NORDIC JOURNAL OF
BOTANY

Research Article

Hechtia mixtecana sp. nov. (Hechtioideae; Bromeliaceae), from Oaxaca, Mexico

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Nordic Journal of Botany
2026: e05137
doi: 10.1002/njb.05137
Subject Editor: Isa Lucia de Morais
Editor-in-Chief: Jalil Noroozi
Accepted 4 December 2025
Published 31 January 2026

Botanical explorations carried out in the state of Oaxaca, Mexico, led to the discovery of a new Bromeliaceae: *Hechtia mixtecana*, which is here described and illustrated. The new taxon is compared with the morphologically similar *Hechtia fragilis*, *Hechtia lyman-smithii*, and *Hechtia minuta*. *Hechtia mixtecana* differs from these taxa by the orientation of the leaves (ascending to divaricate), by the architecture of the staminate (twice branched) and pistillate inflorescences (once to twice branched), and by the length of the primary branches of the pistillate inflorescence (15–28 cm). A complete morphological description, images, and a geographic distribution map of the new species are included, as well as a list of examined specimens.

Keywords: Balsas Basin Province, endemism, monocots, Poales, Sierra Madre del Sur Province

Introduction

Bromeliaceae Juss. (Jussieu 1789) is represented in Mexico by 19 genera and ca 490 species (updated from Espejo-Serna and López-Ferrari 2018). *Tillandsia* L. (Linnaeus 1753) and *Hechtia* Klotzsch (Klotzsch 1835) are the largest genera in the country with 245 and 104 species, respectively (updated from Espejo-Serna and López-Ferrari 2018, Gouda et al. 2025). *Hechtia* is a genus of dioecious plants, except for *Hechtia gayorum* L.W.Lenz (Lenz 1995), distributed from the southern United States to northern Central America and is classified in its own subfamily Hechtioideae (Givnish et al. 2007). The Mexican states with the highest number of *Hechtia* species are Oaxaca (26), Puebla (20), Guerrero (14), and Jalisco (11) (updated from Espejo-Serna et al. 2020).

The taxonomy of the genus *Hechtia* is extremely complicated due, among other issues, to the lack of types with both floral morphs. Many taxa were described from

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plants with only male flowers, female flowers, or plants with fruits, and often the original descriptions and/or illustrations are incomplete or not very detailed and do not allow unequivocal identification of the specimens. Other descriptions were made based on cultivated plants, without precise data about location and/or collection. Recent collections are also not free of problems, since some are fragmentary or lack data, such as the type of development of the inflorescence (lateral or terminal), and the color of the flowers. Finally, several types have been destroyed or have not been located in institutional collections. All of this made the circumscription and identification of species within the genus problematic.

The representatives of the genus *Hechtia* that exist in the state of Oaxaca, Mexico are (update from Espejo-Serna et al. 2007a, Espejo-Serna and López-Ferrari 2018, Espejo-Serna et al. 2020): *Hechtia aquamarina* I.Ramírez & C.F.Jiménez (Ramírez and Jiménez 2012), *Hechtia caudata* L.B. Sm. (Smith 1961a), *Hechtia caulescens* López-Ferr., Espejo & Mart.-Correa (López-Ferrari et al. 2009), *Hechtia colossa* Mart.-Correa, Espejo & López-Ferr. (Martínez-Correa et al. 2010), *Hechtia complanata* Burt-Utley (Burt-Utley 2012), *Hechtia confusa* L.B. Sm. (Smith 1937), *Hechtia conzattiana* L.B. Sm. (Smith 1937), *Hechtia flexilifolia* I. Ramírez & Carnevali (Ramírez-Morillo et al. 2014), *Hechtia fosteriana* L.B. Sm. (Smith 1961a), *Hechtia fragilis* Burt-Utley & Utley (Burt-Utley and Utley 1987), *Hechtia galeottii* Mez (Mez 1919), *Hechtia gypsophila* López-Ferr., Espejo & Hern.-Cárdenas (Hernández-Cárdenas et al. 2019), *Hechtia huamelulaensis* I.Ramírez & Carnevali (Ramírez-Morillo et al. 2014), *Hechtia isthmusiana* Burt-Utley (Burt-Utley 2012), *Hechtia ixtlanensis* Burt-Utley (Burt-Utley 2012), *Hechtia lanata* L.B. Sm. (Smith 1961a), *Hechtia lyman-smithii* Burt-Utley & Utley (Burt-Utley and Utley 1987), *Hechtia marnier-lapostollei* L.B.Smith (1961b), *Hechtia minuta* Hern.-Cárdenas, Espejo & López-Ferr. (Hernández-Cárdenas et al. 2019), *Hechtia nivea* I.Ramírez & Carnevali (Ramírez-Morillo et al. 2014), *Hechtia nuusaviorum* Espejo & López.-Ferr. (Espejo-Serna et al. 2007b), *Hechtia oaxacana* Burt-Utley, Utley & García-Mend. (Burt-Utley et al. 2011), *Hechtia pringlei* B.L.Rob. & Greenm. (Robinson and Greenman 1895), *Hechtia rosea* É. Morren ex Baker (Baker 1889), *Hechtia roseana* L.B. Sm. (Smith 1937), and *Hechtia rubicunda* López-Ferr. & Espejo (López-Ferrari and Espejo-Serna 2014).

As a result of botanical explorations in the state of Oaxaca, Mexico, we collected specimens of some *Hechtia* populations located in the municipalities of Concepción Buenavista and Santiago Miltepec, Oaxaca. After a careful and detailed revision of the living material and herbarium specimens, type material, and protologues of all species of the genus distributed in Oaxaca, we concluded that these populations belong to an undescribed taxon that we propose here.

Material and methods

Staminate and pistillate plants of the new taxon were collected in the municipalities of Concepción Buenavista and Santiago Miltepec, Oaxaca. The specimens were herborized, measured, analyzed, and a description was made. Measurements and description were prepared from living and mostly from dry material. The morphological terms used in the description are those proposed by Radford et al. (1974) and Scharf and Gouda (2008). The vouchers were deposited at UAMIZ and XAL herbaria. We revised the herbarium material of the genus *Hechtia* deposited at CHIP, CIIDIR, FCME, GH, IBUG, IEB, MEXU, MO, OAX, UAMIZ, and XAL (Appendix 1). To ensure the status of the proposed new species, we reviewed protologues and living specimens, as well as herbarium specimens and type material of all *Hechtia* species previously cited for Oaxaca. To name the vegetation type and the biogeographic provinces where the new species grows, we used the classifications proposed by Rzedowski (1978) and Morrone et al. (2017), respectively.

Taxonomic treatment

Hechtia mixtecana Hern.-Cárdenas, Espejo & López-Ferr. sp. nov. (Fig. 1–5)

Diagnosis

Hechtia mixtecana is similar to *H. fragilis* but differs in the inflorescence of the staminate plants (twice branched versus once branched), in the presence of indument on its peduncle and floral bracts (glabrous versus lepidote), in the shape (elliptic versus broadly ovate to oblong) of the petals of the staminate flowers; in the length of the primary branches of the pistillate plants (15–28 versus 1–6 cm), and in the presence of indument on its floral bracts (glabrous versus lepidote).

Type: Mexico, Oaxaca: Distrito de Huajuapan, municipio de Santiago Miltepec, carretera federal (125) que va de Huajuapan de León a Tehuacán, entre los poblados de Santiago Miltepec y Asunción Cuyotepeji, 17°57′56.8″N, 97°40′45.7″W, 1817 m a.s.l., 16 Aug. 2024, R. Hernández-Cárdenas & S. Lara-Godínez 3002♀ (Holotype: XAL (6x), Isotype: UAMIZ (2x)).

Etymology

The specific epithet refers to and honours the Mixtec culture from Mexico. One of the regions occupied by the Mixtec ethnic group is located in northwestern Oaxaca, the area in which the type locality of the new species is found.

Description

Plants saxicolous to terrestrial, in flower 120–160 cm high, rosettes acaulescent, 20–30 cm high, 20–30 cm in diam., forming clumps of five to fifteen rosettes or sometimes solitary. Leaves 15 to 20, ascending to divaricate; sheaths yellowish white at the base to pale brown toward the apex, depressed ovate, 3.0–3.5 cm long, 4.0–5.5 cm wide, with minute marginal sharp teeth toward the apex, glabrous near the base and lepidote toward the apex on both surfaces; blades gray green, narrowly triangular, 10–20 cm long, 1.5–2.5 cm wide at the

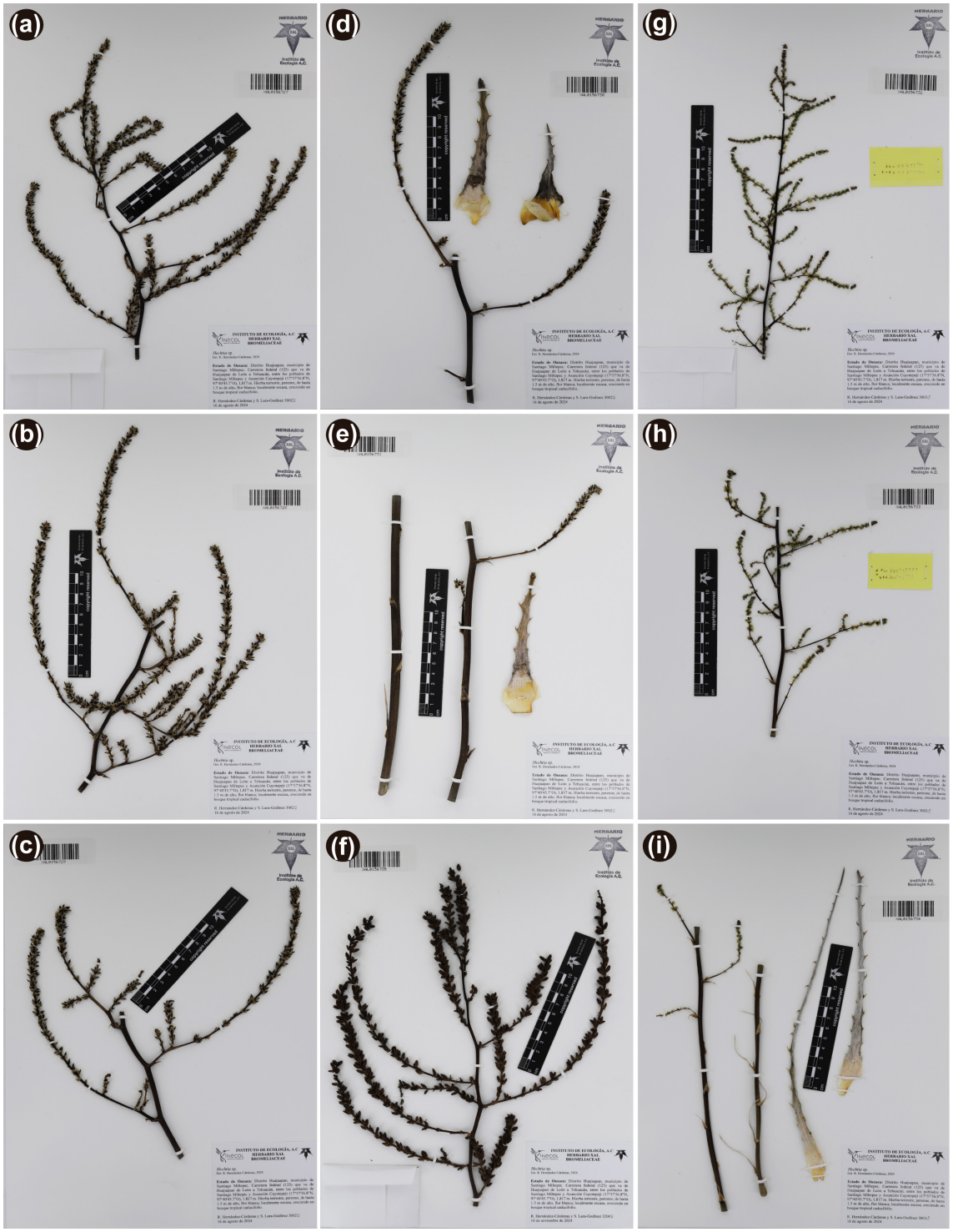


Figure 1. Herbarium specimens of *Hechtia mixtecana* sp. nov. (a–e) Pistillate plant (Hernández-Cárdenas and Lara-Godínez 3002♀, XAL), (f) pistillate plant with fruits (Hernández-Cárdenas and Lara-Godínez 3200♀, XAL) (g–i) staminate plant (Hernández-Cárdenas and Lara-Godínez 3003♂, XAL). Photographs by I. Acosta Rosado

base, long attenuate, very densely white lepidote abaxially, lepidote adaxially and glabrous toward the apex, margins with antrorse to retrorse green to brown, sharp teeth, 4–5 mm long, 3–4 mm wide, 2.0–2.5 cm apart. Inflorescences terminal, erect, twice branched in staminate plants and once to twice branched in pistillate plants. Staminate inflorescence 100–110 cm long; peduncle brown, terete, 4–5 mm in diam., glabrous, internodes 3–4 cm long; peduncle bracts brown,



Figure 2. *Hechtia mixtecana* sp. nov. (a–b) Rosettes at the type locality. Photographs by R. Hernández-Cárdenas.

sheaths triangular, 7–10 mm long, 5–7 mm wide, glabrous on both surfaces, margins hyaline, blades linear, 1–5 cm long, 0.5–1.0 mm wide, lepidote on both surfaces, entire, the basal ones longer than the internodes, the upper ones shorter; primary bracts light brown, narrowly triangular, 10–15 mm long, 0.5–10.0 mm wide when extended, caudate, entire, margins hyaline, glabrous adaxially, lepidote toward the apex abaxially; main axis 60–70 cm long, internodes 2.0–3.5 cm long; primary branches 20 to 25, terete, 5–10 cm long, 0.8–1.0 cm in diam., secondary branches one to four per primary branch, terete, 2–3 cm long, 0.5–0.8 cm in diam., distributed through of the primary branch; floral bracts brown, ovate-triangular, 2.0–2.5 mm long, 1.2–1.5 mm wide, longer than the pedicels, caudate, entire to erose, glabrous on both surfaces. Staminate flowers more than 30 on primary branches, sessile to subsessile, pedicels 0–0.5 mm long; sepals brown, elliptic, 2.0–2.5 mm long, 1.0–1.5 mm wide, acute, hyaline and entire, glabrous on both surfaces; petals white, ovate, 2.0–2.5 mm long, 1.5–2.0 mm wide, obtuse, entire, glabrous on both surfaces; stamens all equal in length; filaments white, narrowly oblong, flattened, 1.5–2.2 mm long; anthers green, oblong, 0.7–1.0 mm long, apiculate, versatile, pollen yellow; pistillode inconspicuous, green, glabrous. Pistillate inflorescence 120–130 cm long; peduncle brown, terete, 0.7–1.0 cm in diam., glabrous, internodes 3–6 cm long; peduncle bracts brown, sheaths triangular, 1.0–1.5 cm long, 1.0–1.5 cm wide, glabrous on both surfaces, margins hyaline, blades narrowly triangular, 1.0–4.5 cm long, 0.3–0.4 cm wide, lepidote on both surfaces, entire, shorter than the internodes; primary bracts brown, triangular, 1–2 cm long, 0.5–1.0 cm wide when extended, caudate, margins entire and hyaline, glabrous on both surfaces; main axis 60–70 cm long, internodes 3.0–6.5 cm long; primary branches 20 to 25, terete, 15–28 cm long, 0.8–1.0 cm in diam., secondary branches when present, two to four per primary branch, terete, 3–7 cm long, 0.8–1.0 cm in diam., distributed through of the



Figure 3. *Hechtia mixtecana* sp. nov. (a) Staminate flowers, (b) pistillate flowers. Photographs by R. Hernández-Cárdenas.

primary branch; floral bracts brown, triangular, 2–3 mm long, 1.5–2.0 mm wide, longer than the pedicels, caudate to apiculate, margins hyaline and entire to erose, glabrous on both surfaces. Pistillate flowers more than 30 on primary branches, sessile to subsessile, pedicels 0–0.5 mm long; sepals brown, ovate-triangular, 2.0–2.5 mm long, 1.5–2.0 mm wide, acute, hyaline and entire, glabrous on both surfaces; petals white, triangular, 3.0–3.5 mm long, 1.8–2.5 mm wide, acute, entire, glabrous on both surfaces; staminodes rudimentary, white; ovary superior, green, oblong, 2.0–2.5 mm long, 1.0–1.5 mm in diam., glabrous; stylar branches white, recurved, slender, 0.5–0.8 mm long, stigmas papillose. Capsules green, brown when mature, ovoid, 5–7 mm long, 3–4 mm in diam., glabrous; seeds brown, fusiform, 4.0–4.5 mm long, caudate.

Phenology

Hechtia mixtecana blooms from July to August and fruits from September to November.

Distribution and ecology

Hechtia mixtecana is known so far from the municipalities of Concepción Buenavista and Santiago Miltepec, Oaxaca, in the Balsas Basin and Sierra Madre del Sur biogeographic provinces (Fig. 5) where it grows in colonies on rocky cliffs and vertical walls, or terrestrially in tropical deciduous forest and grasslands, with species of the genera *Acacia* Mill., *Agave*, *Bursera* Jacq. ex L., *Cuphea* P. Browne, *Ipomoea* L., *Opuntia* Mill., and the family Poaceae Barnhart. Plants of *H. mixtecana* inhabit elevations between 1810 and 2210 m a.s.l.

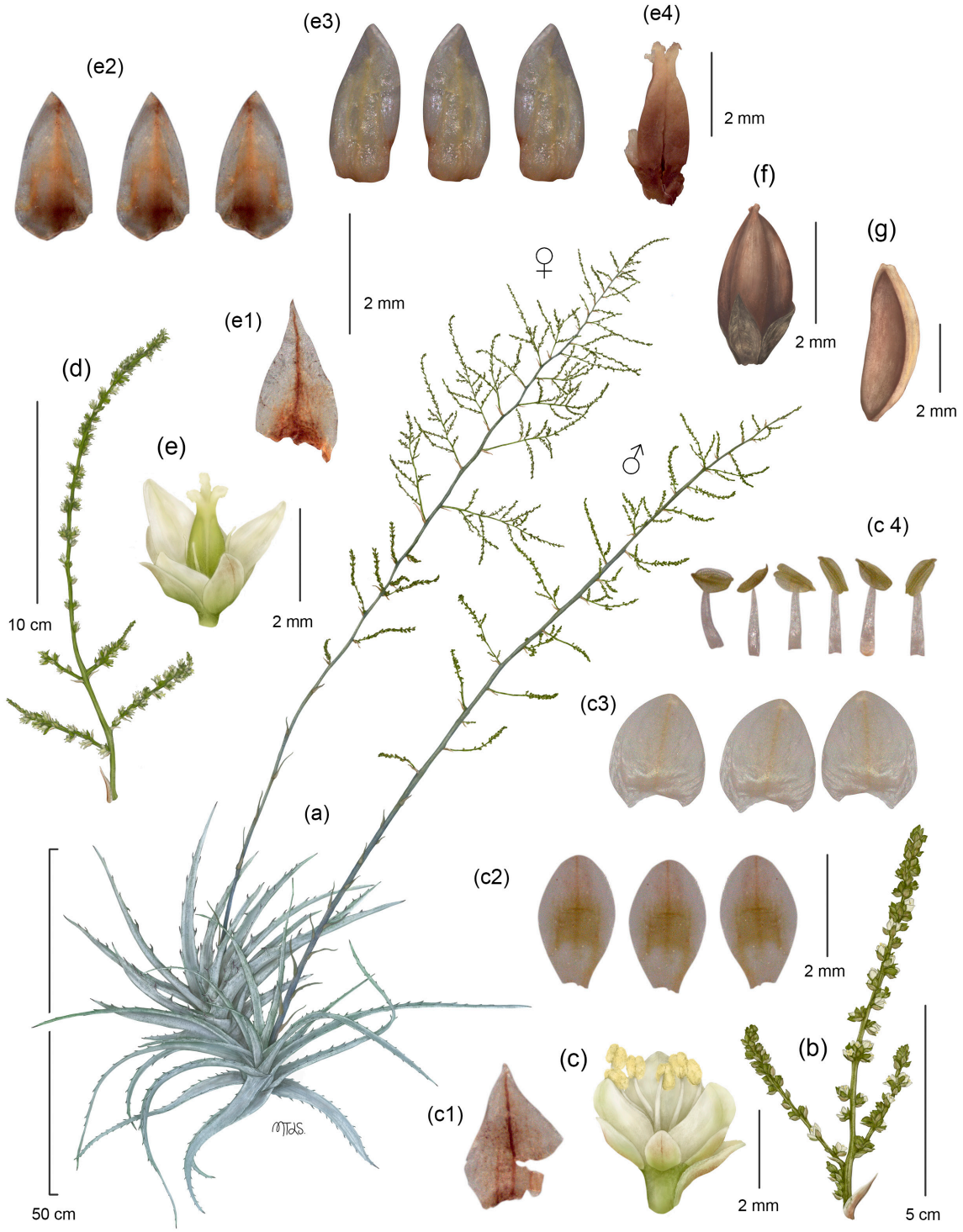


Figure 4. *Hechtia mixtecana* sp. nov. (a) Staminate and pistillate plants in bloom, (b) staminate primary branch, (c) staminate flower, (c1) floral bract, (c2) sepals, (c3) petals, (c4) stamens, (d) pistillate primary branch, (e) pistillate flower, (e1), floral bract, (e2) sepals, (e3) petals, (e4) pistil, (f) fruit, (g) seed. Illustration drawings a, b, c, d, e, f, g by M. T. Jiménez Segura; photographs c1–c4, e1–e4 by R. Hernández-Cárdenas.

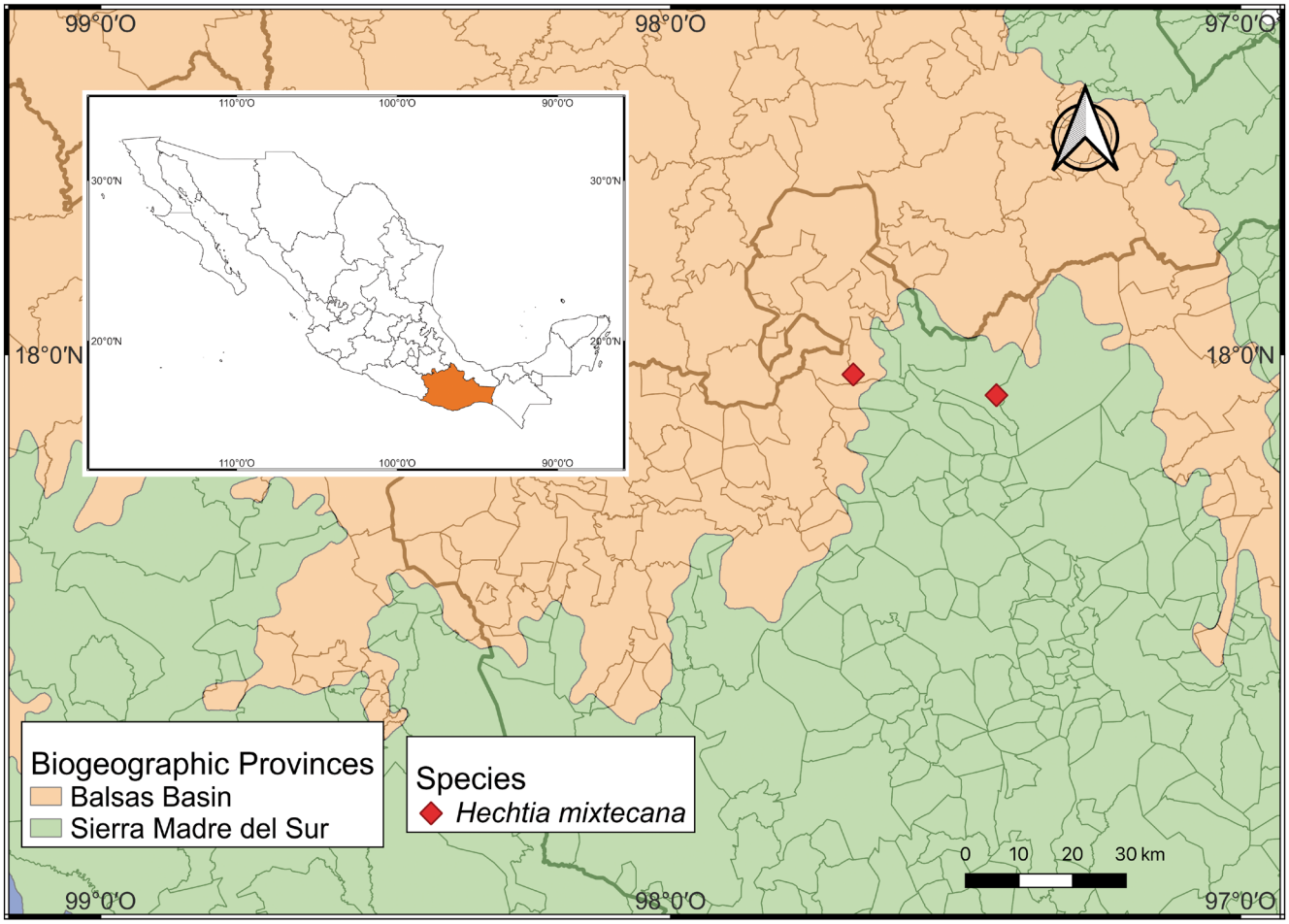


Figure 5. Distribution map of *Hechtia mixtecana* sp. nov.

Conservation status

Due to the lack of detailed information on the species distribution and abundance, we initially assess *Hechtia mixtecana* as 'Data Deficient' (DD), following the IUCN (2025) guidelines.

Similar species

The new species is characterized by the small size of the rosettes (20–30 × 20–30 cm), the size of the leaf blades (10–20 × 1.5–2.5 cm), the architecture of the staminate (twice branched) and pistillate inflorescences (once to twice branched), the number (20–25) and length (5–10 cm) of the primary branches of the staminate inflorescences, the shape (elliptic) and size (2.0–2.5 × 1.5–2.0 mm) of the petals of the staminate flowers; the number (20–25) and length (15–28 cm) of the primary branches of the pistillate inflorescences, and the shape (triangular) and size (2–3 × 1.5–2.0 mm) of the floral bracts of the pistillate flowers. However, *Hechtia mixtecana* shares some similarities with *H. fragilis*, *H. lyman-smithii*, and *H. minuta* including the acaulescent and small size rosettes. Nevertheless, *H. mixtecana* differs from *H. fragilis* in the length of the flowering plants (120–160 versus 55–100 cm), in the branching of the inflorescence of staminate plants (twice branched versus once branched), in the presence of indument on its peduncle and floral bracts (glabrous versus lepidote), in the size (2.0–2.5 × 1.5–2.0 versus 2.6–3.5 × 1.6–2.4 mm) and shape (elliptic versus broadly ovate to oblong) of the petals of the staminate flowers; in the length of the primary branches of the pistillate plants (15–28 versus 1–6 cm), and in the presence of indument on its floral bracts (glabrous versus lepidote). *Hechta mixtecana* differs from *H. lyman-smithii* in the length of the leaf sheath (3.0–3.5 versus 1.8–2.8 cm), in the branching of the inflorescences of staminate plants (twice branched versus once branched), in the length of the petals of the staminate flowers (2.0–2.5 versus 3–4 mm); in the branching (once to twice branched versus once branched) and in the length of the primary branches (15–28 versus 2.0–8.5 cm) of pistillate inflorescences plants. *Hechtia mixtecana* differs from *H. minuta* in the branching of the inflorescences of staminate plants (twice branched versus once branched), in the size of the floral bracts of the staminate plants (2.0–2.5 × 1.2–1.5 versus 2.5–3.0 × 1.5–2.0 mm), in the shape of the sepals of the staminate flowers (ovate versus elliptic); in the length of the primary branches of the pistillate inflorescences (15–18 versus 1.0–2.5 cm), and in the shape of the petals of the pistillate flowers (triangular versus oblong) (Table 1).

Table 1. Morphological differences between *Hechtia mixtecana*, *H. fragilis*, *H. lyman-smithii*, and *H. minuta*.

Characters	*H. mixtecana*	*H. fragilis*	*H. lyman-smithii*	*H. minuta*
Flowering plant length (cm)	120–160	55–100	45–80	70–130
Leaves	ascending to divaricate	recurved	recurved	recurved
Leaf sheath	depressed ovate; 3.0–3.5 × 4.0–5.5 cm	transversely oblong; 1.6–3.0 × 3.8–5.3 cm	depressed ovate; 1.8–2.8 × 3.5–4.5 cm	quadrangular to transversely oblong; 2.0–4.5 × 2.0–4.5 cm
Leaf blade size (cm)	10–20 × 1.5–2.5	10–20 × 2–3	7–17 × 1.7–3	5–13 × 2–4
Sharp teeth	antrorse to retrorse; 4–5 mm long	antrorse to retrorse; 1.3–4.0 mm long	antrorse to retrorse; 2.5–4.0 mm long	antrorse to divaricate; 3–4 mm long
Staminate plants (♂)				
Inflorescences	twice branched	once branched	once branched	once branched
Peduncle	4–5 mm in diam.; glabrous	4.5–6.0 mm in diam.; lepidote	3.0–5.5 mm in diam.; glabrous	4–5 mm in diam.; glabrous
Primary branches number	20–25	ca 40	15–40	18–30
Primary branches length (cm)	5–10	1–6	2.2–6.3	2–6
Floral bracts	ovate; 2.0–2.5 × 1.2–1.5 mm; glabrous	ovate to triangular; 2.0–3.1 × 0.7–1.0 mm; lepidote	ovate; 0.8–2.0 × 0.7–1.0 mm; glabrous	ovate to triangular; 2.5–3.0 × 1.5–2.0 mm; glabrous
Sepals	ovate; 2.0–2.5 × 1.0–1.5 mm	ovate to elliptic; 1.3–2.2 × 0.9–1.1 mm	ovate to widely ovate; 1.3–2.3 × 0.9–1.8 mm	elliptic; 2.0–2.2 × 1.3–1.5 mm
Petals	elliptic; 2.0–2.5 × 1.5–2.0 mm	broadly ovate to oblong; 2.6–3.5 × 1.6–2.4 mm	ovate to oblong-ovate; 3–4 × 1.9–2.6 mm	elliptic; 2.0–2.5 × 1.5–2.0 mm
Pistillate plants (♀)				
Inflorescences	once to twice branched	once branched	once branched	once branched
Peduncle	7–10 mm in diam.; glabrous	4.5–6.0 mm in diam.; lepidote	3.0–5.5 mm in diam.; glabrous	5–7 mm in diam.; glabrous
Primary branches number	20–25	ca 20	12–40	7–12
Primary branches length (cm)	15–28	1–6	2–8.5	1–2.5
Floral bracts	triangular; 2–3 × 1.5–2.0 mm; glabrous	narrowly ovate to triangular; 1.6–4.5 × 1–2 mm; lepidote	ovate to ovate-triangular; 1–2 × 0.7–0.8; glabrous	ovate to broadly ovate; 3–4 × 2–3 mm; glabrous
Sepals	ovate; 2.0–2.5 × 1.5–2.0 mm; glabrous	widely ovate to triangular; 2.9–3.3 × 1.3–1.6 mm; glabrous to lepidote	ovate; 1.3–1.7 × 1.3–2.2 mm; glabrous	ovate; 2.5–3.0 × 1.5–2.0 mm; glabrous
Petals	triangular; 3.0–3.5 × 1.8–2.5 mm	elliptic to oblong; 2.6–3.5 × 1.5–2.2 mm	triangular; 3.0–3.8 × 2.0–2.5 mm	oblong; 3.0–3.5 × 1.0–1.5 mm
Ovary (mm)	2.0–2.5 × 1.0–1.5	4.5–5.1 × 3.4–3.6	ca 3.5 × 3.5	1–2 × 1.0–1.8
Fruit (mm)	5–7 × 3–4	6.5–8.0 × 3.5–5.0	5.5–10.0 × 5–6	8–9 × 4.5–5.0

Additional specimen examined (paratypes)
Mexico, Oaxaca: distrito Coixtlahuaca, municipio de Concepción Buenavista, paraje Calle de Piedra, 17°56′20″N, 97°26′27″W, 2230 m a.s.l., 14 July 2022, C. Martorell et al. X1116♂/♀ (UAMIZ); distrito Huajuapan, municipio de Santiago Miltepec, carretera federal (125) que va de Huajuapan de León a Tehuacán, entre los poblados de Santiago Miltepec y Asunción Cuyotepeji, 17°57′56.8″N, 97°40′45.7″W, 1817 m a.s.l., 16 Aug. 2024, R. Hernández-Cárdenas and S. Lara-Godínez 3003♂ (XAL); carretera federal (125) que va de Huajuapan de León a Tehuacán, entre los poblados de Santiago Miltepec y Asunción Cuyotepeji (17°57′57.3″N, 97°40′45.6″W), 1812 m a.s.l., 10 Nov. 2024, R. Hernández-Cárdenas and S. Lara-Godínez 3200♀ (UAMIZ, XAL).

Acknowledgements – To the curators of CHIP, CIIDIR, FCME, GH, IBUG, IEB, MEXU, MO, OAX, UAMIZ, and XAL, for allowing us access to their collections. To María Teresa Jiménez Segura for the illustration for Fig. 3. To Carlos Aldair Zárate Pérez for keeping the plants alive in the Francisco Javier Clavijero Botanical Garden. To Israel Acosta Rosado for the photographs of the herbarium specimens. We thank the editorial board for the comments and the anonymous reviewers for their observations and suggestions that greatly improved the manuscript.
Funding – The authors received no specific funding for this work.
Conflict of interest – The authors declare no conflict of interest.

Author contributions

Rodrigo Alejandro Hernández-Cárdenas: Conceptualization (lead); Data curation (equal); Investigation (equal); Methodology (equal); Resources (lead); Writing – original draft (equal); Writing – review and editing (equal). **Adolfo Espejo-Serna**: Data curation (equal); Investigation (equal); Methodology (equal); Writing – original draft (equal); Writing – review and editing (equal). **Ana Rosa López-Ferrari**: Data curation (equal); Investigation (equal); Methodology (equal); Writing – original draft (equal); Writing – review and editing (equal). **Sofía Ana Lucrecia Lara-Godínez**: Data curation (equal); Investigation (equal); Methodology (equal); Writing – original draft (equal). **Andrew Siekkinen**: Data curation (equal); Investigation (equal); Methodology (equal).

Data availability statement
This article has no additional data.

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Appendix 1. Specimens examined

Hechtia aquamarina I.Ramírez & C.F.Jiménez. OAXACA: A.R. López-Ferrari et al. 1826♂ (IEB, MEXU, UAMIZ), 1827♀ (UAMIZ); R. Medina et al. 4688♀ (MEXU), 4689♂ (MEXU); I. Ramírez & G. Carnevali 1528a♂ (OAX); A. Salinas & J. Sánchez-Ken 5722♂ (MEXU); O. Tellez et al. 15685♂ (MEXU); 15700♀ (FCME), 17442♀ (FCME). ***Hechtia caudata*** L.B.Sm. OAXACA: A. Espejo et al. 7145♂ (UAMIZ), 7147♀ (UAMIZ); L. Torres & E. Martínez 11276♀ (MEXU); L. Torres et al. 326♀/♂ (MEXU), 388♂ (MEXU); A. Saynes 3289♀ (XAL). ***Hechtia caulescens*** López-Ferr., Espejo & Mart.-Correa. OAXACA: A.R. López-Ferrari et al. 3131♀ (UAMIZ); N. Martínez et al. 65♀ (UAMIZ); 66♂ (UAMIZ). ***Hechtia colossa*** Mart.-Correa, Espejo & López-Ferr. OAXACA: A. Espejo et al. 6871♀ (UAMIZ), 6872♂ (UAMIZ). ***Hechtia complanata*** Burt-Utley. OAXACA: E. Smith & S. Kitchen 4835♀ (MEXU). ***Hechtia confusa*** L.B.Sm. OAXACA: A. Salinas 7659♀ (MEXU). ***Hechtia conzattiana*** L.B.Sm. OAXACA: C. Conzatti & C. Gómez 3501♂ (GH). ***Hechtia flexilifolia*** I.Ramírez & Carnevali. OAXACA: I. Ramírez & G. Carnevali 2217♂ (XAL). ***Hechtia fosteriana*** L.B.Sm. OAXACA: A. Campos & R. Torres 3554♂ (MEXU), 3555♀ (MEXU); J. Castrejón et al. 542♂ (MEXU); J. Rivera et al. 558♂ (MEXU); S. Salas & J. Castrejón 2566♂ (MEXU). ***Hechtia fragilis*** Burt-Utley & Utley. OAXACA: A. Espejo et al. 7376♂ (UAMIZ); 7377♀ (IEB, UAMIZ); A. García-Mendoza et al. 7379♀ (MEXU); R. Medina et al. 1036♀ (MEXU); F. Medrano et al. 1109♂ (MEXU); A. Salinas & E. Martínez-Correa 7122♀ (MEXU, MO), 7402♀ (MEXU), 8082♀ (MEXU), 8112♀ (MEXU); C. Smith et al. 3705♂ (MEXU); J. Utley & K. Utley 8773♀ (MO), 8918♀/♂ (MO). ***Hechtia galeottii*** Mez. OAXACA: J. Calónico Soto et al. 23938♂ (MEXU); C. Conzatti 1167♀ (MEXU), 1811♀ (MEXU), 1999♀ (MEXU); C. Cruz-Espinosa & E. San Pedro 881♂ (IEB, MEXU), 882♀ (IEB, MEXU), 1012♂ (MEXU), 1055♀ (MEXU, UAMIZ), 1212♀ (MEXU); A. Espejo et al. 5319♀ (IEB, UAMIZ), 6510♂ (UAMIZ), 6511♀ (UAMIZ), 6843♀ (UAMIZ), 7383♀ (UAMIZ); A. García Mendoza & J. Reyes 5151♀ (MEXU); F. González Medrano et al. 1746♀ (MEXU); A. Ibarra et al. 197♀ (MEXU); G. Juárez García et al. 678♀ (MEXU); B. Leuenberger & C. Schiers 2751♀ (MEXU); A. Salinas & E. Petterseen 4707♀ (MEXU); A. Salinas & E. Martínez Correa 6256♀ (MEXU). ***Hechtia gypsophila*** López-Ferr., Espejo & Hern.-Cárdenas. OAXACA: A. Espejo et al. 7564♀ (MEXU, UAMIZ); C. Glass et al. 8418♂ (IEB); S. Zamudio & G. Ocampo 11049♂ (UAMIZ). ***Hechtia huamelulaensis*** I.Ramírez & Carnevali. OAXACA: R. Hernández-Cárdenas & S. Lara-Godínez 2865♂ (XAL); I. Ramírez & G. Carnevali 1675b♀ (MEXU), 1882♀ (MEXU). ***Hechtia isthmusiana*** Burt-Utley. OAXACA: P. Carrillo-Reyes & D. Cabrera-Toledo 6592-B♀ (IBUG); C. Gallardo Hernández 1489♂ (MEXU), 1490♀ (MEXU); J. Meave del Castillo & E. Pérez García 1766♀ (MEXU); E. Pérez García 928♂ (MEXU), 1387♂ (MEXU); F. Sánchez et al. 708♂ (MEXU), 1303♂ (MEXU); A. Saynes et al. 3289♀ (MEXU). ***Hechtia ixtlanensis*** Burt-Utley. OAXACA: S. Figueroa Brito & Y. Guzmán Rivera 201♀ (UAMIZ), 533♂ (UAMIZ), 533bis♀ (UAMIZ); A. García Mendoza et al. 1769♀ (MEXU); A. García Mendoza & F. Torres 1963♀ (MEXU); S. Martínez et al. s.n.♂ (MEXU); I. Ramírez et al. 1400♀ (MEXU). ***Hechtia lanata*** L.B.Sm. OAXACA: J. Ceja et al. 1928♀ (IEB, XAL), 1929♂ (UAMIZ), 1932♀ (IEB, UAMIZ), 1933♂ (UAMIZ); R. Ehlers 060605♀ (UAMIZ), 070510♀ (UAMIZ). ***Hechtia lyman-smithii*** Burt-Utley & Utley. OAXACA: A. Espejo et al. 6514♀ (UAMIZ), 7089♀ (UAMIZ), 7156♀ (IEB, UAMIZ), 7157♂ (IEB, UAMIZ), 7370♂ (IEB, UAMIZ), 7371♀ (UAMIZ); R. García Mendoza 1245♂ (OAX); A. García et al. 3467♀ (MEXU); I. Ramírez 1038♀ (MEXU); I. Ramírez & G. Carnevali 1634♀ (OAX), 1668♀ (OAX); A. Salinas 7712♂ (MEXU); A. Salinas 4190 et al.♀ (MEXU); A. Siekkinen & R. Hernández-Cárdenas 1633♀ (UAMIZ); J. Utley & K. Utley 6982♀ (MEXU). ***Hechtia marnier-lapostollei*** L.B.Sm. OAXACA: N. Martínez-Correa et al. 123♀ (UAMIZ), 125♂ (UAMIZ), 129♀ (UAMIZ), 130♂ (UAMIZ); E. Matuda 38429♀ (MEXU); A. Nava Zafra et al. 1856♀ (MEXU); R. Torres et al. 9859♀ (MEXU); S. Zamudio 6356♀ (IEB). ***Hechtia minuta*** Hern.-Cárdenas, Espejo & López-Ferr. OAXACA: J. Calzada 19879♂ (MEXU), 22581♀ (MEXU); R. Hernández-Cárdenas & A. Hernández-Rábago 2145♂ (UAMIZ); R. Hernández-Cárdenas et al. 2155♂ (MEXU, UAMIZ), 2155bis♀ (UAMIZ). ***Hechtia nivea*** I.Ramírez & Carnevali. OAXACA: I. Ramírez et al. 1826a♂ (MEXU), 1826b♀ (MEXU), 1826c♀ (MEXU). ***Hechtia nuusaviorum*** Espejo & López.-Ferr. OAXACA: Benz et al. 679♀ (MEXU); J. Ceja et al. 1751♀ (UAMIZ); A. García Mendoza et al. 6841♀ (IEB, MEXU), 6843♂ (IEB, MEXU). ***Hechtia oaxacana*** Burt-Utley, Utley & García-Mend. OAXACA: A. Espejo et al. 6850♀ (CIIDIR, UAMIZ), 7571♂ (UAMIZ), 7573♂ (UAMIZ), 7574♂ (UAMIZ), 7577♀ (UAMIZ); A. García-Mendoza et al. 9197♀ (MEXU), 9780♀ (MEXU); S. Rangel-Landa 1524♀ (MEXU); J. Utley & K. Utley 7951♀ (XAL). ***Hechtia pringlei*** B.L.Rob. & Greenm. OAXACA: A. Campos 1986♂ (MEXU); A. Cruz Espinosa 2918♀ (MEXU); A. Espejo et al. 6752♀ (IEB, UAMIZ), 6753♂ (UAMIZ), 6765♀ (UAMIZ), 7607♀ (UAMIZ, XAL); A. García-Mendoza et al. 2867♀ (MEXU); H. Hernández 479♀ (UAMIZ); E. Huun 1435♀ (MEXU); I. López 211♂ (MEXU); V. Mateos 26♀ (MEXU). ***Hechtia rosea*** É.Morren ex Baker. OAXACA: C. Beutelspacher 1993♀ (UAMIZ); J. Ceja et al. 1381♀ (UAMIZ); O. Dorado et al. 1640♂ (MEXU); G. Flores-Franco & J. I. Calzada 3614♀ (MEXU); C. Gallardo Hernández 1632♀ (MEXU), 1633♂ (MEXU), 1634♀ (MEXU), 1964♀ (MEXU), 1988♀ (MEXU); A. García-Mendoza 1357♀ (MEXU), 10369♂ (MEXU); C. Heredia-Ortiz & B. Rendón-Aguilar 234♂ (XAL); B. Leuenberger & C. Schiers 2537♂ (MEXU); D. López 629♂ (MEXU), 860♂ (UAMIZ); A. R. López-Ferrari et al. 458♀ (UAMIZ); D. Lorence & R. Cedillo 3005B♂ (MEXU); E. Lott et al. 5781♂ (FCME, MEXU, XAL), 5783♀ (MEXU); C. Martínez 286♂ (MEXU), 1112♂ (MEXU), 1140♂ (MEXU); N. Martínez Correa et al. 114♀ (UAMIZ), 118♂ (UAMIZ); J. Meave del Castillo & E. Pérez-García 1906♂

(MEXU); S. Molina Bende 1053♂ (UAMIZ); E. Pérez-García 1382♀ (MEXU); I. Ramírez & G. Carnevali 1860♂ (CHIP); A. Reyes García et al. 6136♀ (UAMIZ), 6177♀ (MEXU); S. Salas 837♂ (UAMIZ), 4680♂ (MEXU, UAMIZ); S. Salas et al. 2064♀ (MEXU); F. Sánchez & A. Reyes 383♀ (MEXU); F. Sánchez et al. 219♂ (MEXU), 1302♂ (MEXU); A. Sánchez Martínez & J. Lucas 3324♂ (UAMIZ); A. Sánchez Martínez & F. Maldonado 3019♂ (UAMIZ); A. Sánchez Martínez et al. 1980♂ (MEXU), 2049♂ (MEXU); I. Saynes & A. Sánchez 3591♀ (IEB); A. Saynes et al. 3067♀ (UAMIZ), 3331♂ (MEXU); L. Torres et al. 650♂ (MEXU); R. Torres 4238♀ (FCME); R. Torres & A. Campos 14030♂ (MEXU); R. Torres & C. Martínez 10516♂ (MEXU); R. Torres & P. Tenorio 12922♂ (MEXU); R. Torres et al. 4062♂ (FCME, MEXU), 9769♀ (FCME, MEXU). ***Hechtia roseana*** L.B.Sm. OAXACA: J. I. Calzada 5395♀ (XAL); M. Castañeda-Zárate 615♀ (MEXU); E. Cerón 28♀ (UAMIZ); A. Espejo et al. 7158♀ (IEB, UAMIZ), 7159♂ (IEB, MEXU, UAMIZ); F. González Medrano 1300♀ (MEXU); E. Guízar 2320♀ (UAMIZ); N. Martínez Correa et al. 28♀ (IEB, UAMIZ); A. Ramírez Laguna 886♂ (MEXU); C. Smith et al. 4026♂ (MEXU). ***Hechtia rubicunda*** López-Ferr. & Espejo. OAXACA: N. Martínez et al. 115♂ (IEB, MEXU, UAMIZ) 116♀ (IEB, UAMIZ); A. Salinas & E. Martínez-Correa 8176♀ (IEB, MEXU); P. Tenorio L. 18866♀ (MEXU). ***Hechtia tehuacana*** B.L.Rob. OAXACA: D. Lorence & A. García-Mendoza 4808♂ (MEXU); N. Martínez et al. 87♂ (IEB, UAMIZ), 88♀ (UAMIZ); A. García-Mendoza et al. 3466♀ (MEXU); A. Salinas Tovar et al. 6426♂ (MEXU); R. Torres & A. García-Mendoza 6679♂ (MEXU); A. Valiente et al. 389♀ (MEXU).