brown, widely ovate to square, $4\text{--}6 \times 4.4\text{--}5$ cm, densely white-lepidote on both faces, glabrescent when mature, **L** lamina dark green, $28\text{--}40 \times 1.2\text{--}3$ cm, glabrescent and lustrous at the apex adaxially, densely white-lepidote at the base adaxially, densely white-lepidote abaxially, **Sp** purple, triangular, antrorse, 1–2 mm, 0.4–1 cm apart; **Inf** terminal, 1 \times (rarely 2 \times) branched; peduncular **Bra** green tinged with purple, foliaceous, attenuate, pungent, longer than the internodes; **male Inf** with up to 30 primary **Br**, divaricate to ascending, 4–17 cm; floral **Bra** green with brown apex, ovate-elliptic, $6\text{--}7 \times 2.6\text{--}2.9$ mm, acute, margin slightly erose and hyaline; **Fl** divaricate; **Ped** 4–5 mm; **Sep** green with apex brown, triangular, $3.5\text{--}3.8 \times 1.8\text{--}2$ mm, glabrous, acute, entire; **Pet** green, widely elliptic, $4.2\text{--}4.5 \times 3.3\text{--}3.5$ mm, rounded, entire; **St** subequal, shorter than the petals; **Fil** 1.9–3.2 mm; **Anth** green, ± 1 mm; **female Inf** with up to 16 divaricate to ascending primary **Br** 6–14 cm long; floral **Bra** green, ovate-elliptic, $\pm 8 \times 4\text{--}5$ mm, acute, margin slightly erose and hyaline; **Fl** divaricate; **Ped** ± 2 mm; **Sep** green, triangular, $4.5\text{--}4.9 \times 2\text{--}2.4$ mm, glabrous, acute, entire; **Pet** green, elliptic, $4.8\text{--}5.2 \times 2.8\text{--}3$ mm, rounded, entire; **Ov** inferior, green, ellipsoid, $5\text{--}7 \times 2.5\text{--}2.8$ mm; **Fr** green, tinged with red towards the apex, brown to dark brown when mature, trigonous, $10\text{--}14 \times 4\text{--}4.5$ mm, glabrous; **Se** brown to reddish-brown, ± 3 mm.

H. flexilifolia I. Ramírez & Carnevali (Phytotaxa 178(2): 116–118, ills., 2014). **Type:** Mexico, Oaxaca (*Ramírez & Carnevali* 1868 [CICY, MEXU, OAX, SEL, US]). — **Distr:** Mexico (Oaxaca); cliffs with pine-oak forest, on rocks, 1900–2000 m.

Solitary, flowering to 1.8 m tall; **Ros** 50–55 cm \varnothing ; **L** 30–40, sheaths dark brown, broadly oblong, $3\text{--}4 \times 5\text{--}6.5$ cm, densely white-lepidote on both faces at the apex, **L** lamina narrowly triangular to linear, $15\text{--}100 \times 1.5\text{--}3$ cm, glabrous adaxially, densely white-lepidote abaxially, **Sp** white-

yellowish, antrorse, 10–20 mm, 1–1.5 cm apart; **male Inf** 1–2× branched with 70–80 primary **Br**; peduncular **Bra** foliaceous, narrowly triangular, 2.5–20 × 1.5–2.5 cm, entire to finely serrate, acuminate; primary **Br** divaricate to ascending, 4.5–30 cm; floral **Bra** yellowish, lanceolate, 2–4.5 × 1–2 mm, erose, acute, glabrous; **Fl** polystichous, divaricate; **Ped** 1–1.5 mm; **Sep** light brown, ovate, 2–2.5 × 1.2–1.6 mm, acute; **Pet** white, elliptic, 2.4–3.5 × 1.4–2.5 mm, acute to rounded; **St** unequal; **Fil** 1.5–3 mm; **Anth** yellow, 1–1.5 mm; **female Inf** 1× branched with 14–20 **Br**; peduncular **Bra** foliaceous, narrowly triangular, 2.5–20 × 1.5–2.5 cm, entire to finely serrate, acuminate; **Br** divaricate to ascending, 4–10 cm; floral **Bra** yellowish, ovate, 2–3 × 1.5–2 mm, acute, glabrous; **Fl** polystichous; **Ped** 1–1.5 mm; **Sep** light brown, ovate, 1.5–2.2 × 1.2–1.6 mm, acute; **Pet** white, triangular, 2.5–3 × 1–1.5 mm, acute; **Fr** dark brown, narrowly ovoid, 5–6 mm; **Se** 3.5–5 mm.

H. fosteriana L. B. Smith (Phytologia 8: 8, t. 1, figs. 10–11, 1961). **Type:** Mexico, Oaxaca (*Foster & Van Hynning* 2935 [US, US]). — **Distr:** Mexico (Oaxaca); tropical deciduous forest, on the ground or on rocks, 100–600 m.

Solitary, flowering to 1.5 m tall; **L** numerous, sheaths very dark castaneous and lustrous on both faces, transversely oblong to transversely reniform, ±10 cm wide, glabrous except at the apex, **L** lamina green tinged with red adaxially, >1 m × ±7 cm, glabrous above, appressedly cinereous-lepidote abaxially, **Sp** antrorse, ±6 mm; **Inf** seemingly lateral, 1× branched; peduncular **Bra** broadly triangular, exposing almost the whole peduncle but the linear mostly entire laminae equalling or exceeding the internodes; **male Inf** with ±15 slender primary **Br** 6.5–25 cm long; floral **Bra** narrowly triangular to ovate, 4.2–4.4 × ±1.7 mm, acuminate, longer than the pedicels; **Fl** ascending, some appearing verticillate; **Ped** slender, 1–1.3 mm; **Sep** white, ovate-triangular, 2.3–2.4 × 1.7–2 mm, glabrous, acute; **Pet** white tinged with red at the base adaxially, ovate-elliptic, 4.8–5 × 3.2–3.3 mm, glabrous, acute; **St** shorter than the petals; **Fil** 3.5–3.6 mm; **Anth** yellow, ±1.6 mm; **female Inf** 1× branched; floral **Bra** broadly ovate, 4 mm, acute, much exceeding the stout obconic pedicels; **Fl** divaricate; **Sep**

hyaline with a thickened brown base, ovate-oblong, 3 mm, obtuse; **Pet** white, ±4 mm; **Fr** brown, ±8 mm, acute, sharply trigonous, smooth, lustrous.

H. fragilis Burt-Utley & Utley (Brittonia 39 (1): 40–42, ill., 1987). **Type:** Mexico, Oaxaca (*Burt-Utley & Utley* 6980 [MEXU, MO, US]). — **Distr:** Mexico (Oaxaca, Puebla); tropical deciduous forest and thorn scrub, on the ground or on limestone cliffs, 600–1200 (–1800?) m.

Caespitose in small groups, flowering 40–100 cm tall; **L** 20–25, brittle, sheaths yellow to light brown, transversely oblong, 1.6–4 × 3.8–5.6 cm, margin finely spiny, **L** lamina light green with red spots, 10–21 × 1–3 cm, glabrous adaxially, appressedly cinereous-lepidote abaxially, **Sp** retrorse to divaricate, green to red-brown, 1.3–4 mm; **Inf** 1× branched, sparsely tomentose; **male Inf** with ±40 primary **Br**; floral **Bra** ovate-triangular, 2–3.1 × 0.7–1 mm, sparsely tomentose-lepidote, acuminate, occasionally apiculate, finely erose; **Ped** 1.5–2.3 mm; **Sep** green tinged purple, ovate to ovate-elliptic, 1.3–2.5 × 1.9–2.1 mm, glabrous, acute to obtuse; **Pet** greenish-white tinged purple, broadly elliptic to oblong, 4.5–5 × 2.9–3.1 mm, glabrous; **St** as long as the petals; **Fil** 3–5 mm; **Anth** green, 1.5–2 mm; **female Inf** with ±20 primary **Br**; floral **Bra** narrowly ovate to ovate-triangular, 1.6–4.5 × 1–2 mm, acuminate, margin distally erose, sparingly tomentose to lepidote; **Ped** 1.5–2.5 mm; **Sep** brownish-green, ovate-triangular to triangular, 2–2.9 × 1.3–1.6 mm, glabrous to sparingly tomentose, acute, margin hyaline, entire, sometimes distally erose; **Pet** green tinged purple, ovate to ovate-elliptic, 3.6–4.7 × 2.3–2.5 mm, glabrous, acuminate; **Ov** wholly superior, green, purplish at the apex, ovoid, 4.5–5.1 × 3.4–3.6 mm; **Fr** dark brown, 5.5–8 × 3.5–5 mm; **Se** brown, 5.5–6 mm.

H. galeottii Mez (Repert. Spec. Nov. Regni Veg. 16: 71–72, 1919). **Type** [lecto]: Mexico, Oaxaca (*Pringle* 6703 [B, B, BR, ENCB, G, GH, HBG, M, MEXU, P, UC, VT, WU, Z]). — **Lit:** Espejo-Serna & al. (2013). **Distr:** S Mexico (Oaxaca: Asunción Nochixtlán, San Jerónimo Sosola); oak forest and transitions to tropical

deciduous forests, terrestrial on calcareous hills, 1500–2000 m.

Solitary; flowering to 2 m tall; **L** numerous, sheaths light brown, oblong to suborbicular, 5.2–6 × 5–5.5 cm, glabrous and lustrous basally, becoming densely white-lepidote distally on both faces, **L** lamina green, 30–40 × 3.5–4.5 cm, glabrous adaxially, finely appressedly white-lepidote abaxially, **Sp** stout, dark to light brown or green, curved, antrorse, with a conspicuous triangular base, ±4 mm, 2–4 cm apart; **Inf** very sparsely floccose-lepidote, glabrescent; peduncle dark brown, cylindrical, ±2 cm Ø basally; peduncular **Bra** light brown, linear-triangular to triangular, pungent; **male Inf** 2× branched, with numerous divaricate to ascending primary **Br** 16–35 cm long, with 2 short (2.5–13 cm) secondary branches at the base; floral **Bra** light brown, ovate-triangular, ±1 mm, sparsely lepidote, acute, erose, shorter than the sepals; **Fl** ascending, sometimes appearing verticillate, subsessile or very shortly pedicellate; **Ped** stout, conical, ±1.5 mm; **Sep** broadly ovate, ±1.5 × 1.4–1.6 mm, obtuse; **Pet** densely black-punctate, elliptic to ovate-elliptic, 2.5–2.8 × 1.9–2 mm, rounded; **St** longer than the petals; **Fil** 2.5–2.8 mm; **Anth** greenish, ±1 mm; **female Inf** 1× branched, with numerous divaricate to ascending primary **Br** 12.5–28 cm long; floral **Bra** light brown, dark brown towards the base, ovate-triangular, ±1.5 mm, lepidote, erose, shorter than the sepals; **Fl** ascending, densely to laxly disposed, sometimes appearing verticillate, subsessile; **Sep** ovate to triangular, 1.8–2 × 1.4–1.5 mm, acute; **Pet** narrowly triangular to deltoid, 3.3–3.4 × 1.4–1.5 mm, acute; **Ov** ellipsoid, ±2.5 × ±1 mm, glabrous; **Fr** dark brown, 7.5–8 mm, acute; **Se** reddish-brown, ±3.5 mm.

See Espejo-Serna & al. (2013) for details of the typification and the type locality.

H. glauca Burt-Utley & Utley (Brittonia 45: 220–222, fig. 1, 1993). **Type:** Mexico, Michoacán (Burt-Utley & Utley 8387 [MEXU, B, CAS, DUKE, IEB, MICH, MO, NY, US]). — **Distr:** Mexico (Michoacán: Arteaga); on exposed rocky cliffs, 300–900 m.

Usually solitary or in groups of few rosettes, flowering 0.9–1.5 m tall; **Ros** strongly spreading, to 80 cm Ø; **L** frequently falcate, sheaths stramineous to light brown, often deep pink-red distally, transversely elliptic to reniform, 4.5–6.7 × 6.5–11 cm, margins crenulate to weakly spinulose, glabrous and lustrous on both faces, **L** lamina blue-green, occasionally suffused with pink, wax-covered, strongly recurved distally, 33.5–70 × 5.8–9.3 cm, glabrous on both faces, **Sp** red-brown, antrorse, 0.8–3 mm, 0.7–3 cm apart; **Inf** glabrous; peduncular **Bra** foliaceous, becoming progressively reduced distally; **male Inf** weakly 2× branched; floral **Bra** broadly ovate, 1.2–2 × 1.5–1.7 mm, apiculate to attenuate-acuminate, very finely denticulate to erose, longer than the pedicels; **Ped** stout, 0.3–1.2 mm, articulated; **Sep** light green or green suffused with pink, ovate to broadly ovate, 1.6–2.2 × 1.5–2.3 mm, glabrous, rounded to acute or acuminate, entire or rarely somewhat erose; **Pet** white to light lavender-pink, subspatulate, 4.5–5 × 1.8–2.2 mm, rounded; **female Inf** 1× or rarely 2× branched; floral **Bra** ovate, 1–2.3 × 1–1.3 mm, acuminate to apiculate, erose distally, shorter than the pedicels; **Ped** 2–4.5 mm, articulated; **Sep** light green or green suffused with pink, triangular to ovate-triangular, 1.7–2.5 × 1.4–2 mm, apiculate to acute, entire or somewhat erose; **Pet** white to faintly or deeply suffused with dark lavender-pink, triangular, 3.5–5 × 1.3–2.1 mm, acuminate to apiculate; **Ov** largely superior, light green to light green suffused with pink; **Fr** brown, (8–) 9–12 × 3.5–5 mm, glabrous, smooth.

H. glomerata Zuccarini (Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 3: 240–242, t. 6, 1840). **Type:** Mexico, Hidalgo? (Karwinsky s.n. [lecto — icono]: l.c., t. 6]). — **Lit:** Burt-Utley & Utley (2011). **Distr:** Mexico (Nuevo León, Tamaulipas, San Luis Potosí, Aguascalientes, Hidalgo, Querétaro, Guanajuato, México, Chiapas), Guatemala (Guatemala, Huehuetenango, Quiché); thorn scrub vegetation and tropical deciduous forest, generally on limestone hills or cliffs, on the ground or on rocks, 200–2100 m.

Incl. *Dasyllirion pitcairniifolium* Karwinsky & Zuccarini ex Zuccarini (1838) (*nom. inval.*, ICN

Art. 38.3); **incl.** *Yucca pitcairniifolia* Karwinsky ex Zuccarini (1838) (*nom. inval.*, ICN Art. 38.3); **incl.** *Hechtia ghiesbreghtiana* Lemaire (1862) (*nom. inval.*, ICN Art. 38.3); **incl.** *Hechtia ghiesbreghtii* Lemaire (1863); **incl.** *Hechtia argentea* K. Koch ex Baker (1884) \equiv *Dyckia argentea* (K. Koch ex Baker) G. Nicholson (1886); **incl.** *Hechtia capituligera* Mez (1896); **incl.** *Hechtia gamopetala* Mez (1896); **incl.** *Hechtia morreniana* Mez (1896); **incl.** *Hechtia lepidophylla* I. Ramírez (2008).

Solitary or caespitose, flowering 1.4–2.5 m tall; **Ros** globose, 20–90 cm \varnothing ; **L** numerous, 50–100 per rosette, sheaths white to yellowish with a dark brown to black spot, oblong to depressed-ovate, 3–6 \times 3–8 cm, glabrous, lustrous, entire or sometimes minutely denticulate towards the apical portion, **L** lamina green to light or greyish, 20–85 \times 1–3.5 cm, densely cinerous to white-lepidote or glabrous and lustrous adaxially, densely white-lepidote abaxially, **Sp** light brown to brown or reddish, antrorse to divaricate, 4–7 mm, 0.7–2 cm apart; **Inf** seemingly lateral, 1–2 \times branched, rarely simple, white-lepidote to white-tomentulose, soon glabrous; peduncle cylindrical, flattened at the base, 1–3 cm \varnothing , white-lepidote to glabrescent; peduncular **Bra** brown to light brown, triangular to narrowly triangular, 3–5.5 \times 0.9–1.5 cm, entire to minutely denticulate, white-lepidote to glabrescent on both faces, acute to acuminate, the basal ones imbricate and longer than the internodes, the upper shorter than the internodes; **male Inf** with 13–35 divaricate to ascending, glomerate to elongated primary **Br** 1–15 (–23) cm long; primary **Bra** brown to light brown, triangular, 8–12 \times 3–4 mm, acute to acuminate, margins spiny, becoming progressively reduced distally; secondary **Br**, when present, glomerate, 0.6–2.2 cm; secondary **Bra** ovate-triangular, 7–8 \times 3–4 mm, apiculate; floral **Bra** brownish, widely triangular-ovate, 4–7 \times 5–7 mm, fimbriate, lepidote abaxially, acute to apiculate; **Fl** ascending, sessile or shortly pedicellate; **Sep** white to rose-coloured, ovate, widely elliptic to oblong, 3.5–4.5 \times \pm 3 mm, densely white-lepidote, entire, rounded; **Pet** white, obovate to ovate or elliptic, 4.5–6 \times 3–3.5 mm, rounded; **St**

unequal, shorter than the petals; **Fil** 2.5–4 mm; **Anth** green, 1–1.5 mm; **female Inf** with 15–39 divaricate to ascending, glomerate to elongated primary **Br** 1–15 cm long; primary **Bra** brown to light brown, triangular, becoming progressively reduced distally; secondary **Br**, when present, glomerate, \pm 1.5 cm; secondary **Bra** ovate-triangular, 7–8 \times 3–4 mm, apiculate; floral **Bra** brownish, triangular-ovate to triangular, 4.5–6.5 \times 3–5 mm, brownish, densely white-lepidote, fimbriate, acute to apiculate, longer than the sepals; **Fl** ascending, sessile to shortly pedicellate; **Ped** stout, \pm 1 mm; **Sep** greenish or brownish to reddish, ovate to triangular-ovate, 4.2–5.8 \times 3–4 mm, sparsely to densely white-lepidote, margin hyaline, entire to erose, rounded to acute; **Pet** white to rose-coloured, ovate to oblong, 4.5–7 \times 3–4 mm, rounded to apiculate; **Ov** green, ellipsoid to oblong, 4.5–7.5 \times 3–3.5 mm, densely white-lepidote to light brown-floccose-lepidote; **Fr** light to dark brown, 6.5–10 \times 4–5 mm, densely white-lepidote to glabrescent; **Se** brown to reddish, 4.5–5 mm.

Smith & Downs (1974) cite a Karwinski specimen in the Munich herbarium as type, but this specimen was only prepared 1853 from cultivated descendants of the original collection, i.e. 13 years after the publication of the name. According to the nomenclatural rules, this material cannot be the type. Therefore, the detailed figure (plate 6) in the protologue of *H. glomerata* is **here designated as lectotype** of the name.

H. glomerata is a highly variable species with a wide distribution in Mexico and Guatemala. The populations show variation in some characters, particularly in the size of the plants and inflorescences, in the pubescence of the leaves, and in the form of the floral structures. *H. argentea* (accepted as separate species by Siekkinen (2015)), *H. ghiesbreghtii* and *H. lepidophylla* are here listed as synonyms since we consider them to represent only forms of this variation. More detailed studies at the level of populations are needed for a better understanding of the *H. glomerata* complex, however.

H. guatemalensis Mez (Repert. Spec. Nov. Regni Veg. 3: 14, 1906). **Type:** Guatemala,

Guatemala (*Pittier* 137 [US, B]). — **Distr:** Guatemala, Honduras, El Salvador, Nicaragua, Belize; tropical deciduous forest, thorn scrub and pine-oak forest, on the ground or on rocks, 200–1500 m.

Caespitose, flowering to 2 m tall; **Ros** 60–100 cm Ø; **L** numerous, sheaths light brown, widely ovate to suborbicular, 3.5–4 × 4.5–6 cm, glabrous, lustrous, margins weakly spinulose, **L** lamina 30–80 × 2–5.3 cm, lepidote to glabrous adaxially, densely white-lepidote abaxially, long caudate, **Sp** red-brown, antrorse, 3–4.5 mm, 0.7–1.7 cm apart; **Inf** glabrous; peduncle pale brown, cylindrical, 1–2 cm Ø, basally slender, glabrous; peduncular **Bra** light brown, linear to linear-triangular, margins spiny; **male Inf** 2 × branched, laxly flowered; primary **Bra** light brown, triangular, 1.7–3 cm × 4–7 mm, margins minutely spiny; primary **Br** slender, 23–30 cm; secondary **Bra** narrowly triangular, 5–7 mm; secondary **Br** 6–16 cm; floral **Bra** narrowly ovate, 1.3–1.5 mm long, scarious, acuminate, ±equalling the pedicels; **Fl** polystichous, reflexed; **Ped** slender, ±1.5 mm; **Sep** triangular, 2–2.2 × ±2 mm, obtuse; **Pet** white, elliptic, 4–4.5 × 2.4–2.7 mm, obtuse; **St** longer than the petals; **Fil** 4.6–4.9 mm; **Anth** green, 2.3–2.6 mm; **female Inf** generally 2 × branched, rarely 1 × or 3 × branched, laxly flowered; primary **Bra** light brown, triangular, 0.8–1.4 cm × 4–7 mm, entire; primary **Br** slender, 23–41 cm; secondary **Bra** narrowly triangular, 3–4 mm; secondary **Br** 7.5–15 cm; floral **Bra** triangular, ±1.5 mm, acuminate; **Fl** polystichous, reflexed; **Ped** ±1 mm; **Sep** white, triangular, 1.8–3 × 1.8–2 mm, acute; **Pet** white, elliptic, 3.5–3.7 × ±2 mm, acuminate; **Ov** almost wholly inferior, green, ellipsoid, 3–3.3 mm × 2.5–2.6 mm, glabrous; **Sty** ±1 mm; **Fr** light brown, 5–8 mm, glabrous, prominently and irregularly veined; **Se** red-brown.

H. hernandez-sandovalii I. Ramírez & al. (*Phytotaxa* 112(2): 34–38, ills., 2013). **Type:** Mexico, Tamaulipas (*Hernández & Martínez* 1797 [MEXU, QMEX, TEX-LL, UAT]). — **Distr:** Mexico (SW Tamaulipas: Miquihuana); *Agave-Hechtia* rosette-rich shrubland, on limestone hills or rocky exposed areas, 1550–2200 m.

Caespitose, flowering 1–1.8 m tall; **Ros** to 35 cm Ø; **L** 25–35, sheaths white-yellowish adaxially, brownish abaxially, sometimes with a darker brown area on the apical zone, transversely oblong, 2.5–3 × (2.6–) 3.7–4.8 cm, glabrous on both faces, finely dentate at the apex, **L** lamina green, 21–39 × 1.3–2.9 cm, acuminate, glabrous to sparsely white-lepidote adaxially, white-lepidote abaxially, **Sp** reddish, generally retrorse, 4–7 mm, (0.8–) 1.6–4.4 (–5.1) cm apart; **Inf** seemingly lateral; **male Inf** 1 × branched, sparsely white-lepidote but sometimes glabrous, with ±29 primary capitate **Br**; peduncular **Bra** brownish, triangular to triangular-ovate, 2.3–6.2 × 1–2.7 cm, acute and acuminate, sparsely lepidote, finely and laxly denticulate at the base, entire towards the apex; primary **Bra** brownish, triangular, 1–4 × 0.6–1.2 cm, acute, sparsely lepidote, entire; **Fl** densely clustered, covered by a thick brownish cotton-like indumentum, 6.5–7.5 × 3–3.2 mm, sessile; floral **Bra** brownish, long-ovate, 6.3–8.2 × 4–4.4 mm, acute, erose, densely white lepidote, longer than the petals; **Sep** connate for ½ their length, brownish, oblong, 4.4–5.3 × 2.3–2.5 mm, acute, erose, densely white-lepidote; **Pet** white, obovate, 5.5–6 × 2.8–3 mm, rounded, entire, densely white-lepidote; **St** adnate to the petals and pistillode base, barely longer than the petals; **Fil** 2.9–3.5 mm; **Anth** ±2.2 mm; **female Inf** 1 × branched, sparsely white-lepidote, with 11–13 capitate primary **Br**; peduncular **Bra** brownish, 1.7–6.3 × 0.7–2.6 cm, acute, sparsely lepidote, finely and laxly denticulate at the base, entire towards the apex; **Fl** densely clustered, covered with a thick, white, cotton-like indumentum, 7–7.5 × 4–4.6 mm, sessile; floral **Bra** brownish, transversely oblong to broadly elliptic, 8.7–9.4 × 5.8–6 mm, acute, margin erose, densely white-lepidote; **Sep** connate for ½ of their length, brownish, carinate, ovate, 6.2–6.5 × 4–4.2 mm, acute, margin erose, densely white-lepidote; **Pet** free, white, ovate to long ovate, 4–4.9 × 3.8–4.4 mm, acute, entire, densely white-lepidote; **Ov** white to greenish, ovoid, ±6 × 3 mm; **Fr** brown, 7.2–8 × 4–5.2 mm; **Se** brownish, 3.3–3.9 × ±1.4 mm.

H. hintoniana Burt-Utley & al. (*Phytoneuron* 2011(59): 2, 2011). **Type:** Mexico, México

(*Matuda & al.* 31124 [MEXU, CAS, MEXU, MO, NY, US]). — **Distr:** Mexico (México, Michoacán); tropical deciduous forest, 750–900 m.

Habit unknown, flowering to 2 m tall; **L** presumably numerous, sheaths narrow, 3.5–5.5 cm wide, marginally spiny and floccose, distally lepidote on both faces, **L** lamina straight to somewhat falcate, $36.5\text{--}93 \times 0.6\text{--}2.2$ (–3.5) cm, lepidote on both faces, **Sp** red-brown to pale yellow, generally antrorse, 1.8–2.5 mm, 0.7–1.5 cm apart; **Inf** presumably terminal; peduncle 1.2–1.4 cm \varnothing , glabrous to glabrescent; upper peduncular **Bra** chartaceous, shorter than the internodes, rarely equal to or exceeding them, lanceolate-ovate with appressed linear-triangular lamina 1.5–3.9 cm long; **male Inf** lepidote, 2 \times branched, with numerous primary **Br** 8–16 cm long and (2–) 3–6 secondary **Br**; primary **Bra** ascending to subascending, (4.5–) 7.8–22 cm; floral **Bra** shorter than to exceeding the pedicels, chartaceous, ovate-triangular to oblong or suborbicular, $0.7\text{--}1.5 \times 0.4\text{--}1$ mm, externally lepidote, marginally finely serrulate to erose, spinulose or apiculate to praemorse; **Fl** divaricate to weakly ascending, subsessile to shortly pedicellate; **Ped** weakly articulated, stout, lepidote; **Sep** ovate-triangular to oblong, $0.7\text{--}1.3 \times 0.7\text{--}1.3$ mm, margin entire to erose distally, lepidote to glabrous, apically praemorse; **Pet** oblong-elliptic to ovate-elliptic, $2\text{--}3 \times 1.4\text{--}2$ mm, entire, glabrous, apically denticulate to praemorse; **St** equal, **Fil** basally briefly adnate to the petals; **female Inf** 1 \times branched (or if 2 \times branched then with 1–2 short secondary branches); primary **Br** ascending to subascending, (6.5–) 15–31 cm, lepidote, densely many-flowered throughout or flowers disposed in verticills; floral **Bra** shorter than to exceeding the pedicels, chartaceous, narrowly ovate-triangular, $1.3\text{--}2.2 \times 0.8\text{--}1.5$ mm, lepidote, entire to serrulate or erose, attenuate-acuminate to praemorse; **Fl** divaricate to ascending; **Ped** articulated, stout, 0.8–1.5 mm, lepidote; **Sep** triangular to ovate-triangular, $1.7\text{--}2.1 \times 1\text{--}1.8$ mm, glabrous to weakly lepidote, entire and hyaline at the margins, rounded to acute or praemorse; **Pet** narrowly ovate-triangular, $3.1\text{--}4 \times 1.2\text{--}1.9$ mm, glabrous, rounded; **Ov** glabrous; **Fr** $8\text{--}10 \times 3\text{--}4.5$ (–5.5) mm, glabrous, shiny and somewhat ridged, reticulate.

H. huamelulaensis I. Ramírez & Carnevali (*Phytotaxa* 178(2): 119–121, ills., 2014). **Type:** Mexico, Oaxaca (*Ramírez & Carnevali* 1675c [CICY]). — **Distr:** Mexico (Oaxaca); xerophytic vegetation, ± 60 m.

Caespitose in small groups, flowering to 1.5 m tall; **Ros** 50–60 cm \varnothing ; **L** 30–40, sheaths yellowish-green, transversely oblong, $7\text{--}8 \times 10\text{--}12$ cm, glabrous on both faces, **L** lamina dull green, narrowly triangular, $30\text{--}35 \times 6\text{--}8$ cm, glabrous adaxially, white-lepidote abaxially, long-acuminate, **Sp** red, antrorse, 3–5 mm, 1–1.5 cm apart; **male Inf** 1 \times branched with 45–55 branches; peduncular **Bra** foliaceous, sheaths triangular, $2\text{--}3 \times 4\text{--}7$ mm, lamina narrowly triangular, $2\text{--}10 \times 0.5\text{--}0.8$ cm, margins entire to finely serrate, sparsely white-lepidote at the apex; **Br** divaricate, 2.5–13.5 cm; floral **Bra** broadly ovate, $2.3\text{--}2.6 \times 2$ mm, margins erose, acuminate, glabrous; **Fl** polystichous; **Ped** ± 1 mm; **Sep** ovate to triangular-ovate, $2.5\text{--}3.5 \times 1.3\text{--}2$ mm, acute; **Pet** elliptic, $4.5\text{--}6 \times 2.5\text{--}3$ mm, rounded; **St** subequal; **Fil** 4–4.7 mm; **Anth** 1.6–2 mm; **female Inf** 1 \times branched with 45–100 branches; peduncular **Bra** foliaceous, sheaths broadly triangular, $3\text{--}5 \times 5\text{--}9$ mm, lamina narrowly triangular, $2\text{--}12 \times 0.7\text{--}1$ cm, margins finely serrate, sparsely white-lepidote; **Br** divaricate, 1.5–13 cm; floral **Bra** basally green, apically brown, oblong to triangular, $2.4\text{--}4.7 \times 1.5\text{--}3$ mm, margins erose, acuminate, glabrous; **Fl** polystichous; **Ped** 1.5–3 mm; **Sep** purple, triangular, $1.3\text{--}2.6 \times 2\text{--}2.5$ mm, margins entire to erose, acute; **Pet** white with a red stripe, ovate, $4\text{--}5.2 \times 2\text{--}2.7$ mm, acute; **Ov** light green, purple at the apex, ovoid, 3.2–3.5 mm; **Fr** narrowly ellipsoid, 9–12.5 mm; **Se** 6–8.5 mm.

H. iltisii Burt-Utley & Utley (*Brittonia* 45: 222–225, fig. 2, 1993). **Type:** Mexico, Jalisco (*Burt-Utley & Utley* 7703 [MEXU, DUKE, MICH, MO, NY, US, WIS]). — **Distr:** Mexico (Jalisco: La Huerta); thorn-scrub vegetation, on rock outcrops, 250–300 m.

Caespitose, flowering 0.93–2.1 m tall; **Ros** to 70 cm \varnothing ; **L** numerous, straight to occasionally falcate, sheaths stramineous, transversely elliptic to reniform, $3.5\text{--}5.6 \times 5.5\text{--}9.5$ cm, glabrous becoming lepidote distally on both faces,

somewhat inflated in older leaves, spinulose, **L** lamina 42.5–62.5 cm, glabrous adaxially, lepidote abaxially, **Sp** antrorse, occasionally retrorse, 1.5–4.5 mm, 0.5–3 cm apart; **male Inf** 1× branched; primary **Br** subascending; floral **Bra** pink, broadly ovate, 5–8 × 4–6.5 mm, acuminate, lepidote, finely spinulose-serrate, longer than the pedicels; **Fl** pedicellate or occasionally sessile; **Ped** stout, 0.5–3 mm, lepidote; **Sep** pink but drying dark maroon, ovate to ovate-triangular, 4.5–8 × 3.5–4.7 mm, lepidote, rounded to acute; **Pet** green, ovate, 5.5–9 × 3–4.5 mm, glabrous abaxially, somewhat cucullate apically; **St** shorter than the petals; **female Inf** 1× or very rarely 2× branched; primary **Br** subascending; floral **Bra** pink but drying maroon, ovate to broadly ovate, 5–11 × 3–6.5 mm, attenuate-acuminate, lepidote, finely spinulose-serrate to erose, shorter or longer than the pedicels; **Fl** pedicellate; **Ped** stout, triquetrous, 2–6 mm, lepidote; **Sep** pink, triangular, 5–7 × 2.8–3.8 mm, lepidote, attenuate-acuminate, very finely erose to serrulate distally; **Pet** green, triangular, 7–10 × 2.5–4 mm, glabrous abaxially; **Fr** olive-brown, (10–) 15–21 × 6–9 (–11) mm, glabrous, smooth.

In the protologue the presence of abnormal branches and flowers that occasionally had four sepals and petals, as well as ovaries with four locules have been mentioned. Staminate flowers on normal inflorescences occasionally had five sepals and petals and up to 10 stamens. Similar variations in the number of sepals and petals were observed in other species such as *H. glomerata*, *H. montana* (described for the synonymous *H. gayorum*) or *H. tillandsioides*.

H. isthmusiana Burt-Utley (Phytoneuron 2012(69): 10–13, ills., 2012). **Type:** Mexico, Oaxaca (*Utley & Utley* 8491 [MEXU, CAS, GH, MO, NY, US, USF, XAL]). — **Distr:** Mexico (SE Oaxaca: Ciudad Ixtepec, Asunción Ixtaltepec, Tehuantepec); thorn scrub and tropical deciduous forests, on the ground or on rocks on low rocky hillsides and slopes, 0–300 m. **I:** Ramírez Morillo & al. (2014b).

Caespitose, caulescent, flowering 0.6–1 m tall; **Ros** 25–50 cm Ø; **L** several to many, sheaths pale

to dark castaneous, 2–4 × (2.8–) 4–8 cm, glabrous and lustrous on both faces, becoming lepidote distally, margins finely spinulose and floccose, **L** lamina bright green to pale dusty rose, straight to subfalcate, 12–32 × 1.5–3 cm, appressedly cinereous-lepidote on both faces, **Sp** generally antrorse, (0.5–) 1.8–2.5 mm, (0.6–) 0.8–1.8 cm apart; **Inf** glabrous, typically 1× branched; **male Inf** with ±14 ascending primary **Br** (1.8–) 2.5–7.5 cm long; floral **Bra** chartaceous, ovate to oblong, 2–3.5 (–5) × 1–2.5 (–3) mm, glabrous, attenuate-acuminate to apiculate, margin finely denticulate to serrulate or erose distally; **Fl** divaricate to ascending; **Ped** articulated, conical, 1.2–3.5 mm; **Sep** white to cream, ovate to ovate-triangular, 1.5–2.7 × 1–1.8 mm, apically praemorse, margin hyaline; **Pet** white to cream but often tipped rose, elliptic to ovate-elliptic, 3.5–4.5 × 1.9–3.3 mm, glabrous; **female Inf** with ±19 ascending primary **Br** (0.1–) 1.5–3.5 (–4.5) cm long; floral **Bra** chartaceous, ovate-triangular to oblong, 2–3.5 × 1.2–2 mm, apiculate to acuminate, margin erose to very finely serrulate, hyaline; **Fl** divaricate; **Ped** articulated, 1.5–2.5 mm; **Sep** white or greenish to cream, triangular, 1.8–2.5 × 1.2–1.5 mm, glabrous, acuminate to apiculate, praemorse; **Pet** white or greenish to cream but often tipped rose, triangular, 4–5 × 1.5–2.5 mm, glabrous, margin hyaline; **Fr** dark castaneous, (6–) 7.5–11 × 3–4.5 mm Ø.

H. ixtlanensis Burt-Utley (Phytoneuron 2012 (69): 1–5, ills., 2012). **Type:** Mexico, Oaxaca (*Utley & Utley* 7961 [MEXU, B, C, CAS, GH, M, MICH, MO, NY, US, USF, XAL]). — **Distr:** Mexico (Oaxaca); pine-oak forest, on moist steep slopes, 1650–1900 m.

Forming clumps, flowering 1.5–2.7 m tall; **Ros** to 80 cm Ø; **L** very numerous, sheaths stramineous but oldest bases brown to castaneous distally, semiorbicular to transversely elliptic, 5–8.5 × 8–12 cm, margin finely spiny and distally floccose, glabrous and lustrous on both faces, becoming densely lepidote distally, **L** lamina straight to subfalcate, 32–56 × 2–3.5 (–4.5) cm, appressedly cinereous-lepidote but occasionally glabrescent on both faces, **Sp** red-brown, antrorse

to retrorse, (1.5–) 3–6 (–8) mm, 1.5–4.5 cm apart; **Inf** lepidote; peduncular bracts foliaceous, pungent, becoming progressively reduced distally; **male Inf** 2× branched or rarely 1×, with numerous divaricate primary **Br** 8–25 cm long, and with (0–) 5–9 (–11) divaricate to ascending secondary **Br** 0.5–9.5 cm long; floral **Bra** ovate-triangular to broadly ovate, 1.2–3 × 0.8–1.8 mm, lepidote, finely spinulose-serrulate; **Fl** very numerous, divaricate; **Ped** articulated, conical, stout, 0.7–1.8 mm, glabrous to sparingly lepidote; **Sep** ovate-triangular to triangular, 1–1.6 × 0.8–1.8 mm, glabrous to sparingly lepidote, apiculate, entire to erose or very finely serrulate; **Pet** cream, ovate to elliptic, (2–) 2.5–3.2 × 1.5–2 mm, glabrous, rounded to praemorse; **female Inf** 1× or rarely 2× branched, with up to 50 primary **Br** 6–22 cm long, and with 0–2 secondary **Br** 3–6 cm long; floral **Bra** ovate-triangular, 1.3–2.5 × 1–1.6 mm, glabrous to sparingly lepidote, proximally irregularly and finely serrulate-spinulose, apiculate; **Fl** very numerous, sometimes verticillate, ascending; **Ped** stout, 0.5–1.5 mm, glabrous to lepidote; **Sep** ovate-triangular, 1–1.5 × 0.7–1.5 mm, glabrous to lepidote, apiculate, erose distally; **Pet** greenish-yellow, triangular, (1.5–) 2–3 × 1–1.5 mm, glabrous, rounded to acute; **Fr** greenish-brown, 6.5–8 × 2.8–4 mm, smooth but sparingly finely ridged, glossy.

H. jaliscana L. B. Smith (Phytologia 10: 482, t. 1, fig. 10, 1964). **Type:** Mexico, Jalisco (*McVaugh* 18530 [MICH]). — **Distr:** Mexico (Jalisco: Amatitán, San Cristóbal de la Barranca, Zapopan); steep moist ravines with tropical deciduous forest, on rocks, 750–1300 m.

Caespitose, flowering to 1.8 m tall; **L** numerous, sheaths elliptic, 5–6 cm, glabrous basally, serrate distally, **L** lamina 50–80 × 2.7–3 cm, glabrous adaxially, finely appressedly cinereous-lepidote abaxially, margin undulate, **Sp** divaricate to antrorse, ±3 mm, 1.7–3 cm apart; **Inf** 1× branched, sparsely pale-lepidote, becoming glabrous; **male Inf** with 10–15 primary **Br**; basal peduncular **Bra** linear, to 15 cm, margins spiny; floral **Bra** ovate, 6–9 mm, acuminate, erose; **Fl** ascending to divaricate, sessile to shortly

pedicellate; **Ped** 2.5 mm; **Sep** whitish, ovate-deltoid, 4–5 × ±4 mm, glabrous, acute; **Pet** white, oblong-elliptic, 6–7 × 3.5–4 mm, acute to rounded; **St** equalling the petals; **Fil** 5.5–6 mm; **Anth** yellow, 1.5–2 mm; **female Inf** with ±20 primary **Br** 7–20 cm long; primary **Bra** lanceolate, caudate-acuminate, 2–4 cm, serrate; floral **Bra** green towards the base and brown towards the apex, lanceolate-ovate, ±9 mm, acuminate, minutely denticulate, about equalling the sepals; **Fl** divaricate, laxly and subverticillately disposed; **Ped** stout, cylindrical, ±4 mm, subulate, articulate; **Sep** brown with prominent scarious margin, ovate, 3.5–4 mm, attenuate, irregularly erose, acute or obtuse; **Pet** white, triangular-ovate, 3.5–4 × ±3 mm, attenuate, acute; **Fr** brown, 8–11 × 4–5 mm, sparsely lepidote, glabrescent and lustrous when mature.

H. laevis L. B. Smith (Phytologia 10: 482–483, t. 1, figs. 11–12, 1964). **Type:** Mexico, Colima (*McVaugh* 15528 [MICH, MICH, US]). — **Distr:** Mexico (Colima); open rocky slopes with tropical deciduous forests, also reported from chalky soils, on the ground or on rocks, 400–1000 m. **I:** Ramírez-Morillo & al. (2016: 263).

Caespitose, flowering 1–2 m tall; **L** numerous, densely rosulate, sheaths stramineous to light brown, transversally oblong to oblong, 4–4.5 × 4–7 cm, glabrous, barely lepidote distally, lustrous, margins serrate, **L** lamina rigid, 20–60 × 2.5–3 cm, pale appressed-lepidote on both faces, becoming glabrous adaxially, **Sp** reddish, antrorse, 2.5–5.5 mm, 1.4–2 cm apart; **Inf** 1× branched, sparsely white-lepidote when young, glabrescent with age; peduncle straight, 4–10 mm Ø; peduncular **Bra** erect, entire or laxly spiny, the lower linear from a small triangular base, the upper narrowly triangular; **male Inf** with 30–45 divaricate to ascending primary **Br** 3–25 cm long; floral **Bra** minute, narrowly triangular, densely white-lepidote; **Fl** divaricate, laxly disposed; **Ped** filiform, 1.5–3 mm, white-lepidote; **Sep** white with the median nerve purple, oblong-ovate, 1–1.3 × ±1 mm, erose, densely white-lepidote; **Pet** white to yellowish, widely ovate to suborbicular, 2–2.4 × ±2 mm, obtuse; **St** subequal,

shorter to as long as the petals; **Fil** ± 1.4 mm; **Anth** ± 1 mm; **female Inf** with 20–40 divaricate to ascending primary **Br** 5.5–20 cm long; floral **Bra** minute, $\pm 2 \times 0.3$ –0.5 mm, shorter than the pedicels; **Fl** divaricate, laxly disposed; **Ped** slenderly cylindrical, 2.5–3.5 mm, white-lepidote, smooth; **Sep** purplish, triangular, 2.2 – 2.4×1.2 – 1.5 mm, sparsely white-lepidote, acute; **Pet** white with the median nerve purplish, narrowly triangular, 3.5 – 4.4×1.8 – 2 mm, acuminate; **Ov** purple, ellipsoid, $\pm 3.4 \times \pm 2.2$ mm; **Fr** brown, ± 8 mm, deeply sulcate between the carpels, smooth, covered at first with appressed white scales; **Se** brown, 5–6 mm.

Material from Jalisco identified as this species was recently described as *H. santanae*.

H. lanata L. B. Smith (Phytologia 8: 5, t. 1, figs. 6–9, 1961). **Type** [neo]: Mexico, Oaxaca (*Ceja & al.* 1928 [UAMIZ, IEB]). — **Lit**: Espejo-Serna & al. (2012). **Distr**: Mexico (Oaxaca: Santiago Lachiguiri), thorn scrub and tropical deciduous forest, rocky slopes and cliffs, on rocks, 750–1300 m. **I**: Kemble (2016). — Fig. 3.

Solitary, caulescent, flowering to 1.2 m tall; **Ros** 30–40 cm \varnothing , forming long rhizomes to 30 cm and ± 4 cm \varnothing ; **L** numerous, reflexed in the apical part, sometimes the tips strongly curled,

sheaths stramineous to castaneous, suborbicular to broadly ovate, 4 – 6×4 – 8.5 cm, margins finely spinulose, floccose at the apex, glabrous and lustrous on both faces becoming densely lepidote distally, **L** lamina green, occasionally pink-tinged, 12 – 110×3 – 8 cm, very densely white-lepidote on both faces, most conspicuous on the lower $\frac{1}{3}$, glabrescent adaxially in the apical part, **Sp** green to dark brown, antrorse and retrorse, or rarely divaricate, 3–8 mm, 4–7.5 cm apart; **Inf** densely lepidote, glabrescent with age; peduncle cylindrical, 4–10 mm \varnothing ; peduncular **Bra** rose-greenish, linear to narrowly triangular, from a deltoid base, 3–18 cm, becoming progressively reduced distally and exceeding the internodes; **male Inf** $1 \times$ or rarely $2 \times$ branched, with 35–50 divaricate to ascending primary **Br** 2.5–17 cm long; floral **Bra** shorter than to equalling the sepals, ovate to triangular, 2 – 2.3×0.3 – 0.8 mm, finely spinulose-serrulate, attenuate-acuminate, lepidote, acute; **Fl** divaricate, sometimes appearing verticillate; **Ped** articulated, stout, conical, 0.5–2 mm, lepidote; **Sep** green to light brown apically, triangular, 1.5 – 2×1 – 1.6 mm, apiculate, occasionally finely serrulate-spinulose or erose esp. distally, lepidote, acute; **Pet** white, elliptic, 3 – 4.5×2 – 2.5 mm, entire, rounded to acute, apiculate, glabrous; **St** longer than the petals; **Fil** ± 4.5 mm; **Anth** yellow,

Fig. 3 *Hechtia lanata* (near Santiago Lachiguiri). (Copyright: A. Espejo-Serna)



± 1 mm; **female Inf** $1\times$ or infrequently $2\times$ branched, with up to 34 divaricate to ascending primary **Br** (1.5–) 4–9 cm long; floral **Bra** narrowly triangular, $1-1.5 \times 0.4-0.7$ mm, apiculate, entire to finely serrulate-spinulose, lepidote to occasionally glabrous; **Fl** divaricate, laxly disposed, sometimes appearing verticillate; **Ped** articulated, stout, conical, 1.5–2.5 mm, lepidote to occasionally glabrous; **Sep** green, apically brown, triangular, $2-2.5 \times 2-2.3$ mm, entire to irregularly finely serrulate, lepidote to occasionally glabrous, acute; **Pet** white, with a broad green central line, ovate, $3.1-3.5 \times 3.1$ mm, entire, apiculate to acute, glabrous; **Ov** green, ovoid, $4.5-5 \times 1-2$ mm; **Fr** dark brown, drying olive-green, $8-10 \times 3-4$ mm, lustrous, glabrous to finely lepidote; **Se** reddish-brown, $2.8-3$ mm $\times \pm 0.5$ mm.

H. laxissima L. B. Smith (Contr. US Nation. Herb. 29: 521–522, fig. 77, 1954). **Type:** Mexico, Michoacán (Moore & al. 5770 [US]). — **Distr:** Mexico (Michoacán: Múgica, Gabriel Zamora); on cliffs, ± 400 m.

Caespitose, flowering > 1.7 m tall; **L** numerous, sheaths not described, **L** lamina $\pm 40 \times \pm 4$ cm, glabrous adaxially, finely veined and covered with pale appressed scales abaxially, **Sp** pale brown, ± 4 mm; **Inf** seemingly lateral, glabrous; peduncle flattened at the base, ± 1 cm \varnothing ; peduncular **Bra** stramineous, triangular, acuminate, thin; **male Inf** unknown; **female Inf** $1\times$ branched, with ± 15 divaricate or ascending, very slender primary **Br** ± 20 cm long; floral **Bra** greenish-rose, ovate, acute, mostly about $\frac{1}{2}$ as long as the pedicels; **Fl** divaricate, very laxly disposed; **Ped** slenderly cylindrical, 2–4 mm; **Sep** dark rose with a greenish tinge, very broadly ovate, ± 3 mm, acute; **Pet** green with rose tips, ovate, ± 5 mm, acute; **Ov** glabrous; **Fr** unknown.

H. liebmannii Mez (Bot. Jahrb. Syst. 30 (Beiblatt 67): 6, 1901). **Type:** Mexico, Puebla (Liebmann s.n. [C, B]). — **Distr:** Mexico (Puebla, Veracruz); thorn scrub on lava flows, on the ground or on volcanic rocks, 2400–2500 m.

Incl. *Hechtia perotensis* I. Ramírez & Martínez-Correa (2007).

Caespitose to densely caespitose, flowering 0.55–2 m tall; **Ros** compact, globose, to 50×40 cm, sometimes slightly asymmetrical; **L** numerous, sheaths yellow to brownish, lustrous, widely ovate to subquadrate, $3.5-5.5 \times 3.5-8.5$ cm, white-lepidote apically, **L** lamina light green, $15.7-30.5 \times 1-1.8$ cm, glabrescent adaxially, minutely white-lepidote abaxially, **Sp** brown to dark brown, antrorse to divaricate, 5–6 mm, 1.5–2 cm apart; **Inf** $2-3\times$ branched; peduncle cylindrical, 1–3 cm \varnothing ; peduncular **Bra** brown, triangular to narrowly triangular, $3-20 \times 1-3.5$ cm, acute to acuminate, densely imbricate, sheaths entire, lamina erose to spiny, densely lepidote at the base abaxially, glabrescent adaxially; **male Inf** with numerous, ascending, glomerate to shortly elongate primary **Br** 2–3.5 cm long with 2 basal shorter secondary **Br**; primary **Bra** brown, ovate to narrowly ovate, $2.5-7 \times 0.8-1$ cm, lepidote abaxially, erose, acuminate; floral **Bra** green, lanceolate to oblong, ± 4 mm; **Fl** divaricate, laxly disposed; **Ped** 2–3 mm; **Sep** green, ovate to narrowly ovate, $4.5-5 \times 2-2.5$ mm, acute to rounded; **Pet** green to yellowish, elliptic to oblong, $6-7 \times 3-4$ mm, rounded; **St** as long as or shorter than the petals; **Fil** ± 5 mm; **Anth** yellow, curved, 1.2–1.5 mm; **female Inf** with numerous ascending glomerate to elongate primary **Br** 1.5–8 cm long; primary **Bra** widely triangular, $2-2.5 \times 1-1.3$ cm, acuminate to acute; floral **Bra** yellowish, triangular, 3–5 mm; **Fl** densely disposed, ascending; **Ped** obconical, 2–4 mm; **Sep** brownish, widely triangular, $4-5 \times 2.4-2.7$ mm, acute and apiculate; **Pet** green, triangular, $\pm 6 \times \pm 3$ mm, acute; **Ov** green, ovoid; **Fr** brown, $9-10 \times 3.5-7$ mm, lustrous; **Se** light brown, 2.9–3.5 mm.

H. lundelliorum L. B. Smith (in N. L. Britton & al. (eds.), North Amer. Fl. 19: 97–98, 1938). **Type:** Mexico, San Luis Potosí (Lundell & Lundell 7265 [MICH]). — **Lit:** López-Ferrari & al. (2011). **Distr:** Mexico (San Luis Potosí, Querétaro, Hidalgo, Puebla); tropical deciduous and semideciduous forest, limestone ledges and cliffs, on rocks, 150–1250 m.

Forming large pendulous colonies, flowering 0.8–1.8 m tall; **Ros** asymmetrical in mature plants, 30–120 cm long; **L** numerous, very long and

pendent, sheaths white to yellowish, broadly oblong to oblong, 5–6 × 3–5 cm, minutely serrate esp. towards the apical portion, white-lepidote on both faces, **L** lamina light green adaxially, densely white-lepidote abaxially, long-attenuate, 60–110 × 1–2 cm, margins minutely serrate; **Inf** erect to arched and/or pendulous, 3 × branched; peduncle brown, cylindrical, 0.8–2 cm Ø, glabrous; peduncular **Bra** brown to light brown or green, foliaceous, linear to long triangular, 5–70 × ±1 cm, entire to minutely denticulate, densely lepidote abaxially, glabrous to glabrescent adaxially, attenuate; **male Inf** with numerous ascending stalked primary **Br** 25–40 cm long; primary **Bra** light brown, linear to triangular, 2–25 cm × 4–6 mm, long-attenuate to acuminate; secondary **Br** numerous, ascending to appressed, 6–13 cm long, stalked; secondary **Bra** triangular, ±2 × ±1 mm, deciduous; tertiary **Br** numerous; **Fl** numerous on each branch, polystichous; **Ped** filiform, 1.5–2.5 mm; floral **Bra** light brown, triangular, ±2 × ±2.5 mm, rounded; **Sep** brown to light brown suffused with white, slightly rose towards the margins, ovate to triangular, ±1.2 × ±1.4 mm, glabrous, entire, rounded; **Pet** white, elliptic, 3.5–4.2 × 2.1–2.4 mm, rounded; **St** subequal, shorter than the petals; **Fil** 2–3 mm; **Anth** yellow, ±1.4 mm; **female Inf** with numerous ascending stalked primary **Br** 25–35 cm long; primary **Bra** brown to light brown, linear to triangular, 3–12 cm × 4.5–5 mm, acuminate; secondary **Br** numerous, ascending to appressed, 14–17 cm long; secondary **Bra** triangular, ±2 × ±1 mm, deciduous; tertiary **Br** numerous; **Fl** numerous on each branch, polystichous; **Ped** 1.4–1.7 mm; floral **Bra** light brown, hyaline, ovate to triangular, ±1 × ±1 mm, rounded; **Sep** light brown suffused with white, ovate to triangular, ±1.5 × ±1 mm, acute; **Pet** white, oblong-elliptic, ±3.5 × ±1.7 mm, rounded; **Ov** green, ovoid, ±3 × ±2 mm, glabrous; **Fr** brown to dark brown, slightly trigonous, 5–7 × 2–3 mm, glabrous, reflexed; **Se** brown to reddish-brown, ±1.3 mm.

H. lyman-smithii Burt-Utley & Utley (Brittonia 39(1): 37–40, ills., 1987). **Type:** Mexico, Oaxaca (*Burt-Utley & Utley* 6982 [MEXU, MO, NY, US]). — **Distr:** Mexico (Puebla:

Caltepec; Oaxaca: San Antonio Nanahuatipan, Santa María Ixcatlán, Santa María Tecomavaca); thorn scrub and tropical deciduous forest, steep limestone slopes and cliffs, on rocks, 600–1150 m. — Fig. 4.

Densely caespitose, flowering to 80 cm tall; **Ros** 20–27 cm Ø; **L** few, sheaths reniform, 1.8–2.8 × 3.5–4.5 cm, margins inconspicuously spiny, glabrous and lustrous, becoming lepidote distally, **L** lamina light green, often suffused with purple, 7–17 × 1.7–3 cm, appressedly cinereous-lepidote on both faces, **Sp** antrorse or occasionally retrorse, red-brown, 2.5–4 mm, 0.6–1.1 cm apart; **Inf** 1 × branched, glabrous; peduncle 3–5.5 mm Ø; lower peduncular **Bra** exceeding the internodes, ovate with linear, erose, appressed, lepidote lamina, 1.8–5.7 cm; **male Inf** with 15–40 slender divaricate to ascending primary **Br** (0.5–) 2.2–14 cm long; floral **Bra** as long as or slightly exceeding the pedicels, ovate, 0.8–2 × 0.7–1 mm, lacerate to erose, acute to apiculate; **Fl** divaricate; **Ped** slender, 0.8–3 mm; **Sep** white, tinged with rose, ovate to broadly ovate, 1.3–2.3 × 0.9–1.8 mm, glabrous, margin hyaline and distally erose, rounded to acute; **Pet** white to rose, ovate to oblong-ovate, 3–5 × 2–3.1 mm, **St** longer than the petals; **Fil** 4–4.5 mm; **Anth** yellow-green to green, ±2 mm, mucronate; **female Inf** with 12–40 slender divaricate primary **Br** 2–8.5 cm long; floral **Bra** shorter than the pedicels, narrowly ovate to ovate-triangular, 1–2 × 0.7–0.8 mm, margin hyaline, erose, acuminate; **Fl** divaricate to ascending; **Ped** stout, 1.5–3.5 mm; **Sep** light brown, ovate, 1.3–1.9 × 1.3–2.2 mm, glabrous, margin hyaline, acuminate, acute; **Pet** rose, triangular, 3–4 × 2–2.5 mm; **Ov** purple, ovoid, ±3.5 mm; **Fr** purple, drying light brown, triquetrous, 5.5–10 × 5–6 mm, glabrous, smooth; **Se** yellowish-brown, 3.5–4 mm.

H. malvernii Gilmartin (Ceiba 11(2): 9, fig. 4, 1965). **Type:** Honduras, El Paraíso (*Gilmartin* 966 [US, US]). — **Distr:** Honduras (El Paraíso); hillsides and bank of road cuts, ±700 m; known only from the type collection.

Growth habit not described, flowering to 2 m tall; **L** numerous, **L** lamina ±50 × 3.5–4.5 cm, pale appressed-lepidote, becoming glabrous

Fig. 4 *Hechtia lyman-smithii*. (Copyright: A. Espejo-Serna)



adaxially, glabrescent abaxially, margin undulate, **Sp** divaricate to antrorse, 3 mm, 0.9–1.1 cm apart; **Inf** glabrous, 1× branched; peduncular **Bra** to 16 cm, reflexed, lepidote abaxially, nearly glabrous adaxially; **male Inf** unknown; **female Inf** with ± 8 reflexed weak primary **Br** to 55 cm long; floral **Bra** narrowly ovate, 5–10 \times ± 2 mm, glabrous, acuminate; **Fl** divaricate to reflexed, laxly disposed, subsessile; **Sep** reddish, ovate, $\pm 3 \times \pm 1.5$ mm, glabrous, mucronate; **Pet** whitish, $\pm 5 \times \pm 1$ mm; **Ov** inferior, ellipsoid; **Fr** ± 10 mm, glabrous.

H. mapimiana López-Ferrari & Espejo (Acta Bot. Mex. 102: 90–92, ills. (pp. 91, 93–95), 2013). **Type:** Mexico, Durango (*Mercado & al.* 259 [CIIDIR, IEB, UAMIZ]). — **Distr:** Mexico (Durango: Lerdo); thorn scrub, limestone cliffs, on rocks, 1400–1750 m. – Fig. 5.

Caespitose in small groups, flowering to 2.3 m tall; **Ros** 40–70 cm \varnothing ; **L** numerous, sheaths light brown adaxially, dark brown abaxially, broadly ovate to subquadrate, 6–15 \times 5.5–10 cm, lustrous, glabrous on both faces, **L** lamina glaucous, cylindrical-conical and slightly curved upwards at the apex, 30–45 \times 2.5–4 cm, densely white-lepidote on both faces, **Sp** light brown, reddish at the apex, retrorse, 3–6 mm, 2–5 cm apart; **male**

Inf 2–3× branched, with numerous **Br** per node, apparently fasciculate by the reduction of the rachis; peduncular **Bra** foliaceous, sheaths ovate-triangular, papery, brittle, 4.5–5.5 \times 2.6–3.2 cm, entire, very sparsely white-lepidote to glabrous, lamina narrowly triangular, 8–10 \times 5–7 mm, densely white-lepidote on both faces, pungent, margins spiny; primary **Br** oblong-cylindrical, 5.4–6.8 cm, with 2 secondary basal branches 2.8–4.5 cm long; floral **Bra** white, filiform, 3–5 mm, shorter than the pedicels, entire, glabrous; **Fl** polystichous, ascending; **Ped** filiform, 5.5–11 mm; **Sep** white tinged with pink to purple, triangular, 3.6–4 \times 1.5–1.7 mm, acute; **Pet** light green, elliptic, 6.5–7.5 \times 4–4.2 mm, rounded; **St** subequal; **Fil** 3.2–3.5 mm; **Anth** green, 4.2–4.5 mm; **female Inf** 2× branched, with numerous **Br** grouped apparently in fascicles by the reduction of the rachis; peduncular **Bra** foliaceous, sheaths ovate-triangular, 5–6 \times 2.8–3 cm, papery, brittle, entire, very sparsely white-lepidote to glabrous, lamina 7–16.5 \times 0.5–0.7 cm wide, pungent, densely white-lepidote on both faces, margins spiny; primary **Br** oblong-cylindrical, 6–9 cm, with 2 solitary flowers at the base; floral **Bra** white, filiform, 3–5 mm, entire, glabrous, shorter than the pedicels; **Ped** filiform, 7–8 mm; **Fl** polystichous, ascending; **Sep** white tinged with pink to

Fig. 5 *Hechtia mapimiana*. (Copyright: A. Espejo-Serna)



purple, triangular, $\pm 3.5 \times 2.5$ mm, acute; **Pet** light green, ovate-triangular, $5\text{--}5.2 \times 2.5\text{--}2.7$ mm, acute; **Ov** green, ovoid; **Fr** light brown, triquetrous, $\pm 10 \times 8\text{--}9$ mm, with thin papery walls when mature.

H. marnier-lapostollei L. B. Smith (Bromeliad Soc. Bull. 11: 58, ills., 1961). **Type:** Mexico, Oaxaca (*Schwartz* s.n. in *Marnier-Lapostolle* s.n. [US]). — **Distr:** Mexico (Oaxaca: San Carlos Yautepec, San Juan Lajarcia); thorn scrub and tropical deciduous forest, on the ground or on limestone rocks, 750–1500 m.

Caespitose, flowering to 1 m tall; **L** 15–20, sheaths yellowish, suborbicular, ± 2 cm \varnothing , glabrous and lustrous, densely lepidote distally, **L** lamina $15\text{--}28 \times \pm 2$ cm, pungent, densely and closely pale-lepidote on both faces, **Sp** antrorse, slender, 2.5–4 mm, 0.12–1.3 cm apart; **Inf** 1 \times branched, glabrous; peduncle 2–4 mm \varnothing ; peduncular **Bra** exceeding the internodes, stramineous, broadly ovate with a long linear lamina, 1–4 cm, pungent; **male Inf** with 8–24 ascending primary **Br** 1.5–5.5 cm long; floral **Bra** stramineous, broadly ovate, ± 2 mm, erose apically, acuminate, longer than the pedicel; **Fl** divaricate; **Ped** ± 1 mm; **Sep** white-purpureous, triangular-ovate, ± 2 mm; **Pet** white tinged with purple, elliptic,

3–4 mm, rounded; **St** as long as the petals; **Fil** ± 3.5 mm; **Anth** green, ± 1.5 mm, mucronate; **female Inf** with ± 22 divaricate to ascending primary **Br** 2–5 cm long; floral **Bra** broadly ovate, erose, 2–2.5 mm; **Fl** divaricate; **Ped** ± 2 mm; **Sep** ovate-triangular, ± 2 mm, acute; **Pet** triangular to narrowly triangular, with a large callus at the base, ± 3.8 mm; **Ov** ovoid, trigonous, glabrous; **Fr** dark brown, 5.5–9 mm, shiny.

H. matudae L. B. Smith (Phytologia 5: 395–396, t. 1, figs. 1–2, 1956). **Type:** Mexico, Morelos (*Matuda* 26351 [US]). — **Lit:** López-Ferrari & al. (2008: with ills.). **Distr:** Mexico (México: Ocuilan; Morelos: Tepoztlán); oak and tropical deciduous forests, on the ground or on cliffs and crags of volcanic rocks, 1700–1900 m. — Fig. 6.

Caespitose, forming large colonies, flowering 0.8–1.6 m tall; **Ros** symmetrical to slightly asymmetrical in mature plants, 40–80 cm \varnothing ; **L** numerous, sheaths white to yellowish, broadly oblong to square, $6\text{--}12.5 \times 5\text{--}10$ cm, lustrous basally and white-lepidote apically on both faces, **L** lamina extended, pendent in mature plants, glaucous-green, $19\text{--}80 \times 1.7\text{--}6.5$ cm, densely white-lepidote on both faces, glabrescent adaxially, **Sp** yellowish, antrorse, 1.6–2 mm, 0.6–1.2 cm apart;



Fig. 6 *Hechtia matudae*. (Copyright: A. Espejo-Serna)

Inf 2× branched; peduncle cylindrical, 2.5–3 cm Ø; peduncular **Bra** straw-coloured, foliaceous, densely lepidote on both faces, becoming progressively reduced distally, densely imbricate; **male Inf** with up to 40 ascending to divaricate primary **Br** 6–11.5 cm long, each with 2 basal secondary branches; floral **Bra** white, linear, 4–8 × ±1 mm, acuminate, entire; **Fl** ascending to divaricate, densely disposed; **Ped** 2.2–2.7 mm; **Sep** rose, triangular to triangular-oblong, 4.6–5.2 × 1.9–2.7 mm, acute, entire; **Pet** rose, widely elliptic to oblong-elliptic, 6.5–8.5 × 4–4.7 mm, rounded, entire; **St** subequal, shorter than the petals; **Fil** 2.8–4 mm; **Anth** purple to dark purple, 1.5–1.8 mm; **female Inf** with 30–35 primary **Br** 7.8–8 cm long, each with 2 basal secondary branches; floral **Bra** white, linear, 4.5–8 × ±1.5 mm, acuminate, entire; **Fl** ascending to appressed, densely disposed; **Ped** ±4.5 mm; **Sep** rose, linear triangular, 4–4.2 × ±1 mm, acuminate, entire; **Pet** rose to dark rose,

triangular to ovate-triangular, 7–7.5 × 3–3.5 mm, acute, entire; **Ov** purple, ovoid to elongate-ovoid, 5–5.1 × 2.5 mm, glabrous; **Fr** brown, 12–15 × 7–8 mm.

H. melanocarpa L. B. Smith (Contr. Gray Herb. 161: 32, t. 4, figs. 8–9, 1946). **Type:** Mexico, Guerrero (*Foster* 1258 [GH]). — **Distr:** Mexico (Guerrero: widespread); tropical deciduous forest, on steep limestone slopes and riversides, 550–1350 m.

Solitary or with few rosettes, flowering 2–3 m tall; **L** numerous, sheaths widely ovate, ±7 × 5–8 cm, serrate, white-lepidote distally, **L** lamina green, 80–120 × 3.4–5 cm, glabrous adaxially, appressedly white-lepidote abaxially, **Sp** reddish, antrorse, 5–7 mm, 2.2–3 cm apart; **Inf** erect to ascending, 2× branched, sometimes the lower branches appearing verticillate, white-lepidote; peduncle cylindrical, 1.8–2 cm Ø; peduncular **Bra** foliaceous, pungent, margins spiny, becoming smaller distally; **male Inf** with >35 divaricate to ascending primary **Br** 15–37 cm long, with 2–4 (–8) basal secondary branches; floral **Bra** light brown, ovate, acuminate, erose, ±3 mm; **Fl** divaricate, laxly disposed, sessile; **Sep** green tinged with purple dots, triangular-ovate, 2.7–3.2 × 1.7–2.2 mm, glabrous, acute; **Pet** white, elliptic to oblong, 4.5–5 × 2.5–3 mm, rounded; **St** longer than the petals; **Fil** 4.3–5.3 mm; **Anth** green to yellowish, ±2 mm; **female Inf** with >25 divaricate to ascending primary **Br** 8–35 cm long, with 2 basal secondary branches; floral **Bra** light brown, ovate, 4.7–5.2 mm, lepidote, erose, acute, long mucronate; **Fl** ascending; **Ped** stout, ±1 mm; **Sep** green with purple dots, triangular to ovate, 3.7–4 × 2.5–3 mm, glabrous, acute; **Pet** white, ovate-triangular, 5.5–6 × 3.7–4 mm; **Ov** rose, ovoid, 4.5–5 × 2.6–3 mm, glabrous; **Fr** black, 9–14 × ±4.5 mm, glabrous; **Se** reddish-brown, ±5 mm.

H. mexicana L. B. Smith (Contr. Gray Herb. 117: 19–20, t. 1, fig. 60, 1937). **Type:** Mexico, San Luis Potosí (*Mauray* 6593 [F, GH]). — **Distr:** Mexico (Tamaulipas, San Luis Potosí); tropical deciduous and semi-deciduous forests, on rocks, 200–300 m.

Usually forming clumps of 3 or more rosettes, flowering to 2 m tall; **L** numerous in spreading rosettes, sheaths yellowish to light brown, with a dark brown central spot, suborbicular, 6–9 × 5–9 cm, glabrous, lustrous, **L** lamina 80–100 × 2.5–4 cm, glabrous and shiny adaxially, white-lepidote abaxially, **Sp** light brown, divaricate to antrorse, 3–5.5 mm, 1.3–2.3 cm apart; **Inf** seemingly lateral, erect to ascending, densely lepidote, 2× branched; peduncle 12–15 mm Ø; peduncular **Bra** triangular to narrowly triangular, acuminate, densely white-lepidote; **male Inf** unknown; **female Inf** with 16–30 divaricate to ascending primary **Br** 2–18 cm long, with 2 basal secondary branches; floral **Bra** brown, broadly ovate, 3.5–4 × ±2.5 mm, margins hyaline, densely white-lepidote, acute to acuminate; **Fl** divaricate, subsessile; **Sep** brown, broadly ovate, ±3.5 mm, lepidote, rounded, mucronate; **Pet** white, ovate, ±6 mm; **Fr** dark brown, ±10 mm, sparsely lepidote, acute.

H. montana Brandege (Erythea 7: 9, 1899). **Type:** Mexico, Baja California Sur (*Brandege* s.n. [US, NY]). — **Lit:** Felger & Yetman (2000). **Distr:** NW Mexico (Sonora, Baja California Sur); thorn scrub, steep ledges, on the ground or on rocks.

Incl. *Hechtia montana* ‘Burgundy’ Kimmach & Trager (1993); **incl.** *Hechtia gayorum* L. W. Lenz (1995); **incl.** *Hechtia gayii* L. W. Lenz (1995) (*nom. inval.*, Art. 61.1).

Caespitose, forming dense colonies, flowering to 1 m tall; **Ros** compact, small, ±30 cm Ø, rhizomatous; **L** numerous, sheaths light brown to stramineous, ovate to suborbicular, ±3.5 × 3–3.5 cm, margins finely ciliate and spiny-denticulate, glabrous or sparingly lepidote, **L** lamina grey-green, 15–45 × 2–3 cm, lepidote but glabrescent adaxially, white-lepidote abaxially, margins sinuate, **Sp** reddish-brown, retrorse, 2–5 mm, 1.7–2 cm apart; **Inf** 1× branched, white-lepidote, glabrescent with age; peduncle cylindrical, ±7 mm Ø; peduncular **Bra** narrowly triangular, 10–10.5 × ±0.5 cm, margins spiny, becoming smaller distally; **male Inf** with 17–25 divaricate to ascending primary **Br** 3–8 cm long; floral **Bra** hyaline, linear to linear-triangular, 2–2.5 mm; **Fl** laxly disposed, divaricate to reflexed;

Ped 4–7 mm; **Sep** whitish, triangular, 3 mm, lepidote, acute; **Pet** yellowish-white, obovate, 5–6 mm, acute; **female Inf** with 8–9 ascending primary **Br** 4.5–12 cm long; floral **Bra** narrowly triangular, shorter than the pedicels; **Fl** laxly disposed, ascending; **Ped** 6–8 mm; **Sep** whitish, purplish basally, narrowly triangular, 3–3.5 × 1.2–1.3 mm, sparsely lepidote, acuminate to acute; **Pet** yellowish-white, oblong, 4–6 × ±1.6 mm, rounded to acute; **Ov** green, glabrous, smooth, ±3.3 × ±1.5 mm Ø; **Fr** light to reddish-brown, 10–12 × 7–8 mm, rostrate; **Se** brownish, 5–5.5 mm.

As in other species (*H. iltisii*, *H. tillandsioides*, *H. glomerata*), abnormal flowers are sometimes produced. This is the case of the cultivated *H. gayorum* (here treated as synonym) that comes from the same region.

Felger & Yetman (2000) mention that the Guajirío, an ethnic group native to the lower Sierra Madre of SE Sonora and adjacent SW Chihuahua, have for many years used plants (which they call “hichiconi”) of *H. montana* as a supplemental food.

H. montis-frigidi González-Rocha & al. (Acta Bot. Mex. 109: 44–47, ills., 2014). **Type:** Mexico, Morelos (*López-Ferrari & al.* 2206 [UAMIZ]). — **Distr:** Mexico (Morelos: Puente de Ixtla); oak forests, on the ground or on rocks, 1750–2120 m.

Caespitose in small groups, flowering to 2 m tall; **Ros** 60–70 cm Ø; **L** numerous, sheaths straw-coloured adaxially, light brown and lustrous abaxially, depressed-ovate, 5.5–6 × 5–7.5 cm, glabrous at the base, densely white-lepidote at the apex on both faces, **L** lamina dark green, narrowly triangular, 32–48.5 × 2.8–4.8 cm, lepidote on both faces, **Sp** yellowish to brownish, antrorse, 1.5–5 mm, 1–2 cm apart; **male Inf** 3× branched with up to 97 primary branches; peduncular **Bra** foliaceous, sheaths ovate triangular, 3–3.4 × 2.4–2.5 cm, lamina narrowly triangular, 10–13.2 × 0.3–0.5 cm, glabrescent adaxially, sparsely white-lepidote abaxially, acuminate, margins entire to slightly erose; primary **Br** ascending, 9–18 cm, sessile to shortly stalked; secondary **Br** longer than primary branches, 3–10 cm; tertiary **Br** when present 2 cm long; floral **Bra** light brown, triangular, 1.7–3.8 mm,

equal to slightly longer than the pedicels, entire to slightly erose, lepidote; **Fl** polystichous, ascending; **Ped** 1.5–3 mm; **Sep** light brown, triangular, 1.5–3 × 1.1–2 mm, acute and shortly apiculate; **Pet** white-greenish, ovate-elliptic, 3.1–5 × 2–3 mm, rounded to slightly emarginate; **St** subequal; **Fil** 3–5.5 mm; **Anth** green, 1–2 mm; **female Inf** 2× branched with 30–60 primary branches; peduncular **Bra** ovate-triangular, 3–14 × 0.6–2.5 cm, glabrescent adaxially, densely white-lepidote abaxially, acuminate, margins entire to slightly erose; primary **Br** ascending, 6–23 cm, sessile; secondary **Br** 4–10.5 cm; floral **Bra** brownish, narrowly triangular to ovate, 2.8–5.6 × 0.6–1.6 mm, entire to slightly erose, lepidote, longer than the pedicels; **Ped** 1–2 mm; **Fl** polystichous, ascending; **Sep** green-brownish, triangular, 2–3 × 1.7–2.5 mm, densely lepidote, acute and shortly apiculate; **Pet** green-brownish, triangular, 3.5–4.6 × 2–3 mm, acute; **Ov** green, ellipsoid; **Fr** brownish, ovoid, 10–13 × 3–7 mm; **Se** brownish, 3.5–6 mm.

H. mooreana L. B. Smith (Contr. US Nation. Herb. 29: 522–523, fig. 78, 1954). **Type:** Mexico, Guerrero (*Moore* 5196 [US, BM, G, UC]). — **Distr:** Mexico (Guerrero: Chilapa, Copalillo, Eduardo Neri, Mártir de Cuilapan, Tepecoacuilco); tropical deciduous forest, on the ground or more rarely on rocks on steep limestone slopes, 500–1300 m.

Solitary or in clumps of few caulescent elongated rosettes, flowering to 1.5 m tall; stems conspicuous, 25–50 × 1.3–2 cm Ø; **L** numerous, sheaths stramineous, suborbicular to ovate, 3.8–4 × 3.6–4 cm, glabrous, densely white-lepidote and spiny at the margins distally, **L** lamina light green, squarrose, 15–35 × 0.85–1.5 cm, glabrous adaxially, densely white-lepidote abaxially, **Sp** light brown, antrorse, 2.4–3.3 mm, 1.1–2 cm apart; **Inf** 1× branched, glabrous; peduncle ±1 cm Ø; **male Inf** with ±15 divaricate primary **Br** ±10 cm long; floral **Bra** hyaline with purple dots, narrowly triangular, ±1 mm, erose, acuminate; **Fl** divaricate, subverticillate; **Ped** slender, ribbed, 2–2.5 mm; **Sep** white with purple dots, ovate-triangular, 1.5–1.7 × ±0.7 mm, glabrous, rounded; **Pet** white, elliptic, 2.9–3.1 × ±1.7 mm, rounded; **St** ± equalling the petals; **Fil** ±1.5 mm;

Anth yellow, ±1.3 mm; **female Inf** with 25–32 divaricate to ascending primary **Br** 3–10 cm long; primary **Bra** ±1.2 mm; **Fl** divaricate to ascending, laxly disposed; **Ped** 1.9–2.1 mm; **Sep** white, ovate, 1.9–2.2 × 1–1.2 mm, margin hyaline, rounded; **Pet** white, triangular, 3.2–3.4 × 1–1.1 mm, acuminate; **Ov** green, ovoid, ±3 mm; **Fr** brown to dark brown, 7–8 × 2–4 mm, glabrous, smooth; **Se** light brown, ±2.2 mm.

H. myriantha Mez (Bot. Jahrb. Syst. 30 (Beiblatt 67): 6, 1901). **Type:** Mexico, Veracruz (*Liebmann* s.n. [C, B]). — **Distr:** Mexico (Veracruz: Actopan, Coatepec, Emiliano Zapata, Jalcomulco); tropical deciduous forest and arid scrub, on the ground or on rocks on rocky slopes, 0–800 m. **I:** Espejo-Serna & al. (2005: 91).

Incl. *Hechtia macrophylla* Greenman (1907).

Solitary, caulescent, flowering to 3–4 m tall; **Ros** globose to elongated, to 1.5 m high, ±1 m Ø, stems conspicuous, to 20 cm Ø; **L** very numerous, sheaths white, with a dark brown spot to the apex, lustrous, broadly ovate to depressed-elliptic, 5.5–6 (–9) × 9.5–11.5 cm, spiny towards the apex, **L** lamina green, sometimes reddish at the margins, (0.4–) 1–1.7 m × 2.5–6.5 cm, glabrous adaxially, white-tomentose and conspicuously veined abaxially, **Sp** antrorse to retrorse or divaricate, 3–7 mm, with an ample triangular base, 1–2 cm apart; **Inf** seemingly lateral, white-lepidote, 3× branched; **male Inf** with very numerous primary **Br** 8–40 cm long; peduncle cylindrical, 0.6–2 cm Ø; peduncular **Bra** brown, triangular, 6.5–12 × 1.5–2.5 cm, lepidote, acute to acuminate, longer than the internodes; primary **Bra** brown, triangular to lanceolate, 1.5–9 cm; floral **Bra** broadly triangular to ovate, 3–4 × ±3 mm, lepidote, erose, acute and apiculate; **Fl** ascending to divaricate, loosely arranged, very numerous on each branch, subsessile; **Sep** connate at the base, obovate, ±3 × ±2 mm, rounded, apiculate; **Pet** white, oblong or obovate, 4–4.5 × 2–3 mm; **St** shorter than the petals; **Fil** ±3 mm; **Anth** yellow, ±1.5 mm; **female Inf** with very numerous primary **Br** 10–36 cm long; primary **Bra** brown, triangular, 1–4 cm, ovate to triangular; floral **Bra** brown to white, ovate, 3.8–5 × ±3 mm, margins slightly fimbriate at the base,

attenuate, pungent; **Fl** ascending to divaricate, loosely arranged, very numerous on each branch; **Ped** 1–5 mm; **Sep** brown to white, ovate to triangular, $3\text{--}3.5 \times \pm 2.5$ mm, entire, acute; **Pet** white, oblong to oblong triangular, $3.6\text{--}4.1 \times 2.2\text{--}2.5$ mm, acute; **Ov** greyish to blackish, ovoid to long-ovoid, $4\text{--}5 \times \pm 2.5$ mm, densely white-lepidote; **Fr** dark brown, $10\text{--}12 \times 4\text{--}5$ mm, white-lepidote to glabrescent; **Se** reddish-brown, 4–7 mm.

H. nivea I. Ramírez & C. F. Jiménez (Phytotaxa 178(2): 122–124, ills., 2014). **Type:** Mexico, Oaxaca (Ramírez & al. 1826b [CICY, MEXU]). — **Distr:** Mexico (Oaxaca: San Juan Bautista Cuicatlán); xerophytic scrub, 700–800 m.

Solitary, flowering to 1.4 m tall; **Ros** 35–45 cm \emptyset ; **L** 60–70, sheaths white-yellowish adaxially, brownish abaxially, oblong, $2.5\text{--}3 \times 3\text{--}5$ cm, glabrous on both faces, **L** lamina green, narrowly triangular, $21\text{--}39 \times 1.3\text{--}2.9$ cm, glabrous to sparsely white-lepidote adaxially, white-lepidote abaxially, **Sp** reddish, retrorse, 4–7 mm, $1.6\text{--}4.5$ cm apart; **Inf** 1 \times branched; **male Inf** with 65–75 branches; peduncular **Bra** foliaceous, sheaths triangular, lamina narrowly triangular, $4\text{--}11 \times 0.8\text{--}1$ cm, margins entire, glabrous; **Br** ascending, 1.2–3 cm; floral **Bra** light brown, elliptic, $6.3\text{--}8 \times 3.5\text{--}5.5$ mm, erose, acute, glabrous; **Fl** polystichous; **Ped** 1–2 mm; **Sep** straw-coloured, oblong, $3.5\text{--}4 \times 2.2\text{--}3$ mm, erose, acute, glabrous; **Pet** white, elliptic, $4\text{--}4.4 \times 2.2\text{--}2.5$ mm, rounded; **St** subequal; **Fil** 4–4.6 mm; **Anth** green, 1.7–2 mm; **female Inf** with 40–45 branches; peduncular **Bra** $2.5\text{--}9 \times 0.8\text{--}0.9$ cm, triangular, acuminate, entire, glabrous; **Br** ascending, 0.8–2.4 cm; floral **Bra** brown, triangular-ovate, $5\text{--}7 \times 3\text{--}4$ mm, erose, glabrous; **Fl** polystichous, sessile; **Sep** brown, triangular, $3\text{--}3.5 \times 2.5\text{--}3.5$ mm, apically erose, glabrous; **Pet** green, triangular to ovate, $3\text{--}4 \times 2\text{--}2.8$ mm, acute; **Ov** oblong, 2.5–3 mm; **Fr** brown, ellipsoid, $6.3\text{--}9$ mm; **Se** brown, 3.4–4 mm.

H. nuusaviorum Espejo & López-Ferrari (Acta Bot. Mex. 78: 98–102, ills., 2007). **Type:** Mexico, Oaxaca (Ceja & al. 1751 [UAMIZ, IEB]). — **Distr:** Mexico (Oaxaca: Santiago Yosondúa); oak-pine forest, on vertical limestone cliffs, 1700–1900 m.

Solitary or in clumps of few rosettes, flowering to 2 m tall; **Ros** caulescent, ± 50 cm \emptyset , stems conspicuous, succulent, woody, to $1.2 \text{ m} \times 15\text{--}30$ cm \emptyset ; **L** numerous, very succulent, soft, sheaths light brown, widely ovate to square, $3.5\text{--}8.5 \times 3.5\text{--}7.5$ cm, lustrous, white-lepidote on both faces, **L** lamina lime-green, $30\text{--}75 \times 1.5\text{--}4.5$ cm, glabrous adaxially, lepidote abaxially, **Sp** divaricate to antrorse, green to brown, 4–9 mm, 1–2 cm apart; **Inf** seemingly lateral, flocculose, 1 \times branched; peduncle 1–2.5 cm \emptyset ; peduncular **Bra** brown, triangular, $2.2\text{--}20 \times 1.5\text{--}3.5$ cm, acute, acuminate, lamina erose to spiny, densely lepidote, becoming progressively reduced distally; **male Inf** with 8–38 ascending, short to capitate primary **Br** 2.5–3.2 cm long; floral **Bra** light brown, ovate to triangular-ovate, $5\text{--}6 \times 4\text{--}5$ mm, acuminate; **Fl** divaricate, very densely disposed, sessile; **Sep** light brown, ovate, $4\text{--}4.7 \times 2.3\text{--}2.4$ mm, acute; **Pet** white, elliptic to oblong, $6\text{--}6.3 \times 2.2\text{--}2.4$ mm, acute; **St** subequal, as long as petals; **Fil** 5.5–6.1 mm; **Anth** yellow, ± 1.4 mm; **female Inf** with 20–25 divaricate, capitate and globose primary **Br** of 1.2–3 cm \emptyset ; floral **Bra** brown, widely ovate, $5\text{--}7 \times \pm 5$ mm, glabrous, entire; **Fl** densely disposed, sessile; **Sep** brown with margins white with rose dots, ovate, $4.7\text{--}5 \times 4.3$ mm, entire, acute-apiculate; **Pet** white with rose dots on the median nerve, elliptic, $6\text{--}7 \times 3.5\text{--}3.8$ mm, entire, acute; **Ov** ovoid, rose, $7\text{--}7.7 \times \pm 2.6$ mm; **Fr** brown, $\pm 10 \times \pm 5$ mm, lustrous; **Se** dark brown, falcate, ± 6 mm.

H. oaxacana Burt-Utley & al. (Phytoneuron 2011(59): 3, 2011). **Type:** Mexico, Oaxaca (Utley & Burt-Utley 7960 [MEXU, CAS, GH, M, NY, US, USF]). — **Distr:** Mexico (N Oaxaca); oak and pine forest, steep hillsides and karstic rock outcrops, 1650–2400 m.

Usually in large colonies, flowering to (0.72–) 1.16–1.77 m tall; **Ros** 30–50 cm \emptyset , occasionally with stout stolons; **L** very numerous, sheaths reniform to transversely elliptic, $2.3\text{--}5.6 \times (3.5\text{--}) 5\text{--}8.3$ cm, lepidote distally on both faces, marginally spiny and floccose, **L** lamina (11–) $22\text{--}40.5 \times (1\text{--}) 1.5\text{--}2$ (–2.5) cm, lepidote to glabrescent adaxially, lepidote abaxially, **Sp**

reddish-brown, antrorse, occasionally retrorse, (1.5–) 2.5–3.5 (–4.5) mm, (0.4–) 1.4–2 (–2.5) cm apart; **Inf** glabrous to lepidote, rachis often weakly geniculate; peduncle (6–) 8–14 (–18) mm \emptyset ; peduncular **Bra** ascending, (2.2–) 3.4–22 cm, with narrowly linear-triangular spiny lamina; **male Inf** 1 \times branched with numerous ascending to subascending primary **Br** (1–) 2–11 (–17.5) cm long, or rarely 2 \times branched with very short basal secondary branches; floral **Bra** shorter to longer than the sepals, narrowly to broadly ovate or ovate-triangular to suborbicular, (2.2–) 3–7 (–9) \times (1.7–) 2.5–5 (–6) mm, glabrous to finely lepidote, margin finely spinulose to erose, spinulose to apiculate, acute, rounded or praemorse at the apex; **Fl** divaricate to ascending; **Ped** articulated, stout, (0.5–) 1.5–2 (–3) mm; **Sep** ovate to ovate-triangular, 1.2–2.5 (–3.5) \times 1.3–2.5 mm, glabrous, entire to erose, rounded to acute or praemorse; **Pet** greenish-white, oblong-elliptic to ovate-elliptic, 2.5–4.8 \times 1.5–3 mm, glabrous, entire, rounded; **Fil** basally briefly adnate to the petals; **female Inf** 1 \times branched, with numerous ascending to subascending primary **Br** (1–) 2–11 (–17.5) cm long; floral **Bra** shorter or longer than the sepals, narrowly ovate to broadly ovate or oblong-ovate, 3–6 \times 3–5.5 mm, marginally hyaline, entire to finely spinulose or erose, apiculate to spinulose; **Fl** divaricate to ascending; **Ped** articulated, stout, triquetrous, 1–2 mm; **Sep** triangular to ovate-triangular, 2–3 (–4) \times 1.2–2.5 (–3.5) mm, glabrous or rarely weakly lepidote, entire, rounded to acute, apiculate or praemorse; **Pet** narrowly ovate to triangular, 3–4.5 (–5.5) \times 1.5–2.8 mm, rounded to spinulose; **Ov** glabrous; **Fr** 7–9 (–11.5) \times (3–) 4–5 (–6) mm, glabrous, smooth or somewhat reticulate.

H. pedicellata S. Watson (Proc. Amer. Acad. Arts 26: 155, 1891). **Type:** Mexico, Jalisco (*Pringle* 2970 [GH, VT]). — **Distr:** Mexico (Jalisco: Guadalajara); tropical deciduous forest, on rocks on dry rocky bluffs and ledges, \pm 1000 m; known from the type only.

Habit unknown, flowering to 1.2 m tall; **L** numerous, sheaths stramineous, suborbicular, 4.5–5 \times 3.5–4 cm, margin spiny, **L** lamina 25–65

\times 2–3 cm, glabrous adaxially, white-lepidote abaxially, **Sp** yellow to light brown, divaricate to antrorse, 1.5–2 mm, 0.9–1.2 cm apart; **Inf** glabrous; peduncle cylindrical, 6–7 mm \emptyset ; peduncular **Bra** brown, narrowly triangular, 3–9.5 \times 0.7–1 cm, attenuate, pungent, margins serrulate; **male Inf** unknown; **female Inf** 1 \times branched, with 15–18 ascending to divaricate primary **Br** 2–6 cm long; primary **Bra** brown, triangular, 10–14 \times 4–5 mm, acuminate; **Fl** laxly disposed, ascending; **Ped** stout, 5–6 mm; **Sep** ovate-triangular, 1.5–2 \times \pm 1 mm, acute; **Pet** triangular, 3–3.3 \times \pm 2 mm, acute; **Fr** brown, 9–12 \times \pm 5 mm; **Se** brown, \pm 5 mm.

H. podantha Mez (in A. & C. de Candolle, Monogr. Phan. 9: 549–550, 1896). **Type** [neo]: Mexico, Hidalgo (*Pringle* 6932 [ENCB, B, BR, CHAPA, GH, LY, MEXU, MICH, P, UC, US, WU, Z]). — **Lit:** Martínez-Correa (2008); Espejo-Serna & al. (2010c). **Distr:** C Mexico (Aguascalientes, Guanajuato, Querétaro, Hidalgo); xerophilous scrub, on limestone hills or volcanic rocks, 1100–2650 m.

Solitary or in small clumps, flowering \pm 1.5 m tall; **L** numerous, sheaths light yellow to brown, ovate to suborbicular, 2.1–8.8 \times 2.3–6.1 cm, glabrous adaxially, glabrous at the base and sparsely lepidote at the apex abaxially, serrate, **L** lamina green, 19–53.7 \times 0.5–1.5 cm, sparsely lepidote on both faces, **Sp** antrorse, 3.1–8 mm, 0.65–3.2 cm apart; **Inf** 2 \times branched, glabrous or glabrescent; peduncle cylindrical, 0.46–1.8 cm \emptyset ; peduncular **Bra** foliaceous, sparsely lepidote, serrate, 6.3–17.8 cm, the upper ones sheathing, sparsely lepidote, entire; primary **Bra** stramineous, widely ovate, glabrous, serrulate, 2.2–4.8 cm; **male Inf** with up to 46 ascending primary **Br** 1.6–6.6 cm long; secondary **Br** ascending, 1.35–5.25 cm; floral **Bra** brown, linear to triangular, 1.2–3.1 \times 0.2–1 mm, glabrous, entire, acute; **Fl** divaricate; **Ped** 1.4–2.7 mm; **Sep** brownish, triangular to ovate, 1.7–4.3 \times 1–2.1 mm, glabrous, entire, acute; **Pet** green, brownish apically, elliptic to ovate, 2.5–5.4 \times 1.4–2.8 mm, glabrous, entire, rounded; **St** equal, longer than the petals; **Fil** 1.3–4.2 mm; **Anth** yellow, 0.7–2 mm; **female Inf** with up to 47 ascending primary **Br** 2.5–9 cm

long; secondary **Br** ascending, 1.4–5.3 cm; floral **Bra** brown, triangular, 1.1–5.3 × 0.1–0.6 mm, entire, acute; **Fl** numerous, divaricate; **Ped** 1.6–5.1 mm; **Sep** brownish, triangular to ovate, 1.5–4 × 0.7–2.2 mm, glabrous, entire, acute; **Pet** green, triangular, 1.9–4.7 × 1.4–2.7 mm, glabrous, entire, acute; **Ov** green, ovoid, 3.8–7 × 1.2–2.4 mm; **Fr** brownish, 7–15 × 4–6.5 mm; **Se** reddish-brown, 6–7 mm.

H. pretiosa Espejo & López-Ferrari (Acta Bot. Mex. 83: 50–53, ill., 2008). **Type:** Mexico, Guanajuato (*López-Ferrari & al.* 3268 [UAMIZ, IEB]). — **Distr:** Mexico (Guanajuato: Xichú); cactus scrub, slopes and cliffs, on igneous rocks, 800–1400 m.

Caespitose, flowering to 1.7 m tall; **Ros** with 2 or more conspicuous narrowly cylindrical stolons; **L** numerous, sheaths yellowish to light brown, widely ovate to square, 4–5.5 × 5 cm, glabrous, lustrous, **L** lamina 30–50 × 2.2–3.5 cm, glabrous adaxially, densely brown-lepidote abaxially, **Sp** green to brown, antrorse, 2.5–5 mm, 0.5–1.5 cm apart; **Inf** seemingly lateral, simple to 1 × branched, procumbent; **male Inf** with 4–9 divaricate primary **Br** 5–22 cm long; floral **Bra** rose to rose-brownish, ovate to triangular-ovate, 6–8 × 3–4.5 mm, with capitate gland-hairs, acuminate, margin slightly erose; **Fl** divaricate to reclinate, sessile to subsessile; **Sep** rose to rose-brownish, oblong to lanceolate-oblong, connate at the base forming a tube, 5.5–7 mm, limb 6–8.5 × 2.5–3.5 mm, with capitate gland-hairs, acute and shortly apiculate; **Pet** rose, elliptic, 6–8 × 3.5–4 mm, with capitate gland hairs, rounded; **St** unequal, united at the base with the perigone tube; **Fil** 2–5 mm; **Anth** dark purple, 1–1.5 mm; **female Inf** simple or with 2–7 divaricate primary **Br** 8–19 cm long; floral **Bra** rose to rose-brownish, triangular to triangular-ovate, 8–13 × 4–4.5 mm, with capitate gland-hairs, acuminate, margin slightly and irregularly erose; **Fl** sessile to subsessile; **Sep** rose to rose-brownish, narrowly triangular, 7–11 × 4–5 mm, with capitate gland-hairs, acute and shortly apiculate, margin lightly erose; **Pet** rose, elliptic, 8–9 × 3–5 mm, with capitate gland-hairs, entire, rounded and shortly apiculate; **Ov** ovoid to

narrowly ovoid, 6–10 × 3–4 mm, with capitate gland hairs and scarcely pedate scales; **Fr** light brown, 9–13 × 8–9 mm, lustrous, sparsely lepidote; **Se** light brown, 5–6 × 0.5 mm.

H. pringlei B. L. Robinson & Greenman (Amer. J. Sci. (New York) ser. 3, 50: 167, 1895). **Type:** Mexico, Oaxaca (*Pringle* 4637 [GH, AC, B, BHUPM, BKL, BM, BR, ENCB, G, GOET, HAL, ISC, K, MANCH, MEXU, MIN, MO, MSC, NY, P, PH, S, UC, US, VT, WU, Z]). — **Distr:** S Mexico (C Oaxaca); shrublands, oak forest and/or tropical deciduous forest, on calcareous soils or rarely on limestone cliffs.

Solitary or in small clumps, flowering to 1–2 m tall; **L** 15–30, fleshy, sheaths stramineous to light brown, ovate to depressed-ovate, 3.1–4.5 × 4–7 cm, **L** lamina green, 13–55 × 1–4 cm, white-lepidote on both faces, **Sp** reddish to dark brown, retrorse to antrorse or divaricate, 3–5 mm, 0.23–3.9 cm apart; **Inf** 1 × branched, farinose-lepidote to glabrescent with age; peduncle ±1.5 cm Ø; peduncular **Bra** linear to narrowly triangular, attenuate, entire, pungent, becoming gradually shorter further up; **male Inf** with 24–35 ascending to divaricate primary **Br** 3–6 cm long; primary **Bra** linear to lanceolate from a triangular base, 1.5–2 cm; floral **Bra** white, ovate, ±2.5 × ±1.6 mm, erose, longer than the sepals; **Fl** polystichous, divaricate, subsessile; **Ped** inconspicuous, lepidote; **Sep** whitish to light brown, ovate-triangular, 1.7–2 × 1.2–1.3 mm, margin scarious, erose, somewhat farinose-lepidote, rounded; **Pet** white, oblong to elliptic-oblong, 2.9–3 × 1–2 mm, obtuse; **St** equal, shorter than the petals; **Fil** ±2.5 mm; **Anth** yellow, 0.8–1 mm, apiculate; **female Inf** with 20–30 ascending to divaricate primary **Br** 3–17 cm long; primary **Bra** light brown, triangular, 1–3 cm, erose, attenuate; floral **Bra** brown, ovate to elliptic, 2–3 mm, farinose-lepidote, erose-spiny, acute to acuminate; **Fl** 3–3.5 × 1–1.7 mm; **Ped** stout, to 2 mm, sulcate; **Sep** brown, ovate, ±2.4 × ±1.3 mm, acuminate; **Pet** green, triangular, 3.2 × 1.2 mm; **Ov** light brown to rose, ellipsoid, ±2.7–3.5 × ±1.2 mm; **Fr** brown to light brown, 6–7 × 3–4.5 mm; **Se** brown, 4–4.5 mm.

H. pumila Burt-Utley & Utley (Syst. Bot. 13 (2): 279–281, ills., 1988). **Type:** Mexico, Guerrero (*Burt-Utley & Utley* 7908 [MEXU, B, BH, BM, CAS, DUKE, F, GH, K, MEXU, MICH, MO, NY, TEX, UC, US, WIS]). — **Distr:** Mexico (Guerrero: Chilpancingo, Tepecoacuilco); thorn scrub with palms and tropical deciduous forest, rocky places on steep limestone hills, 600–1650 m.

Usually forming small clumps of 2 or more rosettes, flowering 58–151 cm tall; **Ros** 11–34 cm \emptyset ; **L** few, spreading, sheaths stramineous, broadly ovate to reniform, 1.3–2.2 \times 2.3–4.6 cm, margins finely spiny, glabrous and lustrous on both faces, becoming densely lepidote distally, **L** lamina 9–25 \times 1.3–2 cm, appressedly cinereous-lepidote on both faces, **Sp** red-brown or rarely stramineous, antrorse or occasionally retrorse, 1–2 mm, 0.45–1 cm apart; **Inf** 1 \times branched, glabrous; peduncle cylindrical, 3.5–8 mm \emptyset ; peduncular **Bra** 0.7–7.5 cm, with ovate or broadly ovate glabrous sheaths and linear lepidote lamina, entire; **male Inf** with \pm 12 subascending primary **Br** (1.5–) 2–4 cm long, appearing somewhat winged when dry; floral **Bra** ovate or ovate-triangular, 1–2.5 \times 0.8–2 mm, glabrescent, attenuate-acuminate, erose, esp. at the apex, exceeding the pedicels; **Fl** sessile to subsessile; **Ped** articulated, stout, to 1 mm; **Sep** ovate or ovate-triangular, 1.1–1.8 \times 0.7–1.3 mm, praemorse or occasionally acuminate, entire and occasionally hyaline, glabrous; **Pet** elliptic, 2–3.5 \times (1–) 1.6–2 mm, rounded, glabrous; **St** subequal, shorter than the petals; **Fil** 2.9–3 mm; **Anth** yellow, \pm 1 mm; **female Inf** with 12–17 subcapitate primary **Br** 0.3–2.5 cm long; floral **Bra** exceeding the pedicels, triangular to ovate-triangular, 1.1–2.5 \times 0.6–2.6 mm, glabrous, attenuate-acuminate, erose distally, occasionally hyaline; **Fl** sessile to subsessile; **Sep** dark red-brown, ovate to ovate-triangular, 1.3–2.5 \times 1.3–2 mm, glabrous, acute or praemorse, margins often hyaline; **Pet** triangular to narrowly ovate-triangular, 2.6–4.3 \times 1.3–2.3 mm, rounded to acute; **Fr** dark red-brown, 5.5–11 \times 3.1–5.5 mm, glabrous.

H. purhepecha I. García & al. (Acta Bot. Mex. 107: 10–14, ills., 2014). **Type:** Mexico, Michoacán (*Espejo & al.* 7547 [UAMIZ, CIMI, IEB]). — **Distr:** Mexico (Michoacán: Los Reyes, Peribán);

(sub-) deciduous tropical forest, slopes and cliffs, on rocks, 900–1000 m.

Caespitose, stoloniferous, flowering to 1.7 m tall; **Ros** 30–50 cm \emptyset , at the tip of narrowly cylindrical stolons; **L** 15–25, sheaths white on both faces, depressed-ovate, 3–4 \times 5–6.5 cm, glabrous, lustrous, **L** lamina 11–50 \times 2.6–4.5 cm, light green with a purple stripe along the margins, glabrous adaxially, densely white-lepidote abaxially, **Sp** yellow to light brown, 2–4.5 mm, 0.8–1.3 cm apart; **Inf** seemingly lateral, 1–2 \times branched, erect, glabrous; **male Inf** 2 \times branched with 25–30 divaricate to ascending primary **Br** 4–28 cm long; secondary **Br**, when present, 2–4 cm; floral **Bra** brown-purplish to dark brown with purplish dots, triangular-ovate, 1.5–1.9 \times 0.9–1.2 mm, erose, glabrous, apiculate; **Fl** divaricate, sessile; **Sep** brown-purplish to dark brown with purplish dots, triangular-ovate, 3.1–3.4 \times 3–3.5 mm, entire, glabrous, rounded; **Pet** white, elliptic, 4.8–5 \times 3.3–3.5 mm, rounded; **St** subequal; **Fil** 3.9–4.2 mm; **Anth** yellow, 2–2.5 mm, apiculate; **female Inf** 1 \times branched with 13–20 ascending primary **Br** 10–21 cm long; floral **Bra** green with rose apex and purplish dots, ovate-triangular, 1.4–2 \times 0.5–0.7 mm, glabrous, minutely crenate, acute; **Fl** sessile; **Sep** green with rose apex and purplish dots, ovate-triangular, 3.5–4.5 \times 2.6–3.6 mm, entire, glabrous, rounded; **Pet** white-greenish, narrowly triangular-elliptic, 5.8–6 \times 3.2–3.8 mm, rounded; **Ov** narrowly ovoid, 5–6 \times 2.6–3 mm; **Fr** brown-reddish to dark brown, 10–12 \times 4–6 mm, lustrous; **Se** reddish, 8–9 mm.

H. purpusii Brandegee (Univ. Calif. Publ. Bot. 7: 325, 1920). **Type:** Mexico, Vera Cruz (*Purpus* 8420 [UC, NY, US]). — **Distr:** Mexico (Veracruz: Coatepec, Jalcomulco, Totutla, Puente Nacional, Tenampa); tropical deciduous forest, on limestone cliffs, 30–1200 m. — Fig. 7.

Incl. *Hechtia lindmanioides* B. L. Robinson (1937).

Caespitose, pendulous, flowering to 1 m tall; **Ros** short to long caulescent, stems rhizomatous, cylindrical, 20–80 \times 2–3 cm \emptyset , covered by the persistent leaf sheaths; **Ros** somewhat asymmetrical, 20–50 cm \emptyset ; **L** 10–15, recurved and pendent, brittle, sheaths yellowish, oblong to ovate,

5–7.5 × 3.5–5 cm, lustrous, white-lepidote distally on both faces, minutely serrate, **L** lamina yellowish-green, 20–50 × 1–1.5 cm, densely white-lepidote abaxially, long-attenuate, minutely serrate; **Inf** erect to pendent; **male Inf** 3× branched, with numerous primary **Br** 10–28 cm long; peduncle cylindrical, 20–32 cm, 4–5 mm Ø; peduncular **Bra** yellowish, narrowly triangular to linear, 2–10 cm × 2–5 mm, densely white-lepidote, much longer than the internodes, decreasing in size further up, deciduous; floral **Bra** filiform, 1–1.5 mm, glabrous, deciduous, shorter than the pedicel; **Fl** polystichous, divaricate to descending; **Ped** filiform, 3–5 mm; **Sep** brownish, triangular, 1.5–2 × ±1 mm, acute; **Pet** white, broadly elliptic, 4–5 × 1.5–2 mm, rounded; **St** shorter than the petals; **Fil** 2.5–3 mm; **Anth** yellow, ±1 mm; **female Inf** 3× branched, with numerous primary **Br** 10–16 cm long; peduncle cylindrical, 25–50 cm, ±3 mm Ø; peduncular **Bra** yellowish, narrowly triangular to linear, 5–13 × 0.2–0.5 cm, densely white-lepidote, much longer than the internodes, decreasing in size upwards; floral **Bra** filiform, inconspicuous, to 2.5 mm; **Fl** polystichous, divaricate to descending; **Ped** filiform, 1.5–2.5 mm; **Sep** brown-greenish, triangular to narrowly triangular, ±0.9 × ±0.8 mm, acute; **Pet** white to rose-whitish, elliptic to oblong,

4–6 × ±3 mm, rounded; **Ov** dark brown, ovoid, 4–5 × 2–3 mm; **Fr** light brown, 5–10 × 2.6–3 mm, divaricate to reflexed; **Se** brown, 2.5–3 mm.

H. reflexa L. B. Smith (Contr. Gray Herb. 117: 18–19, t. 1, figs. 54–55, 1937). **Type:** Mexico, Michoacán (*Langlassé* 238 [US, GH, K, P]). — **Distr:** S Mexico (Michoacán: Aquila, Arteaga; Guerrero: José Azueta); tropical deciduous and semideciduous forest, on karstic limestone rocks, 50–650 m.

Incl. *Hechtia michoacana* Burt-Utley & al. (2011).

Usually caespitose, flowering (0.55–) 1–1.4 m tall; **Ros** 30–90 cm Ø; **L** numerous, sheaths reniform to transversally elliptic, 2.5–4.5 × (3.5–) 4.4–5.7 (–8.5) cm, marginally spiny and floccose, both faces glabrous and lustrous becoming lepidote distally, **L** lamina green to maroon, straight to falcate, 24–57 × 1.2–2.4 (–2.9) cm, densely lepidote adaxially and lepidote abaxially, **Sp** red-brown, antrorse or occasionally divaricate or retrorse, (2–) 2.5–4.5 (–5) mm, 0.7–2.5 cm apart; **Inf** glabrous; peduncle 3.5–7 mm Ø; peduncular **Bra** foliaceous, ascending, 1.1–26 cm, lepidote, becoming progressively reduced upwards, ovate-triangular with linear lamina; **male Inf** 2× branched, with numerous ascending to

Fig. 7 *Hechtia purpusii*.
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subascending reflexed primary **Br** 6–22.5 cm long; floral **Bra** adnate to and often exceeding the pedicels, ovate, 1.2–2.5 × 0.7–1.2 mm, finely serrulate distally, apiculate to attenuate-acuminate, glabrous; **Fl** divaricate to subascending; **Ped** slender, 0.5–2.2 mm; **Sep** deep to light pink or green with brownish maculation, ovate, 0.9–1.5 × 0.5–1.1 mm, entire to serrulate distally, incised to praemorse or apiculate distally; **Pet** white, cream or light to dark pink, elliptic, (1.6–) 3–3.5 × 1–1.7 mm, rounded; **St** longer than the sepals; **female Inf** 1 × branched, with 20–22 arcuate to ascending or subascending primary **Br** 6.5–22.5 cm long, rarely with 1–2 short basal secondary branches; floral **Bra** adnate to the pedicels, shorter than the sepals, narrowly ovate to ovate, 1.5–2.5 × 0.8–1.8 mm, glabrous, entire to finely erose, apiculate to attenuate-acuminate or praemorse; **Fl** ascending to subascending; **Ped** slender, 1.5–3.5 (–4.5) mm; **Sep** deep to light pink or green with maroon maculation, triangular to ovate-triangular, 1.2–2 × 0.7–1.1 mm, glabrous, entire to serrulate distally, acute-praemorse to apiculate; **Pet** white, cream or light to dark pink, narrowly triangular, (2.3–) 3–4.5 × 1–1.2 mm, glabrous, rounded; **Ov** ovoid, 2.8–3 × ±1 mm; **Fr** green suffused with red when immature but becoming yellow-brown and reticulate at maturity, (5–) 6–9 × 2.5–4.5 mm, glabrous, smooth.

H. reticulata L. B. Smith (Contr. Gray Herb. 117: 17–18, t. 1, fig. 46, 1937). **Type:** Mexico, Colima (*Palmer* 1352 [GH, F, UC, US]). — **Distr:** Mexico (Jalisco: La Huerta; Colima: Colima, Manzanillo; Michoacán: Arteaga, La Huacana); tropical deciduous forest, 40–750 m.

Caespitose, flowering to 1.2 m tall; **Ros** 60–140 cm Ø; **L** numerous, densely rosulate, spreading, sheaths stramineous to light brown, orbicular to depressed-ovate, 5.2–6.8 × 6–7.6 cm, glabrous, lustrous, margins irregularly spiny, **L** lamina green to reddish adaxially, 30–70 × 3–4 cm, **Sp** brown to yellowish, antrorse, 3–4.5 mm, 0.7–1.5 cm apart; **Inf** barely 2 × branched, glabrous; peduncle ±1 cm Ø; peduncular **Bra** erect, the lower exceeding the internodes, progressively smaller distally, pungent;

male Inf unknown; **female Inf** with 15–20 ascending primary **Br** 10–15.5 cm long; primary **Bra** brown, triangular, 5–15 mm, filiform-acuminate; floral **Bra** ovate, ±3.5 × ±1 mm, acuminate, equal or barely longer or shorter than the pedicels; **Fl** divaricate, laxly disposed; **Ped** stout, conical, 2–4 mm, glabrous, sulcate; **Sep** green, ovate, 2.5–4 × ±1.5 mm, margins hyaline, erose, rounded; **Pet** white, narrowly triangular, 3.5–4 × 1.5–2 mm, acute; **Ov** superior, green, ovoid, ±3 × ±1 mm; **Fr** brown, 7.5–10 × 3–5 mm, irregularly reticulate; **Se** brown, 4.8–5.4 mm.

H. rosea E. Morren *ex* Baker (Handb. Bromel., 140, 1889). **Type:** Mexico (*Anonymus* s.n. in *Hort.* Liège s.n. [LG [Morren drawing], GH [photo]]). — **Distr:** Mexico (Oaxaca, Chiapas); tropical deciduous and semideciduous forests and thorn scrub, on the ground or on rocks, 10–600 m. **I:** Roguenant & al. (2016: 150–151).

Incl. *Hechtia roezlii* hort. *ex* Baker (1889) (*nom. inval.*, Art. 34.1c); **incl.** *Dyckia desmetiana* Baker (1894) ≡ *Hechtia desmetiana* (Baker) Mez (1896); **incl.** *Bromelia desmetiana* hort. *ex* Baker (1894) (*nom. inval.*, Art. 34.1c); **incl.** *Hechtia meziana* L. B. Smith (1935); **incl.** *Hechtia macdougallii* L. B. Smith (1969).

Caespitose, flowering to 1.5 m tall; **L** rather few, rosulate, sheaths stramineous to light brown, suborbicular to transversally oblong, 4.5–6 × 5.5–7 cm, densely brown-lepidote on both faces, glabrous to the base, lustrous, margins spiny to the apex, **L** lamina dark green to purple, 15–90 × 3.6–4.2 cm, fleshy, densely lepidote on both faces, **Sp** divaricate to antrorse, coarse, 5–7 mm, 0.7–2.7 cm apart; **Inf** reddish, 1 × branched, glabrescent; peduncle ±1 cm Ø; peduncular **Bra** broadly ovate, the lower ones with a long linear lamina exceeding the internodes, the upper ones merely acuminate; **male Inf** with (5–) 13–25 ascending primary **Br** 5.5–22 cm long; **Fl** divaricate to ascending, laxly disposed, subsessile; floral **Bra** rose, ovate to oblong-ovate, 3.8–4.7 × 1.8–2 mm, acuminate, shorter than the sepals; **Sep** rose, broadly ovate, 5–5.6 × 3.3–3.8 mm, entire, acuminate to apiculate, glabrous; **Pet** rose, basally very shortly connate, elliptic, 9.5–10 × 3.7–5 mm, glabrous, obtuse; **St** subequal,

shorter than the petals; **Fil** 7.6–8.4 mm; **Anth** yellow, ± 3 mm, shortly apiculate; **female Inf** with 10–25 ascending primary **Br** 5.8–15 cm long; floral **Bra** triangular, $3.5\text{--}4.5 \times \pm 3.3$ mm, acute to acuminate, longer than the sepals; **Fl** divaricate, pedicellate; **Ped** ± 1 mm; **Sep** rose, triangular, $2.4\text{--}4.6 \times 2.65\text{--}3.4$ mm, glabrous, acuminate; **Pet** rose, narrowly triangular, $8\text{--}10 \times 3.7\text{--}4.2$ mm, glabrous, acute; **Ov** reddish, ellipsoid, $5\text{--}5.7 \times 1.7\text{--}2.7$ mm; **Sty** ± 0.9 mm; **Fr** green to light brown, $12\text{--}23 \times 5.6\text{--}9$ mm, smooth; **Se** reddish to brown, 5.5–10 mm.

H. roseana L. B. Smith (Contr. Gray Herb. 117: 17, t. 1, figs. 41–42, 1937). **Type:** Mexico, Puebla (*Rose & al.* 9970 [US]). — **Distr:** Mexico (Puebla, Oaxaca); arid thorn scrub and cactus scrub, on limestone soils, 1500–1700 m. — Fig. 8.

Caespitose, flowering to 2.9 m tall; **Ros** to 60 cm \varnothing with 1 to several conspicuous, stout stolons to 1 m long; **L** 40–50, sheaths yellow adaxially, light brown abaxially, transversally elliptic, $3.5\text{--}4.5 \times \pm 6$ cm, glabrous and lustrous on both faces, lepidote abaxially at the distal end, **L** lamina yellow-green to light green with red spots at the spine bases, $29\text{--}43 \times 2.5\text{--}4$ cm, glabrous adaxially, finely appressedly white-lepidote abaxially, **Sp** reddish-brown, divaricate, some

antrorse or retrorse, 4–6 mm, 1.3–3.8 cm apart; **Inf** $2\times$ (rarely $1\times$) branched, glabrous; peduncle ± 1.5 cm \varnothing ; peduncular **Bra** light brown, linear to narrowly triangular, the lower spiny, the upper entire, gradually becoming shorter upwards; **male Inf** with >60 primary branches 7.5–23 cm long, the basal primary **Br** with 2 basal lateral secondary branches; floral **Bra** stramineous to light brown, ovate, $5.5\text{--}7.5 \times 3.5\text{--}4.2$ mm, erose and hyaline at the margins, much longer than the sepals; **Fl** divaricate to ascending, laxly disposed; **Ped** stout, 1–1.6 mm; **Sep** stramineous to light brown, widely ovate, $3.2\text{--}3.4 \times 3.1\text{--}3.4$ mm, entire, glabrous, obtuse; **Pet** white, elliptic, $5.3\text{--}5.8 \times 2.5\text{--}2.6$ mm, entire, glabrous, obtuse; **St** subequal, barely longer than the petals; **Fil** 2.8–4.2 mm; **Anth** greenish, 1.5–2 mm; **female Inf** with >50 primary **Br** 9–25 cm long, basal primary branches with 2 basal lateral secondary branches; primary **Bra** triangular-ovate, long acuminate, 1.5–3 cm; floral **Bra** triangular-ovate, 4.5–6.2 mm, acute, longer than the sepals; **Fl** ascending, very laxly disposed, sometimes appearing subverticillate, sessile to subsessile; **Sep** greenish to light brown, triangular-ovate, $3.2\text{--}3.7 \times 2\text{--}2.2$ mm, entire, glabrous, margin hyaline, acuminate; **Pet** white, triangular to ovate-triangular, $5\text{--}5.2 \times 2.5\text{--}2.9$ mm, glabrous,

Fig. 8 *Hechtia roseana*. (Copyright: A. Espejo-Serna)



entire, acute to acuminate; **Ov** wholly superior, greenish to rose, ellipsoid, $4.9\text{--}5.1 \times \pm 2.4$ mm; **Fr** brown, $10\text{--}12 \times 5\text{--}5.5$ mm, slightly lustrous, very faintly rugose; **Se** reddish-brown, $5.5\text{--}6 \times \pm 1$ mm.

H. rubicunda López-Ferrari & Espejo (Acta Bot. Mex. 107: 154–158, ill., 2014). **Type:** Mexico, Oaxaca (*Martínez-Correa & al.* 116 [UAMIZ, IEB]). — **Distr:** Mexico (Oaxaca: Yautepec); tropical deciduous forest, on rocks on igneous cliffs, 500–850 m.

Solitary, flowering to 1.5 m tall; **Ros** 50–75 cm Ø; **L** 15–30, sheaths dark brown, glabrous and lustrous on both faces, depressed ovate, $2.7\text{--}3.7 \times 5\text{--}6.5$ cm, margins minutely spinose, **L** lamina red-yellowish, narrowly triangular, $28\text{--}60 \times 3.5\text{--}6.5$ cm, glabrous adaxially, densely appressed-lepidote abaxially, **Sp** yellowish to light brown, divaricate to antrorse except in the basal portion where they are retrorse, $2\text{--}4.5$ mm, $0.9\text{--}1.2$ cm apart; **Inf** erect to arcuate; **male Inf** 2× branched with 45–50 primary branches; peduncular **Bra** foliaceous, straw-coloured, sheaths triangular, $0.8\text{--}1.2$ cm, lamina linear, $1.7\text{--}15.5 \times 0.15\text{--}0.4$ cm, lepidote on both faces, margins entire, pungent; primary **Br** 6.6–30 cm, stalked; secondary **Br** ascending, 2–4.5 cm; floral **Bra** straw-coloured, ovate-triangular, $1\text{--}1.5 \times 0.5\text{--}0.7$ mm, erose, glabrous, attenuate; **Fl** polystichous, divaricate; **Ped** 2 mm; **Sep** light brown, triangular, $1.3\text{--}1.7 \times 1\text{--}1.3$ mm, acute; **Pet** white, elliptic, $2.7\text{--}4 \times 2\text{--}2.3$ mm, acute; **St** subequal; **Fil** 3–3.2 mm; **Anth** yellow, 1.5 mm; **female Inf** 1× branched with 35–40 branches, occasionally the lower branches with a pair of secondary basal branches; peduncular **Bra** foliaceous, straw-coloured, sheaths triangular, $0.8\text{--}1.2$ cm, lamina linear, $1.7\text{--}15.5 \times 0.15\text{--}0.4$ cm, lepidote on both faces, margins entire, pungent; **Br** divaricate to ascending, 4.5–40 cm; floral **Bra** straw-coloured, ovate-triangular, $1\text{--}1.5 \times 0.5\text{--}0.7$ mm, erose, acuminate, glabrous, longer than the pedicels; **Ped** 1 mm; **Fl** polystichous, reflexed at anthesis; **Sep** green with rose apex, triangular, $1.5\text{--}1.7 \times 1.2\text{--}1.4$ mm, acute; **Pet** white, triangular, $3.8\text{--}4 \times 1.8\text{--}2$ mm, attenuate and acuminate; **Ov** rose-coloured, ovoid, 3.8–4 mm; **Fr** light green, ovoid, $10\text{--}12 \times 4\text{--}4.5$ mm, lustrous; **Se** reddish.

H. santanae I. Ramírez & P. Carrillo (Phytotaxa 266(4): 262–266, ill., 2016). **Type:** Mexico, Jalisco (*Ramírez & al.* 1940 [CICY, IBUG, MEXU, US, ZEA]). — **Distr:** Mexico (S Jalisco); tropical deciduous forest, 780–920 m.

Caespitose, flowering 1.1–1.4 m tall; **Ros** globose, to $30 \times 20\text{--}40$ cm Ø; **L** 30–40 per rosette, sheaths pale yellow with light brown spots when dry, broadly ovate to broadly oblong, $3\text{--}4 \times 3.5\text{--}4.8$ cm, finely spiny, glabrous in the middle area but with white-lepidote margins, **L** lamina narrowly triangular, attenuate, $12\text{--}34 \times 1.7\text{--}2.8$ cm, succulent, green, densely to sparsely silvery-lepidote adaxially, densely white-lepidote abaxially, **Sp** brownish, antrorse, 1–3 mm, $0.4\text{--}1.7$ cm apart; **Inf** 1× branched; **male Inf** with 40–45 **Br** 5.5–13.5 cm long; floral **Bra** purple with a brown apex, oblong-triangular, $3.4\text{--}3.9 \times 2.2\text{--}2.4$ mm, acuminate, erose and hyaline, glabrous, shorter than the sepals; **Fl** erect, $5\text{--}5.5 \times 3.8\text{--}4.2$ mm, subsessile; **Sep** purple with a brown apex, ovate, $2.3\text{--}2.7 \times 1.8\text{--}2.3$ mm, entire, glabrous, acute; **Pet** white, elliptic, $4.3\text{--}4.8 \times 3\text{--}3.2$ mm, entire, rounded; **St** unequal, shorter than the petals; **Fil** 3.8–4.4 mm; **Anth** reddish, 2–2.2 mm; **female Inf** with 30–70 **Br** 4–9.5 cm long; floral **Bra** purple with a brown apex, oblong, $4\text{--}4.2 \times 3\text{--}3.2$ mm, acuminate, erose and hyaline, glabrous, longer than the sepals; **Fl** erect, $5.7\text{--}6 \times 3\text{--}4$ mm, pedicellate; **Ped** 2.8–3.2 mm; **Sep** purple with a brown apex, triangular, $2.4\text{--}2.9 \times 2\text{--}2.2$ mm, entire, glabrous, acute; **Pet** white-purplish, oblong, $4.7\text{--}5 \times 2\text{--}2.2$ mm, entire, acute; **Ov** purple to reddish, oblong to ellipsoid, $3\text{--}3.2 \times 1.7\text{--}2$ mm Ø; **Fr** brown, $6\text{--}11 \times 3\text{--}4$ mm Ø; **Se** 5–6.8 mm.

Material of this species was previously identified as *H. laevis*.

H. schottii Baker *ex* Hemsley (Biol. Centr.-Amer., Bot. 3: 318, 1884). **Type:** Mexico, Yucatán (*Schott* 645 [BM, F]). — **Distr:** Mexico (Yucatán: Opichén; Campeche: Calakmul); tropical deciduous forest, on the ground or on limestone rocks, 30–260 m.

Forming extensive colonies, flowering 2–2.5 m tall, rhizomatous; **L** numerous, sheaths stramineous to light brown, suborbicular, $4\text{--}5 \times 4\text{--}5$ cm,

glabrous, lustrous, margins spiny, **L** lamina green, 50–100 × 3.5–4.5 cm, glabrous adaxially, finely cinereous-lepidote abaxially, **Sp** mostly divaricate, some retrorse or antrorse, 5–6 mm, 1.4–3 cm apart; **Inf** seemingly lateral, 2–3× branched, densely and finely white-flocculose throughout; peduncle ±1 cm Ø; peduncular **Bra** light brown, triangular, 4.5–5 cm, acuminate; **male Inf** with numerous ascending to erect primary **Br** 4–20 cm long; secondary **Br** 1.5–8 cm; primary **Bra** light to dark brown, ovate, 1–6 × 0.6–1.5 cm, entire, acuminate; floral **Bra** brown, ovate to broadly ovate, 4–5 mm, acute, apiculate, about equalling the sepals; **Fl** ascending, subverticillate and densely to laxly disposed, subsessile; **Sep** brown, ovate, 2.8–3 × 2.2–2.4 mm, floccose-lepidote, margins hyaline, erose, obtuse; **Pet** basally shortly connate, white, elliptic, 4.4–4.8 × 2.7–2.8 mm, glabrous, entire, obtuse; **St** unequal, barely shorter than the petals; **Fil** 2.3–3.9 mm; **Anth** greenish, ±1.7 mm, apiculate; **female Inf** with numerous ascending to erect primary **Br** 10–20 cm long; secondary **Br** 2–8 cm; primary **Bra** light to dark brown, ovate, 1–6 × 0.6–1.5 cm, entire, acuminate; floral **Bra** brown, ovate to broadly ovate, 4–5 mm, acute, apiculate, about equalling the sepals; **Fl** ascending, subverticillate and densely to laxly disposed, subsessile; **Sep** brown, ovate, 4–4.4 × 3–3.3 mm, floccose-lepidote, margin hyaline, erose, obtuse to acute; **Pet** basally shortly connate, white, triangular to ovate, 5–5.2 × 3–3.3 mm, glabrous, entire, acute; **Ov** rose, ellipsoid, ±4.5 × ±2.3 mm, white-lepidote; **Fr** light brown, 8–9 × 4.5–4.7 mm, white-lepidote to glabrescent, acute; **Se** reddish-brown, 3.5–6 mm.

H. sphaeroblata B. L. Robinson (Proc. Amer. Acad. Arts 35: 323, 1900). **Type:** Mexico, Guerrero (*Nelson* 2044 [GH, US]). — **Distr:** Mexico (Puebla, Guerrero, Oaxaca); tropical deciduous forest, on the ground or rarely on rocks, 800–1900 m.

Caespitose, flowering 2.5–3.5 m tall; **L** numerous, sheaths stramineous, orbicular to ovate, 5.6–8 × 5.8–11 cm, lepidote adaxially, glabrous and lustrous abaxially, margins spiny, **L** lamina green, 25–110 × 3–5.5 cm, inconspicuously

finely white-lepidote on both faces, **Sp** brownish to reddish, antrorse, 2.5–5 mm, 1.5–3.2 cm apart; **Inf** seemingly lateral, 2× branched, glabrous; peduncle 2.5–2.8 cm Ø; peduncular **Bra** green to light brown, foliaceous, linear, 24–50 × 0.5–0.7 cm, margin spiny, pungent; **male Inf** with numerous ascending flattened primary **Br** 28–40 cm long and with 2–15 divaricate secondary **Br** 3–12 cm long; primary **Bra** stramineous, ovate-triangular, 1.5–2 cm, attenuate; floral **Bra** scarious, triangular, 1–1.5 mm; **Fl** divaricate, single to subverticillate, subsessile; **Sep** light brown, ovate, 2–2.3 × ±1.6 mm, glabrous, entire, obtuse; **Pet** white, suborbicular to elliptic, 3–3.4 × 2–2.2 mm, glabrous, entire, obtuse; **St** subequal, barely shorter than the petals; **Fil** 2.5–2.7 mm; **Anth** yellowish, ±1 mm; **female Inf** with numerous ascending flattened primary **Br** 22–42 cm long, with 8–15 ascending secondary **Br** 2.5–10 cm long; primary **Bra** stramineous, ovate-triangular, 1.2–2.5 cm, attenuate; floral **Bra** white, ovate-triangular, 1.5–1.8 mm, erose, apiculate, shorter than the sepals; **Fl** ascending to divaricate, subverticillate, subsessile to shortly pedicellate; **Ped** stout, 0.8–1.2 mm; **Sep** white, ovate, 1.9–2.3 × ±1.6 mm, glabrous, entire, obtuse; **Pet** white, triangular, 2.5–3 × ±1.5 mm, glabrous, entire, acute; **Ov** green, ellipsoid, 2–2.5 × ±1.2 mm, glabrous; **Fr** light brown, 5.8–6.8 × 2.5–4 mm; **Se** dark brown, 4.7–5 mm.

H. stenopetala Klotzsch (Allg. Gartenzeitung 3: 402, 1835). **Type:** Mexico, Veracruz (*Schiede & Deppe* s.n. [B, HAL]). — **Distr:** Mexico (C Veracruz); tropical deciduous forest, on the ground and on rocks of lava flows, 100–700 m.

Incl. *Hechtia besseriana* J. Verschaffelt (1874); **incl.** *Hechtia glabra* Brandege (1920).

Caespitose, flowering 0.5–2 m tall; **Ros** ± elongated, short- to long-caulescent, stems rhizomatous, ±1.6 cm Ø; **L** numerous, sheaths yellowish-brown, ovate to widely ovate to oblong, 3.5–6 × 2–4.6 cm, lustrous towards the base, brown-lepidote toward the apex, margins finely serrate and densely lepidote, **L** lamina green, sometimes tinged with red, 28–56 (–70) × 1.3–3.5 cm, densely lepidote on both faces, **Sp** divaricate to antrorse, light brown, 1.5–2.3 mm,

1.4–2.2 cm apart; **Inf** 2× branched; **male Inf** with numerous primary **Br** 10–15 cm long; peduncle 9–11 mm Ø, glabrous; peduncular **Bra** yellowish, narrowly triangular to linear, 6–12 × 0.2–1 cm, white-lepidote, entire, decreasing in size upwards; floral **Bra** whitish-brown, oblong to elliptic, 0.7–1.2 mm, erose, acute, equal or shorter than the pedicels; **Fl** polystichous, divaricate; **Ped** 0.8–1 mm; **Sep** elliptic to broadly triangular, 1.6–2.1 × 1–1.7 mm, rounded; **Pet** white, broadly elliptic to broadly oblong, 2.5–3 × 1.6–2 mm, rounded; **St** longer than the petals; **Fil** 2.5–3 mm; **Anth** green, 1.1–1.4 mm; **female Inf** with numerous primary **Br** 10–15 cm long; peduncle cylindrical, 8–13 mm Ø; peduncular **Bra** yellowish, narrowly triangular to linear, (2–) 11–12 (–18) × (0.5–) 0.8–1 cm, deciduous; floral **Bra** oblong to triangular, 0.9–1.1 × ±0.5 mm, rounded, equal or longer than the pedicels; **Fl** polystichous, divaricate; **Ped** obconical, 0.7–1 mm; **Sep** green, triangular to ovate, 1.4–2.3 × 1–2 mm, rounded or acute; **Pet** white, triangular, 2.5–3 × 1.3–1.6 mm, acute; **Ov** green, ellipsoid, 3–4 × 1.3–2 mm; **Fr** dark brown, 6–8 × 3–4 mm; **Se** brown, 2.5–2.9 mm.

H. subalata L. B. Smith (Contr. Gray Herb. 117: 15–16, t. 1, fig. 29, 1937). **Type:** Mexico, Durango (*Rose* 3467 [US]). — **Distr:** Mexico (Durango, Zacatecas, Nayarit, Jalisco); tropical shrubland, on the ground or on rocks, 900–1750 m.

Caespitose, flowering to 1.5 m tall; **L** numerous, sheaths stramineous, square to transversely oblong, 4–4.5 × 4.5–4.7 cm, glabrous, lustrous, erose to spiny at the margins, **L** lamina green to glaucous, 20–36 × 1.5–3 cm, densely appressedly white-lepidote on both faces, long attenuate and coiled in the apical portion, margins repand, **Sp** light brown, divaricate to retrorse or some antrorse, 2.2–4.5 mm, 0.65–1.3 cm apart; **Inf** 1× branched, white-lepidote, glabrescent with age; peduncle 1.3–1.5 cm Ø; peduncular **Bra** light brown, amplexicaul, ovate to oblong-ovate, with a short narrowly triangular lamina, 5–5.6 × 1.5–2.3 cm, irregularly dentate, white-lepidote abaxially, margins irregularly dentate; **male Inf** with numerous ascending to erect primary **Br** 4–8 cm long; primary **Bra** stramineous to light brown, ovate to lanceolate, 4–6.6 × 1.6–2 cm,

acuminate, glabrous adaxially, white-lepidote abaxially, margins irregularly dentate; floral **Bra** light brown, linear to very narrowly triangular, 1.6–2.5 mm, shorter than the pedicels; **Fl** polystichous, ascending to divaricate; **Ped** conical, 2.5–3.5 mm, sulcate; **Sep** brownish, triangular, 4.8–5.3 × 2–2.3 mm, entire, glabrous, acute; **Pet** white, elliptic, 5.7–6 × 3–3.3 mm, entire, glabrous, rounded; **St** subequal, shorter than the petals; **Fil** 5.3–5.6 mm; **Anth** yellow, ±2 mm; **female Inf** with numerous ascending primary **Br** 2–10 cm long; primary **Bra** stramineous to light brown, ovate-triangular, 2.5–4.6 × 1.4–1.6 cm, glabrous adaxially, white-lepidote abaxially, margins irregularly spiny-dentate, acuminate; floral **Bra** light brown, narrowly triangular to linear, 2–2.5 mm, shorter than the pedicels; **Fl** densely disposed to agglomerated, ascending; **Ped** stout, conical, 2.5–3.5 mm, sulcate; **Sep** brownish, elliptic to ovate-triangular, ±3.5 mm, erose, hyaline, rounded; **Pet** white, triangular, 4.5–5.2 × 2.3–2.5 mm, entire, glabrous, acute; **Ov** green, ellipsoid, ±4 mm; **Fr** green to light brown, 10–14 × 7–9 mm; **Se** brown-reddish, 4–4.8 mm.

H. tehuacana B. L. Robinson (Proc. Boston Soc. Nat. Hist. 31: 265–266, 1904). **Type:** Mexico, Puebla (*Pringle* 8578 [GH, B, BM, ENCB, G, GOET, K, MEXU, NY, P, UC, US, VT, Z]). — **Distr:** Mexico (Puebla, Oaxaca); xerophytic shrubland, calcareous hills, 1650–1750 m.

Incl. *Hechtia pueblensis* Burt-Utley & al. (2011).

Solitary or in small groups, flowering to 2.2 m tall; **Ros** ±50 cm Ø; **L** numerous, sheaths yellow adaxially, brownish abaxially, square to ovate, 4.4–7 × 4.3–7.2 cm, glabrous, distally densely lepidote on both faces, serrate, **L** lamina green, 25–46 × 0.8–1.8 cm, sparsely lepidote to lepidote on both faces, **Sp** light brown to reddish, divaricate to antrorse or sometimes retrorse, 3.8–8.9 mm, 0.53–2.5 cm apart; **Inf** 2× branched, glabrescent; peduncle cylindrical, 1–2 cm Ø; basal peduncular **Bra** foliaceous, brown, 7.3–16.5 cm, sparsely lepidote, serrate, upper peduncular **Bra** caudate, entire; **male Inf** with up to 86 ascending primary **Br** 3.6–8 cm long; secondary **Br** basal, ascending, 1.9–4.9 cm; primary **Bra** ovate-triangular, sparsely

lepidote, serrate, 2–7.3 cm; floral **Bra** brownish, triangular, 2–3.5 × 0.2–1.2 mm, entire, glabrous, acuminate; **Fl** divaricate, densely disposed; **Ped** stout, 1–2.7 mm, glabrous; **Sep** brownish, ovate, 1.6–4.3 × 0.6–2.1 mm, glabrous, entire, acute; **Pet** green, oblong, 3.2–4.7 × 1.7–3.2 mm glabrous, entire, rounded; **St** equal, longer than the petals; **Fil** 2.3–4.2 mm; **Anth** yellow, 0.5–1.9 mm; **female Inf** with up to 44 ascending primary **Br** 5.1–6 cm long; secondary **Br** ascending, 1.3–2.4 cm; primary **Bra** brown, ovate-triangular, 3.1–4.6 cm, sparsely lepidote, serrate; floral **Bra** brownish, triangular, 1.5–2.8 × 0.4–1.2 mm, entire, glabrous, acute; **Fl** divaricate, densely disposed; **Ped** stout, 2.8–4.4 mm; **Sep** brownish, ovate, 1.3–2.6 × 0.6–1.2 mm, glabrous, entire, acute; **Pet** green, triangular, 2.1–3.6 × 0.9–1.4 mm, glabrous, entire, acute; **Ov** green, ovoid, ±2 mm; **Fr** brownish, 7–10 × 4.4–7.5 mm Ø; **Se** brownish, 3–3.8 mm.

H. texensis S. Watson (Proc. Amer. Acad. Arts 20: 374–375, 1885). **Type:** USA, Texas (*Havard* 85 [GH, GH]). — **Distr:** USA (Texas), Mexico (Coahuila, Nuevo León, Durango, Zacatecas); xerophytic scrub and rosette-rich shrubland, limestone hills and ledges, on the ground or on rocks, 900–1850 m.

Incl. *Hechtia scariosa* L. B. Smith (1937);

incl. *Hechtia zacatecae* L. B. Smith (1937).

Caespitose, flowering 0.55–2 m tall; **L** numerous, sheaths light brown, broadly ovate to suborbicular, 2.5–5.5 × 3–5.5 cm, glabrous and lustrous on both faces, densely serrulate to serrulate, **L** lamina green or green with red to bright rose stripes, 20–45 × 1–5 cm, glabrous and lustrous adaxially, densely appressedly white-lepidote abaxially, **Sp** yellow to dark castaneous, antrorse to divaricate or some retrorse, 4–6 mm, 1–2.7 cm apart; **Inf** seemingly lateral, lepidote, 1× to rarely 2× branched; peduncle strongly flattened at the base, 3.5–7.5 mm Ø; peduncular **Bra** stramineous to dark brown, ovate to triangular, 2.7–5 × ±1 cm, acuminate, shorter than the internodes; **male Inf** with 7–18 ascending slender primary **Br** 4–26 cm long; primary **Bra** stramineous, ovate-triangular, 3.7–12 mm, attenuate; secondary **Br** 1.7–4 cm; floral **Bra** rose with a broad hyaline margin, suborbicular, 4.5–7 mm, erose, apiculate, shorter than

or nearly equalling the sepals; **Fl** ascending, subverticillate, sessile; **Sep** green, ovate to elliptic, 4.5–6 × 2.5–4 mm, margin hyaline, densely lepidote, carinate, obtuse; **Pet** white, elliptic, connate basally, 5–8.5 × 2.2–3.5 mm, obtuse, slightly lepidote abaxially; **St** unequal, shorter than the petals; **Fil** 3–6 mm; **Anth** green, sagittiform, 1.5–2 mm; **female Inf** with 11–17 ascending to appressed primary **Br** 3–23 cm long; primary **Bra** 1.2–1.5 cm, attenuate, acute; **Fl** ascending, subverticillate, sessile to subsessile; floral **Bra** brownish, triangular-ovate, 4–6 mm, shorter than the sepals; **Sep** brownish, ovate to broadly ovate, 4.5–7 × ±4 mm; **Pet** white, elliptic, 7.5–10 × 4.5–5 mm, glabrous, entire, rounded; **Ov** green to brownish, ovoid, densely lepidote; **Fr** brown, 8–12 × 5–6 mm, lepidote, glabrescent.

Vernacular names: “Texas False Agave”, “Guapilla de Texas”.

H. tillandsioides (André) L. B. Smith (Contr. US Nation. Herb. 29: 431, 1951). **Type:** Mexico (*Anonymus* s.n. [K]). — **Distr:** Mexico (San Luis Potosí, Querétaro, México, Guerrero); tropical deciduous forest and shrublands, on perpendicular limestone cliffs and ledges, 600–1800 m. **I:** Roguenant & al. (2016: 145, as *H. caerulea*).

≡ *Bakeria tillandsioides* André (1889) (*incorrect name*, Art. 11.4) ≡ *Bakerantha tillandsioides* (André) L. B. Smith (1934); **incl.** *Vriesea glaucophylla* hort. ex Mez (1934) (*nom. illeg.*, Art. 53.1); **incl.** *Niveophyllum caeruleum* Matuda (1965) ≡ *Hechtia caerulea* (Matuda) L. B. Smith (1972); **incl.** *Hechtia integerrima* M. B. Foster (1968).

Solitary to caespitose, pendulous, flowering to 1.6 m tall, shortly caulescent; **Ros** asymmetrical, 30–80 cm Ø; **L** numerous, recurved and pendent, sheaths white to light brown, square to transversally oblong, 5–7.5 × 3.5–5 cm, white-lepidote on both faces, glabrescent, entire and sinuate, **L** lamina light green adaxially, white-lepidote abaxially, 30–80 × 1.5–4 cm, long-attenuate, minutely serrate to entire; **Inf** erect to arching or pendent, 1–2× branched, glabrous; peduncle 6–13 mm Ø; peduncular **Bra** light brown to purplish-brown, foliaceous, linear to very narrowly triangular, 5–70 × 0.8–1 cm, entire

to minutely serrate, glabrous adaxially, densely white-lepidote abaxially, involute, long-attenuate, longer than the internodes, becoming gradually shorter upwards; **male Inf** with 20–25 ascending primary **Br** 8–30 cm long; primary **Bra** light brown, linear to triangular, 10–20 × 3–8 mm, acuminate; secondary **Br** when present 2–6, 4–14 cm, divaricate to diffuse; floral **Bra** brown to purplish, linear, 2–3 × ±0.5 mm, shorter than the pedicels; **Fl** polystichous, divaricate; **Ped** filiform, 5–7 mm; **Sep** purplish to rose, triangular to narrowly triangular, 1.5–2.8 × 1–1.7 mm, glabrous, entire, rounded; **Pet** lilac, ovate to elliptic, 5–6 × 3.3–3.8 mm, rounded; **St** subequal, longer than the petals; **Fil** 3–4.5 mm; **Anth** green, ±1 mm; **female Inf** with 14–16 ascending primary **Br** 25–35 cm long; primary **Bra** brown-purplish, triangular, 2–7 × 0.8–1.2 cm, long-attenuate to acuminate; secondary **Br** 7–12, 5–16 cm, ascending; floral **Bra** light brown, linear to triangular, 1.6–1.8 × ±1 mm, acuminate; **Fl** polystichous, divaricate; **Ped** filiform, 2.3–4 mm; **Sep** green to purplish, triangular, 2–2.2 × 1–1.3 mm, acute; **Pet** lilac, elliptic to oblong, 4–5 × 2.3–2.6 mm, rounded; **Ov** green, ±3.5 × ±3 mm; **Fr** green, narrowly ovoid, 7.7–8 × ±3 mm, reflexed and pointing downwards at maturity.

H. zamudioi Espejo & al. (Acta Bot. Mex. 83: 55–59, ills., 2008). **Type:** Mexico, Querétaro (*Zamudio & Hernández* 11285 [IEB, MEXU, NY, UAMIZ]). — **Distr:** Mexico (Querétaro: Peñamiller, Pinal de Amoles, San Joaquín); arid and montane shrubland, on vertical calcareous cliffs or rocky bluffs and ledges, 850–1650 m.

Caspirose, forming extensive colonies, flowering to 2 m tall; **Ros** spreading, 60–70 cm Ø; **L** numerous, sheaths straw-yellow, widely ovate to subquadrate, 8.5–9 × 8.8–10.2 cm, lustrous, glabrous on both faces, with a yellow exudate, **L** lamina blue-green, slightly discoloured, 30–48 × 3.5–5 cm, densely white-lepidote on both faces, **Sp** light brown to reddish, antrorse, slender, 1.5–2 mm, 0.6–1.5 cm apart; **Inf** glabrous; peduncle cylindrical, 1.2–2 cm Ø; peduncular **Bra** foliaceous, straw-yellow, narrowly triangular to triangular, 10–30 × 1.8–2.5 cm, attenuate, pungent, the basal ones imbricate and

longer than the internodes, becoming progressively reduced distally, sheaths subquadrate, 2–2.5 cm long, entire, lamina densely white-tomentose on both faces, spiny along the margins; **male Inf** 1–2 × branched, with numerous primary **Br** 15–25 cm long, with 2 basal secondary **Br** 5–9.5 cm long; primary **Bra** light brown, narrowly triangular to lanceolate, 5.5–7 × 1.5–1.7 cm, glabrous, acuminate, hyaline and minutely spiny along the margins; floral **Bra** filiform, white, inconspicuous, to 3 mm, entire, glabrous; **Fl** divaricate to diffuse, laxly disposed; **Ped** filiform, 3–6 mm; **Sep** green, triangular to ovate or oblong, 3.5–4.5 × 2–3.5 mm, hyaline, acute; **Pet** green, elliptic, 6–8 × 3.5–4 mm, rounded; **St** subequal, shorter than the petals; **Fil** 6–7 mm; **Anth** green, ±3 mm; **female Inf** 1 × branched with numerous diffuse to ascending primary **Br** 6–10 cm long; primary **Bra** light brown, lanceolate to narrowly triangular or narrowly ovate, glabrous, 3.5–7 × 0.9–1.5 cm, acuminate, hyaline and minutely spiny along the margins; floral **Bra** white, filiform, inconspicuous, to 3 mm, entire, glabrous; **Fl** divaricate, laxly disposed; **Ped** filiform, 5–9 mm; **Sep** green, triangular to narrowly triangular, 3–4 × 1.2–1.4 mm, apiculate; **Pet** green, narrowly triangular to narrowly ovate, 5–8 × 2.5–3 mm, acute to rounded; **Ov** green, ovoid to ellipsoid, 5–7 × 3–4 mm; **Fr** green, light brown when mature, 8–12 × 5–6 mm; **Se** light brown, 5–6 mm.

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