



## Novelties in *Pitcairnia* (Bromeliaceae; Pitcairnioideae): three new species from Mexico

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### Abstract

Three new species of *Pitcairnia* from Mexico are proposed: *P. aleserratoae* was found in Guerrero, Morelos, and Puebla; *P. gracietae* known from the Estado de Mexico and Morelos while *P. pugana* has been collected in Jalisco. Information on distribution, habitat and phenology is provided for each species. The new taxa are compared with *P. jaliscana*, *P. karwinskyana*, *P. micheliana*, *P. palmeri*, and *P. pteropoda*, species morphologically similar.

**Key words:** endemic, Monocots, Sierra de Huautla, Sierra de Mazamitla

### Resumen

Se proponen tres nuevas especies de *Pitcairnia* de México: *P. aleserratoae* localizada en Guerrero, Morelos y Puebla; *P. gracietae* conocida del Estado de México y Morelos; mientras que *P. pugana* se ha colectado en Jalisco. Para cada especie se proporciona información sobre la distribución, hábitat y fenología. Los nuevos taxa se comparan con *P. jaliscana*, *P. karwinskyana*, *P. micheliana*, *P. palmeri* y *P. pteropoda*, especies morfológicamente similares.

**Palabras clave:** endémicas, Monocotiledóneas, Sierra de Huautla, Sierra de Mazamitla

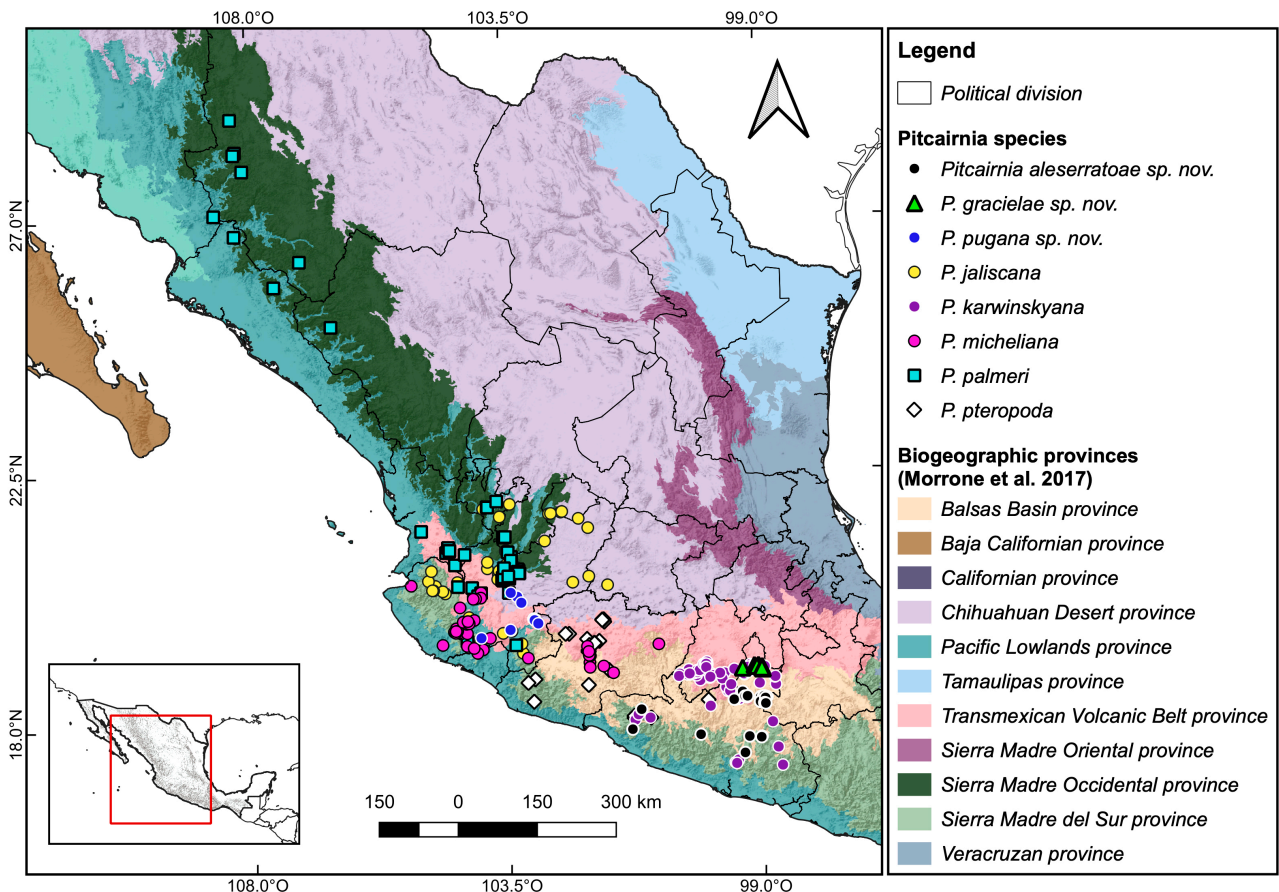
### Introduction

*Pitcairnia* L'Hér. (1789: 5; 1790: t.11) including *Pepinia* Brongn. ex André (1870: 32, t.5) (Pereira Saraiva *et al.* 2015) is one of the genera with the highest number of species of the Bromeliaceae, ranking second after *Tillandsia* L. (1753: 286). Among the Pitcairnioideae, it is the richest and most widely distributed genus, including ca. 412 species (Pereira-Saraiva *et al.* 2015, Gouda *et al.* 2023 continuously updated), a number that continues to increase due to the recent discovery of new taxa (Espejo-Serna & López-Ferrari 2018, Flores-Argüelles *et al.* 2017, Beutelspacher & García-Martínez 2019, Mejía-Marín *et al.* 2020, Flores-Argüelles *et al.* 2022).

*Pitcairnia* species are distributed from Mexico to northern Argentina in South America, with *P. feliciana* (A. Chev.) Harms & Mildbraed (1938: 118), disjunct in West Africa (Smith & Till 1998, Porembski & Barthlott 1999, Benzing 2000). Most representatives of the genus are terrestrial or saxicolous plants, preferring shady places and humid or warm climates (Benzing 2000), although there are also epiphytic and even some subaquatic species (Smith & Till 1998, Espejo & López-Ferrari 2013).

In Mexico, 54 species are recorded of which 47 (87%) are endemic to the country (Espejo-Serna & López-Ferrari 2018, Beutelspacher & García-Martínez 2019, Mejía-Marín *et al.* 2020, Flores-Argüelles *et al.* 2022) and they grow preferably in tropical forests, coniferous forests, *Quercus* forests, cloud forests, and xerophilous scrubs (*sensu* Rzedowski 1978).

As part of the comprehensive review of herbarium specimens carried out during the doctoral project of the first author (González-Rocha 2023), several specimens of the genus that could not be assigned to any of the known species were detected. We proceeded to collect living and complete material in the populations from which they came and to carry out a detailed review of the protologues and nomenclatural types of the morphologically similar taxa, which allowed us to confirm that these are novelties for the science that we propose here.



**FIGURE 1.** A) Combined distribution map for the species *Pitcairnia aleserratoae*, *P. graciela*, *P. pugana*, *P. jaliscana*, *P. karwinskyana*, *P. micheliana*, *P. palmeri*, and *P. pteropoda*.

## Material and methods

Plants were collected in 2012, 2013, 2015, and 2017 in populations of Sierra de Mazamitla, in the state of Jalisco and in Sierra de Tepoztlán and Sierra de Huautla, in the state of Morelos (Fig. 1). The gathering of the specimens was carried out in accordance with Lot and Chiang (1986). Measurements and descriptions were made from fresh material and herbarium specimens. The morphological terms used in the descriptions are those proposed by Radford *et al.* (1974) and Scharf and Gouda (2008). The holotypes were deposited at Herbario Metropolitano Ramón Riba y Nava Esparza, Universidad Autónoma Metropolitana Iztapalapa (UAMIZ) and the isotypes were deposited at Herbario Luz María Villarreal de Puga, Universidad de Guadalajara (IBUG) and Herbario Nacional, Universidad Nacional Autónoma de México (MEXU). We revised herbarium material of the genus *Pitcairnia* (approximately 1173 sheets) housed at BM, BR, CHAP, CHAPA, CIIDIR, CODAGEM, CORU, ENCB, FCME, G, GH, HUAA, HUMO, IBUG, IEB, INEGI, K, LL, MEXU, MICH, MO, NDG, NY, P, TEX, UAMIZ, UC, US, XAL, YU, and ZEA (acronyms according to Thiers 2021). To ensure the status of the proposed new species, we revised the protologues, living specimens, herbarium specimens, and type material of the taxa with major morphological similarities: *Pitcairnia karwinskyana* Schult. &

Schult.f. (1830: 1239), *P. palmeri* S. Watson (1887: 456), *P. jaliscana* S. Watson (1887: 456), *P. micheliana* André (1901: 576, t. s.n.), *P. pteropoda* L.B. Sm. (1937: 26) and also images obtained from the JSTOR Global Plants database (JSTOR 2023 continuously updated) (Appendix 1) (Fig. 2). The distribution map of the species was elaborated with the open source geographic information system QGIS (2021), using the data obtained from the herbarium specimen labels and collected plants. In addition, data on the vegetation type (*sensu* Rzedowski 1978), in which the species grow, its distribution at the state level and by biogeographic provinces (*sensu* Morrone *et al.* 2017) (Fig. 1), elevation and phenology are included.

## Taxonomy

*Pitcairnia aleserratoae* Gonz.-Rocha, López-Ferr. et Espejo, *sp. nov.* (Figs. 1, 3)

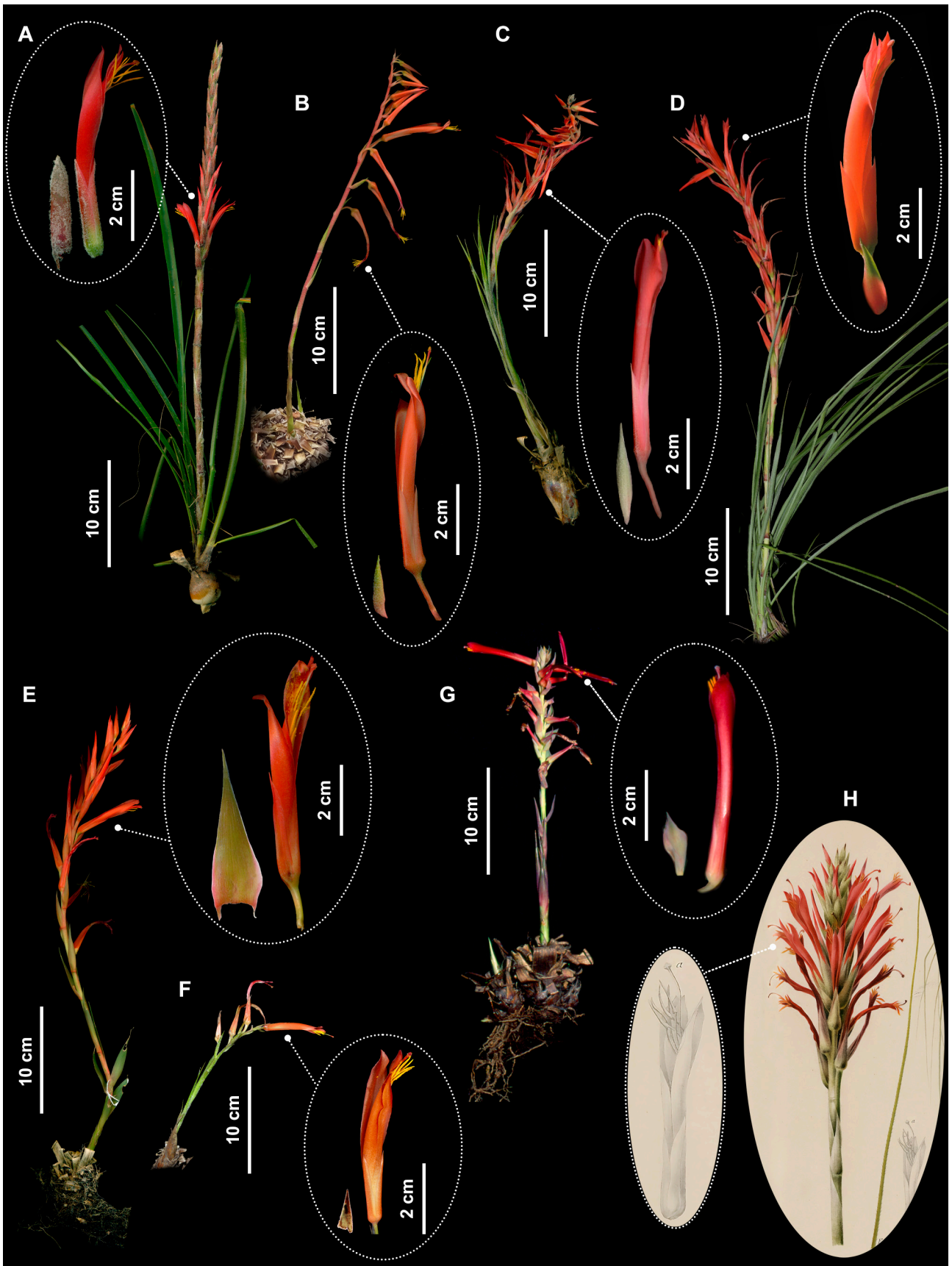
**Type:**—MEXICO, Morelos: municipality of Puente de Ixtla, 3.7 km sobre la brecha Tilzapotla-El Salto, a partir de la carretera Tilzapotla-Coaxitlán, 18°28'0" N, 99°16'37" W, 1600 m, 10 November 2012, *E. González-Rocha, A. Espejo & A.R. López-Ferrari 191* (holotype UAMIZ!, isotypes IBUG!, MEXU!).

**Diagnosis:**—*Pitcairnia aleserratoae* is similar to *P. micheliana* but differs in the size of the spikes (16–27 cm vs. 12.5–25 cm long), in the indument of the abaxial surface of the peduncle and the sepals (densely white-lepidote vs. sparsely white-lepidote), as well as the shape of the petals (oblanceolate vs. narrowly elliptic to very narrowly oblong).

**Description:**—*Plant* saxicolous, caespitose, 22–55 cm high in flower. *Roots* fibrous. *Stem* bulbous, 2.6–4.8 cm long, 2.5–4.8 cm diameter; *stolons* present, terete, ca. 1 cm long, ca. 5 mm in diameter. *Leaves* not petiolate; *sheath* dark brown abaxially, light brown adaxially, widely depressed-ovate, 1.4–4.5 cm long, 1.3–3.5 cm wide, spiny-toothed on the margins distally; *leaf blades* of three different kinds: the first and main ones foliaceous, green, linear, 37–86 cm long, 6–11 mm wide, entire except the persisting base, conspicuously nerved, glabrous adaxially, densely white-lepidote abaxially, present during flowering season, deciduous by a transverse line of abscission well above the sheath, and the persistent portion densely white-lepidote on both sides and with retrorse spiny-teeth ca. 1.5 mm long on the margins; the second ones without blade and much reduced, sheath like, 6–9 cm long, 0.8–2 cm wide, lanceolate to narrowly triangular, entire, acuminate; the third ones non-photosynthetic, with a stiff persistent brown linear blade of 1.5–5 cm long, ca. 1.5 mm wide, densely white-lepidote on both sides, with retrorse spiny-teeth ca. 1.5 mm long on the margins. *Inflorescence* terminal, simple, spicate, erect; *peduncle* green, 11–31 cm long, 2.5–5.5 mm diameter, densely white-lepidote; *peduncle bracts* green, sometimes brownish towards the basal portion, ovate-lanceolate to lanceolate, 2.5–8.5 cm long, 6–16 mm wide, entire, glabrous adaxially, densely white-lepidote abaxially, decreasing in size distally; *the basal ones* acuminate, sometimes extending into a needle-like blade of 1–2 cm long, ca. 1 mm wide, with a spiny toothed margin, just exceeding the internodes; *the distal ones* exceeding the internodes; *spike* 16–27 cm long, with 19–34 flowers densely arranged along the rachis, polystichous; *rachis* densely white-lepidote, internodes up to 1.9 cm long; *floral bracts* reddish brown, triangular-ovate, 2.2–3.5 cm long, 8–15 mm wide, entire, narrowly sub-acuminate, glabrous adaxially, densely white-lepidote abaxially, imbricate, usually shorter than sepals, sometimes slightly longer specially in the basal ones, decreasing in size distally; *flowers* erect, appressed to ascendent to the rachis at anthesis, sessile, slightly zygomorphic; *sepals* pinkish red at the apex, greenish towards the base, lanceolate, 1.9–2.7 cm long, 4–5 mm wide, acuminate, glabrous adaxially, densely white-lepidote abaxially, the two adaxial ones carinate; *petals* red, oblanceolate, 4.6–6 cm long, 7–10 mm wide, rounded then broadly subacute, or occasionally slightly emarginate, turning to one side forming a cap over the stamens, short unguiculate, the claw 5–7 mm long, cream colored, without a nectary scale at the base; *stamens* 4.8–5.6 cm long, of about equal length, equal to or shorter than petals; *filaments* white, linear, 4–4.7 cm long; *anthers* yellow, linear, 8–10 mm long, basifixed; *pistil* exceeding the stamens; *ovary* 6–7 mm long, 2–4 mm diameter, ovoid; *style* linear, white, 5–5.3 cm long; *stigma* of the spiral conduplicate type, reddish. *Capsules* dark brown, ovoid, trigonous, 8–12 mm long, 3–6 mm diameter, rostrate; *seeds* light brown, fusiform, without appendages ca. 2 mm long, bicaudate, the caudae filiform, ca. 2 mm long.

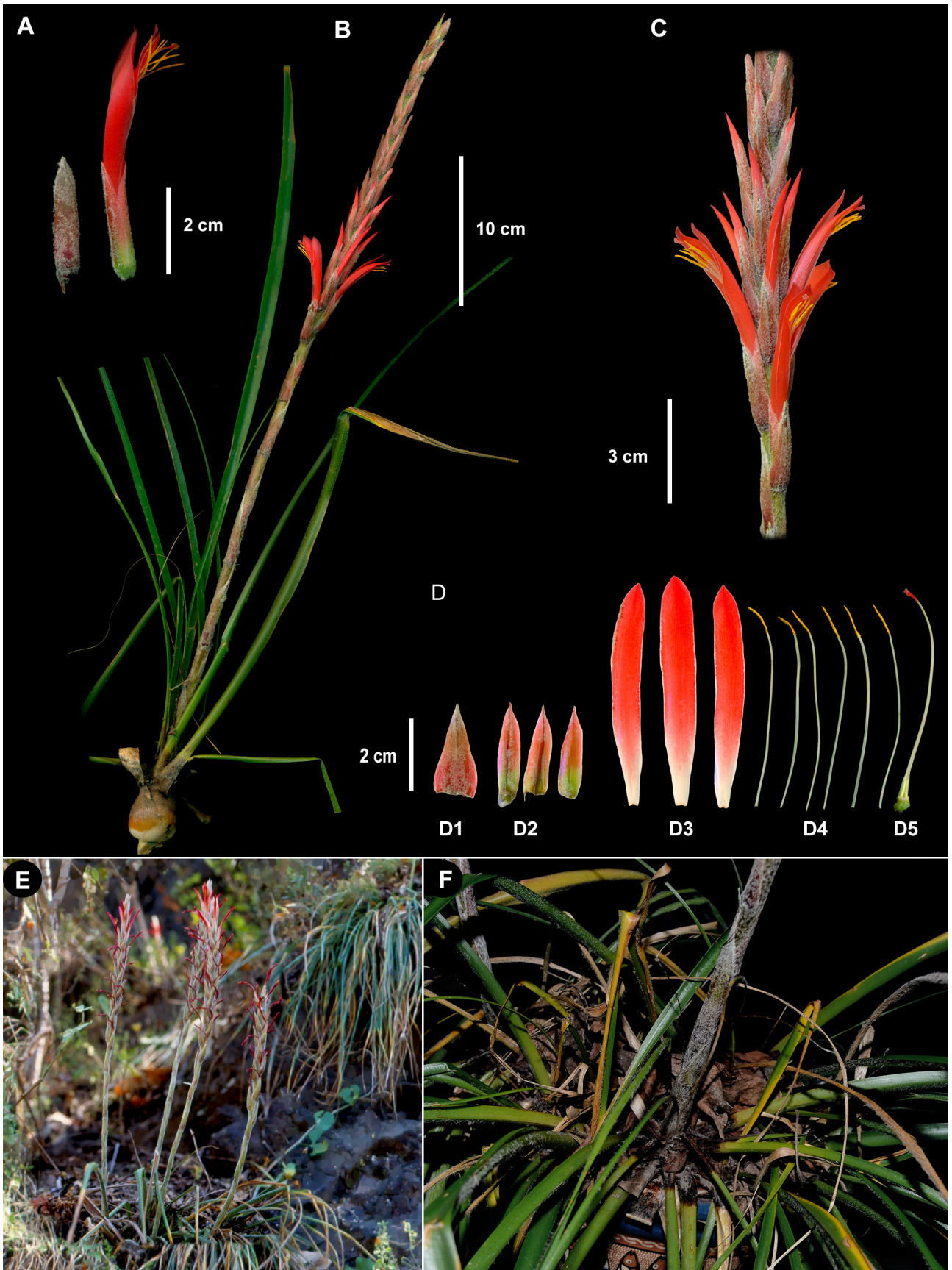
**Distribution, habitat and phenology:**—The species is known from the biogeographic Balsas Basin and Sierra Madre del Sur provinces (Fig. 1), in the states of Guerrero, Morelos and Puebla, where it grows on rocky walls and humid slopes in *Quercus* and tropical deciduous forests, at elevations between 900 and 2000 m. The species flowers from September to December and bears mature fruits in December.





**FIGURE 2.** Comparison of plants and flowers of : A) *Pitcairnia aleserratoae*, B) *P. graciellae*, C) *P. pugana*, D) *P. jaliscana*, E) *P. karwinskyana*, F) *P. palmeri*, G) *P. pteropoda*, and H) type of *P. micheliana*. Photos: E. González-Rocha (A, B, C, E, F), L.J. Hernández-Barón (plant, D), modified photo Chris Lloyd (flower, D), A. Espejo (G), and inflorescence and flower detail from the figure in the original description of *P. micheliana*, made by J.L. Goffart and J.R. Guillot (H).





**FIGURE 3.** *Pitcairnia aleserratoae*, A) floral bract and flower, lateral view, B) flowering plant, C) inflorescence detail, D) dissected flower: D1 floral bract, D2 sepals, D3 petals, D4 stamens, D5 pistil, E) group of plants in habitat, F) base of a plant, *E. González et al.* 249 *bis* (UAMIZ). Photos: A. Espejo (E), and E. González-Rocha (A–D, F).





**FIGURE 4.** A) Dra. Alejandra Serrato Díaz (1972–2021), B) Dra. Graciela Calderón Díaz Barriga (1931–2022), and C) Professor Luz María Villarreal de Puga (1913–2013). Photos: Yanin Islas Barrios (A), Sergio Zamudio Ruiz (B), and Luz María González Villarreal (C).

**Etymology:**—The specific epithet honors Dra. Alejandra Serrato Díaz (1972–2021) (Fig. 4A), professor who was in charge of Divisional Laboratory of Molecular Biology at the Universidad Autónoma Metropolitana-Iztapalapa. She always supported her students and contributed notably to the first author’s doctoral project, allowing that it was developed and concluded successfully.

**Comments:**—The new species had previously been identified by several authors as *Pitcairnia roseana* L.B. Sm. (1937: 27) (Pulido-Esparza *et al.* 2004, Espejo-Serna & López-Ferrari 2010, González-Rocha *et al.* 2016). However, upon analyzing in detail and comparing the specimens of both taxa, we were able to notice that in the plants of *P. roseana*, distributed in northwestern Mexico (Durango, Jalisco and Nayarit), all the bracts of the peduncle are long foliaceous and equaling or exceeding the peduncle, while in *P. aleserratoae* all the bracts of the peduncle are bractiform and much shorter, and just exceeding the internodes, and the species restricts its distribution to the central-southern region of the country (Guerrero, Morelos and Puebla).

*Pitcairnia aleserratoae* is rather similar to *P. micheliana*; both have inflorescences in spike narrowly cylindrical with sessile flowers, and their phenology is also similar, they flower when photosynthetic leaves are present. However, the two species differ in the size of their inflorescences and in the indument of leaves, as well as in their distribution.

The nomenclatural type of *Pitcairnia micheliana*, was prepared from cultivated plants obtained from seeds collected by Eugène Langlissé in Inguarán, Michoacán. Smith and Downs (1974) mentioned that the figure included in the original description could be considered as the type. Herbarium specimens from sites close to the type locality are scarce in institutional collections (Michoacán: La Huacana, Santa Mónica, Sierra de Inguarán, A.R. López-Ferrari *et al.* 2057, UAMIZ!), and it has been extremely complicated to collect additional material due to the current situation of insecurity in that area. We have decided to consider *P. micheliana* as a valid species, including under this name all the specimens from Michoacán, Jalisco, and Colima that match with the original description and the figure that accompanies it, until we have living material to carry out a more complete analysis.

**Examined specimens (paratypes):**—GUERRERO. **Buenavista de Cuéllar.** Al S de El Salto, del lado del estado de Guerrero, 14 km al SW de Tilzapotla, S. Morales S. 71 (FCME). **Iguala de la Independencia.** Cañón de la Mano, entre los Amates y El Naranjo, 10 km al N de Iguala por el ferrocarril, C. Catalán H. 249 (CHAPA), C. Catalán H. 295 (CHAPA); C. Catalán H. 318 (CHAPA), C. Catalán H., F. Terán & S. Vázquez 371 (CHAPA), C. Catalán H. 482 (CHAPA). **La Unión de Isidoro Montes de Oca.** Distrito de Montes de Oca, Vallecitos, G.B. Hinton 11345 (GH, K, US). **Zirándaro.** El Plátano, 12 km al SE de Guayameo, J.C. Soto N. & G. Silva R. 4421 (ENCB, MEXU, MO). MORELOS. **Amacuzac.** 1.62 km al SE del puente de la presa Rancho Nuevo, en la cañada al W del camino al Zoquitlan, R. Ramírez, M. Bello, A. Sánchez & M. Méndez 4548 (MEXU). **Puente de Ixtla.** 3.7 km sobre la brecha Tilzapotla-El Salto, a partir de la carretera Tilzapotla-Coaxitlán, E. González-Rocha, A. Espejo & A.R. López-Ferrari 191 (UAMIZ); 0.85 km al NE del poblado de El Zapote, camino a Cerro Frío, E. González-Rocha, A. Espejo, A.R. López-Ferrari & I.N. Gómez E. 263 (UAMIZ). **Tepalcingo.** Cerro La Piedra, B. Guerrero C. 1415 (XAL). **Tlaquiltenango.** 0.5 km al SW de Ajuchitlán, A. Valdés 237 (UAMIZ); 1 km sobre el camino a Ajuchitlán a partir del camino a Huautla, A.R. López-Ferrari, A. Espejo, R. Jiménez M. & L. Sánchez S. 2404 (UAMIZ); 1.3 km al S de Huautla, J.C. Juárez-Delgado, R. Cerros, A. Valdez, A. Ramírez & O. Dorado 93 (FCME, HUMO); 1.4 km sobre la brecha a Ajuchitlán, a partir del camino San José de Pala-Huautla, E. González-Rocha, L.J. Hernández B., R. Cerros, A. Espejo & A.R. López-Ferrari 299 (UAMIZ); 1.5 km antes de Huautla, SE de Huautla, A. Valdez T. & R. Cerros 237 (HUMO); 3 km al NW de Huautla, R. Cerros T. 545 (UAMIZ); 5.2 km al SW de Santiopan sobre la carretera a Huautla, R. Ramírez, G. Flores, B. Rojas, A. Rodríguez & A. Sánchez 4738 (MEXU); a 1.25 km al SW de Huautla, R. Cerros T. 487 (HUMO, UAMIZ); Ajuchitlán, 1 km al NW de la cañada de Ajuchitlán, R. Cerros T., A. Valdez, R. Ramírez & E. Leyva 563 (FCME, HUMO, UAMIZ); Ajuchitlán, 1 km al S de Huautla, CR 57 (UAMIZ); Ajuchitlán, cascada El Salto, R. Cerros T., A. Ramírez, G. Ramírez & A. Valdez 772 (HUMO); Xantiopa, 1.5 al N de Xantiopa, BMA 1242 (UAMIZ). PUEBLA. **Jolalpan.** Cañada del Diablo, aproximadamente 2 km al NW del poblado El Salado, G. Flores F. 6117 (FCME, HUMO); cañada Los Limones, a 400 m del poblado El Salado, J.M. Vidaña R. 114 (CHAP).

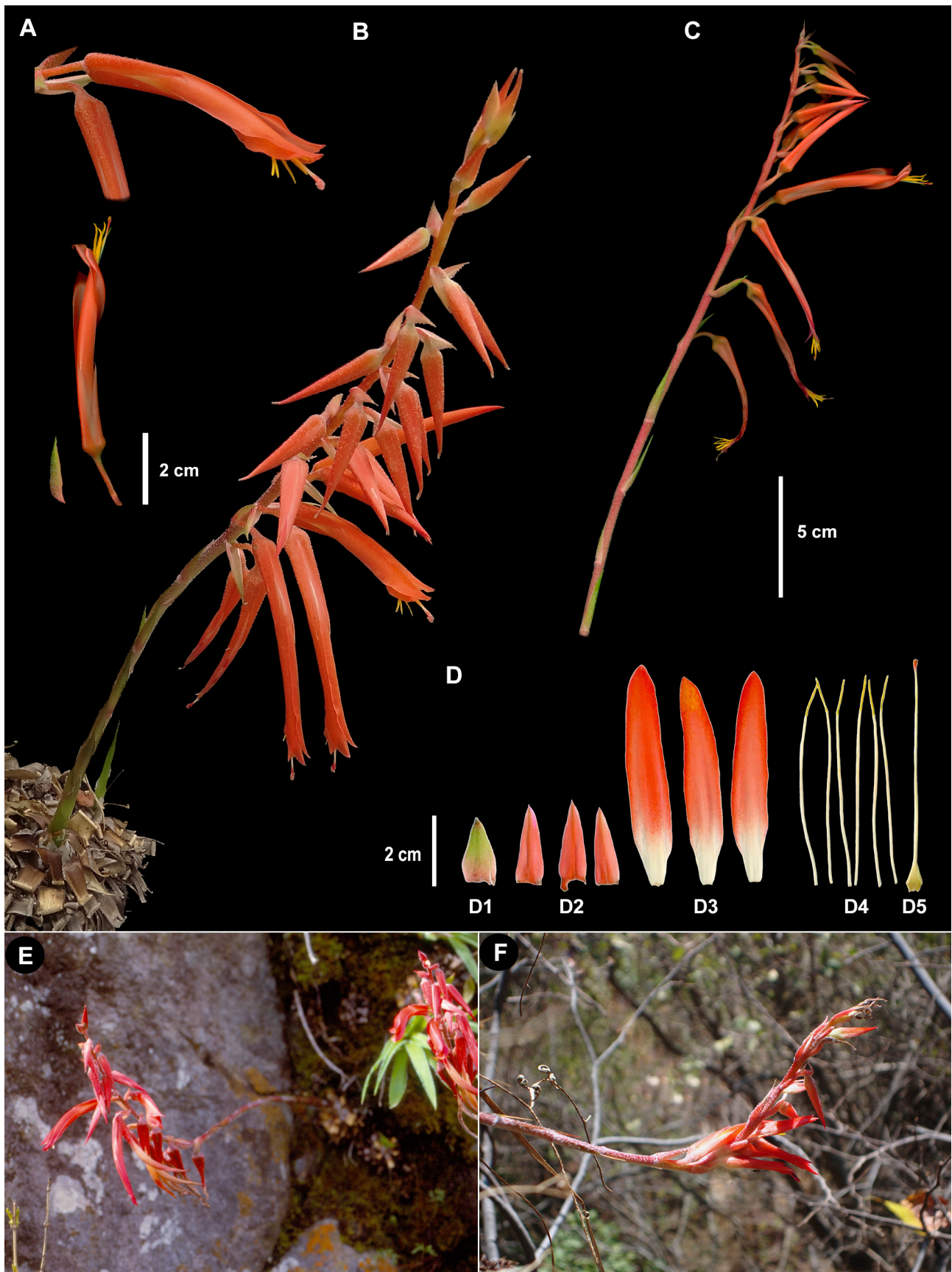
*Pitcairnia graciela* Gonz.-Rocha, López-Ferr. et Espejo, *sp. nov.* (Figs. 1, 5)

**Type:**—MEXICO, Morelos: municipality of Tepoztlán, sendero a la zona arqueológica del Tepozteco 18°59'50.5"N, 99°05'58.4"W, 1890 m, 16 April 2016, E. González-Rocha & F. Bonilla 383 (holotype UAMIZ!; isotypes IBUG!, MEXU!).

**Diagnosis:**—*Pitcairnia graciela* is similar to *P. palmeri* but differs in the indument of the photosynthetic leaves (sparsely white-lepidote on the margins vs. sparsely white-lepidote on abaxial surface), in the shape and size of the floral bracts (ovate, 4–11 mm wide vs. narrowly triangular, 2–5 mm wide), and in the orientation of the flowers at anthesis (secondly spreading to nutant vs. erect to ascending).

**Description:**—*Plant* saxicolous, cespitose, 21–48 cm high in flower. *Roots* fibrous. *Stem* bulbous, 4–9 cm long, 3–7 cm diameter; *stolons* present, terete, 2–3 cm long, 4–5 mm diameter. *Leaves* not petiolate; *sheath* dark brown abaxially, light brown adaxially, oblong, 2.5–4 cm long, 1.8–3 cm wide, entire; *leaf blades* of three different kinds:





**FIGURE 5.** *Pitcairnia gracielae*, A) flowers and floral bract, lateral view, B) flowering plant, *A. Espejo* 7400 (UAMIZ!), C) inflorescence, *E. González-Rocha et al.* 234 (UAMIZ!), D) dissected flower: D1 floral bract, D2 sepals, D3 petals, D4 stamens, D5 pistil, *E. González-Rocha* 91 (UAMIZ!), E) flowering plant in habitat, *A. Espejo* 6089 (UAMIZ!), F) inflorescence in habitat, *E. González-Rocha* 113 (UAMIZ!). Photos: A. Espejo (A, B, E), and E. González-Rocha (C, D, F).

the first and main ones foliaceous, green, linear, 20–40 cm long, 6–10 mm wide, entire, except the persisting base, conspicuously nerved, glabrous on both surfaces except the white-lepidote margins on both sides, not present during flowering season, deciduous by a transverse line of abscission well above the sheath and the persistent portion densely white-lepidote adaxially, sparsely white-lepidote abaxially and with retrorse spiny-teeth ca. 1 mm long on the margins; the second ones reduced and sheath like, papiraceous, 2–6 cm long, 1–1.5 cm wide, lanceolate to narrowly triangular, entire, acuminate, conspicuously nerved, sparsely lepidote adaxially, densely to sparsely white lepidote abaxially; the third ones non-photosynthetic, with a stiff persistent brown linear blade, of 1–8 cm long, ca. 1 mm wide, densely white-lepidote on both sides, with retrorse spiny-teeth of ca. 1 mm long on the margins. *Inflorescence* racemose, often slightly curved; *peduncle* brownish to reddish distally, 13–34 cm long, 2–3 mm diameter, sparsely to densely white-lepidote at the nodes, for most part visible; *peduncle bracts* green, narrowly triangular to ovate-lanceolate, 1.6–11 cm long, 4–12 mm wide, entire, glabrous adaxially, sparsely white-lepidote to glabrescent abaxially, decreasing in size distally; *the basal ones* long-acuminate, just exceeding the internodes; *the distal ones* slightly longer than internodes, sometimes shorter; *raceme* 7–17 cm long, with 9–24 flowers loosely arranged along the rachis, secund; *rachis* nearly fully exposed, sparsely white-lepidote, internodes up to 2.3 cm long; *floral bracts* pale green or tinged reddish, narrowly ovate, 1.3–2.6 cm long, 4–11 mm wide, entire, acuminate, glabrous adaxially, sparsely white-lepidote abaxially, decreasing in size distally, usually shorter than the pedicels or slightly longer; *flowers* secund, spreading to nutant at anthesis or shortly afterward, slightly zygomorphic, pedicellate; *pedicel* slender, divergent to curving at age, 4–23 mm long, sparsely white-lepidote; *sepals* reddish, lanceolate, 2–2.7 cm long, 5–7 mm wide, acuminate, glabrous adaxially, sparsely white-lepidote abaxially, the two adaxial ones carinate; *petals* red to orange-red, very narrowly oblong, 5.3–6.1 cm long, 8–12 mm wide, rounded then obtuse or broadly acutish, turning to one side forming a cap over the stamens, short unguiculate, the claw 5–7 mm long, whitish, without a nectary scale at the base; *stamens* 5.2–6 cm long, shorter than the petals; *filaments* white, linear, 4.3–5 cm long; *anthers* yellow, linear, 8–10 mm long, basifixed. *Capsules* dark brown, ovoid, trigonous, 14–15 mm long, 5–6 mm diameter, rostrate; *seeds* reddish brown, fusiform, without appendages 1.5–2 mm long, bicaudate, the caudae filiform, ca. 1 mm long.

**Distribution, habitat and phenology:**—*P. graciellae* is endemic to the biogeographic Transmexican Volcanic Belt province, in the states of Morelos and Estado de México (Fig. 1), where it grows on rocky walls in coniferous and *Quercus* forests, in relicts of cloud forests, and in tropical deciduous forests, at elevations between 1700 and 2500 m. The species flowers during March to June.

**Etymology:**—The specific epithet honors Dra. Graciela Calderón Díaz Barriga (1931–2022), professor and eminent botanist specialised in various families of angiosperms, whose dedication and constant work contributed significantly to the knowledge of Mexican Flora (Fig. 4B).

**Comments:**—Material of this new taxon had been erroneously identified in herbarium specimens as *Pitcairnia palmeri* var. *longebracteata* (1960: 64) by L.B. Sm. in 1974 due to the presence of long pedicellated secund flowers and floral bracts slightly longer than the pedicels; in *Flora Neotropica*, Smith & Downs (1974) included some specimen of this species in the section of examined specimens for *P. palmeri* var. *longebracteata*, collections from Chihuahua (*H. Leseur* 1258, GH!; *Pennington* 113, US!), Michoacán (*R.M. King & T.S. Soderstrom* 4846, US!), Morelos (*C.G. Pringle* 9181, GH!, US!; *O. Nagel* 8092, GH!), and Nayarit (*R. McVaugh* 16496, MICH!, US!), which have been subsequently revised and identified (McVaugh, 1989) with other names: *P. palmeri* (*H. Leseur* 1258; *Pennington* 113), *P. pteropoda* (*R.M. King & T.S. Soderstrom* 4846), and *P. compostelae* McVaugh (1989: 27) (*R. McVaugh* 16496). However, based on the results of a multivariate analysis González-Rocha *et al.* (2018), concluded that the specimens assigned to *P. palmeri* var. *longebracteata* actually correspond to a different species for which they proposed the name *P. robert-downsii* Gonz.-Rocha, Espejo, López-Ferr. & Cast.-Riv (2018: 224). Although the material from Morelos that these authors included in their analysis was grouped with *P. palmeri*. A detailed comparison of these specimens with the type material of this species, allowed us to observe differences in some characteristics as the indument on the main green leaves, the size of the peduncle, and in the shape and size of the floral bracts. Furthermore, in living plants of *P. palmeri* the flowers are always secund but then ascending, while in *P. graciellae* these are secund spreading to soon nutant.

**Examined specimens (paratypes):**—ESTADO DE MÉXICO. **Ocuilan.** Terracería Ocuilan-Cuernavaca km 10-18, *J. Castañeda* R. 1262 (MEXU). MORELOS. **Tepoztlán.** Cima de los cerros al E de San Juan Tlacotenco, *A. Espejo, A.R. López-Ferrari, J. Ceja & A. Mendoza* R. 6089 (UAMIZ); en el camino de subida a la pirámide del Tepozteco, *A. Espejo & J. Espejo* T. 6945 (UAMIZ); sierra de Tepoztlán, near Cuernavaca, *C.G. Pringle* 9181 (GH, US); ledges of Sierra de Tepoztlán, *C.G. Pringle* 9182 (K); sendero a la zona arqueológica del Tepozteco, *E. González-Rocha & F. Bonilla* 113 (UAMIZ), 114 (UAMIZ), 383 (UAMIZ), *E. González-Rocha & M.G. Hernández* 234 (UAMIZ); cerca del Parque (Sierra de Tepoztlán), *F. Miranda* 177 (MEXU, UAMIZ); Tepoztlán, *M. Martínez* 150 (MO); Near Tepoztlán,

*O. Nagel 8039* (GH); Mts. above Tepoztlán, near “El Parque”, in Tepoztlán, *O. Nagel 8092* (GH); Tepoztlán, *sin colector s. n.* (FCME). **Tlayacapan.** Subida al cerro Las Mariposas, partiendo de San José de los Laureles, *A. Espejo, A.R. López-Ferrari, R. Cerros, A. Flores Morales & R.A. Hernández 7400* (UAMIZ); cerro de las Mariposas, San José de los Laureles, *R. Cerros T. 275* (UAMIZ); barranca Tepecapa, *R. Hernández-Cárdenas, R. Cerros-Tlatilpa & A. Flores-Morales 329* (IEB, UAMIZ); cerro El Sombrerito, al W del poblado [Tlayacapan], *V.A. Pulido E., J. Santana C. & E. Mora G. 50* (UAMIZ); barrancas al N de San José de los Laureles, *V. Sánchez C., A. Espejo, M. Flores C., G. Barroso Ch. & E. Bobadilla 23* (CHAPA, IEB, MEXU, UAMIZ).

***Pitcairnia pugana*** Gonz.–Rocha et P. Carrillo, *sp. nov.* (Figs. 1, 6)

**Type:**—MEXICO, Jalisco: municipality of Mazamitla, cascada Los Cazos, 3.5 km aprox. al SW de Mazamitla, sierra del Tigre, 19°53'35.9"N, 103°02'29.8"W, bosque de *Quercus* alterado, 2100 m, 14 June 2017, *E. González-Rocha & P. Carrillo-Reyes 403* (holotype UAMIZ!, isotypes IBUG!, MEXU!).

**Diagnosis:**—*Pitcairnia pugana* is similar to *P. jaliscana* but differs in the inflorescence direction (curved vs. erect), in the size and indument of the peduncle (16–25 cm long, densely white-lepidote vs. 12–40 cm long, sparsely white-lepidote to glabrescent) and in the size of the peduncle bracts (12–29 cm long, barely surpassing the peduncle vs. 12–57 cm long, much longer than the peduncle).

**Description:**—*Plant* saxicolous, cespitose, 23–54 cm high in flower. *Roots* fibrous. *Stem* bulbous, 3–5.5 cm long, 2–4 cm diameter. *Leaves* not petiolate; *sheath* brown abaxially, light brown adaxially, widely ovate to ovate, 2–4.3 cm long, 1.3–3 cm wide, entire; *leaf blades* of three different kinds: the first and main ones foliaceous, green, linear, 21–40 cm long, 6–10 mm wide, entire except on the persisting base, conspicuously nerved, glabrous adaxially, densely white-lepidote abaxially, not present during flowering season, deciduous by a transverse line of abscission well above the sheath and the persistent portion densely white-lepidote adaxially, sparsely white-lepidote abaxially and with antrorse spiny-teeth ca. 1 mm long on the margins; the second ones reduced and sheath like, papiraceous, 5–6 cm long, 1–1.5 cm wide, lanceolate to narrowly oblong, entire, acuminate, conspicuously nerved, sparsely lepidote adaxially, white lepidote abaxially; the third ones non-photosynthetic, with a stiff persistent brown linear blade, 1.5–4.5 cm long, ca. 1 mm wide, glabrous adaxially, densely white-lepidote abaxially, with retrorse spiny-teeth ca. 1 mm long on the margins. *Inflorescence* racemose, curved; *peduncle* red, 16–25 cm long, 1.5–4 mm diameter, densely white-lepidote, totally covered by the peduncle bracts in the basal portion, partly visible in distal portion; *peduncle bracts* green, lanceolate, entire, acuminate, glabrous adaxially, densely white-lepidote abaxially, *the basal ones* foliaceous, 12–29 cm long, 8–11 mm wide, much exceeding the internodes, almost as long as the peduncle; *the distal ones* green, 2–4.2 cm long, 6–8 mm wide, longer than internodes, nearly completely covering the peduncle; *raceme* 7–22 cm long, with 10–27 flowers loosely to subdensely and polystichous arranged along the rachis, internodes up to 1.8 cm long; *rachis* visible, densely to sparsely white-lepidote, green to reddish; *floral bracts* green with reddish tones towards the base, ovate-lanceolate, 1.5–3.5 cm long, 6–10 mm wide, entire, acuminate, glabrous adaxially, densely white-lepidote abaxially, longer than pedicels, never surpassing the sepals, decreasing in size distally; *flowers* erect to divaricate at anthesis, slightly zygomorphic, pedicellate; *pedicels* slender, erect to divaricate, 3–23 mm long, white-lepidote; *sepals* red, narrowly triangular-ovate, 2–2.7 cm long, 5–7 mm wide, acuminate, glabrous adaxially, sparsely white-lepidote abaxially especially on the keel, the two adaxial ones carinate; *petals* red, very narrowly oblong, 5.4–6.2 cm long, 6–12 mm wide, rounded then obtuse, turning to one side forming a cap over the stamens, short unguiculate, the claw 4–6 mm long, white, without a nectary scale at the base; *stamens* 4.8–5.9 cm long, shorter than petals; *filaments* white, linear, 4–5 cm long; *anthers* yellow, linear, 7–9 mm long, basifixed; *ovary* 7–8 mm long, 3–4 mm diameter, ovoid; *style* 4.5–5.6 cm long. *Capsules* light brown, ovoid, trigonous, 13–15 mm long, ca. 5 mm diameter, rostrate; *seeds* reddish brown, fusiform, without appendages ca. 2 mm long, bicaudate, the caudae filiform, ca. 0.5 mm long.

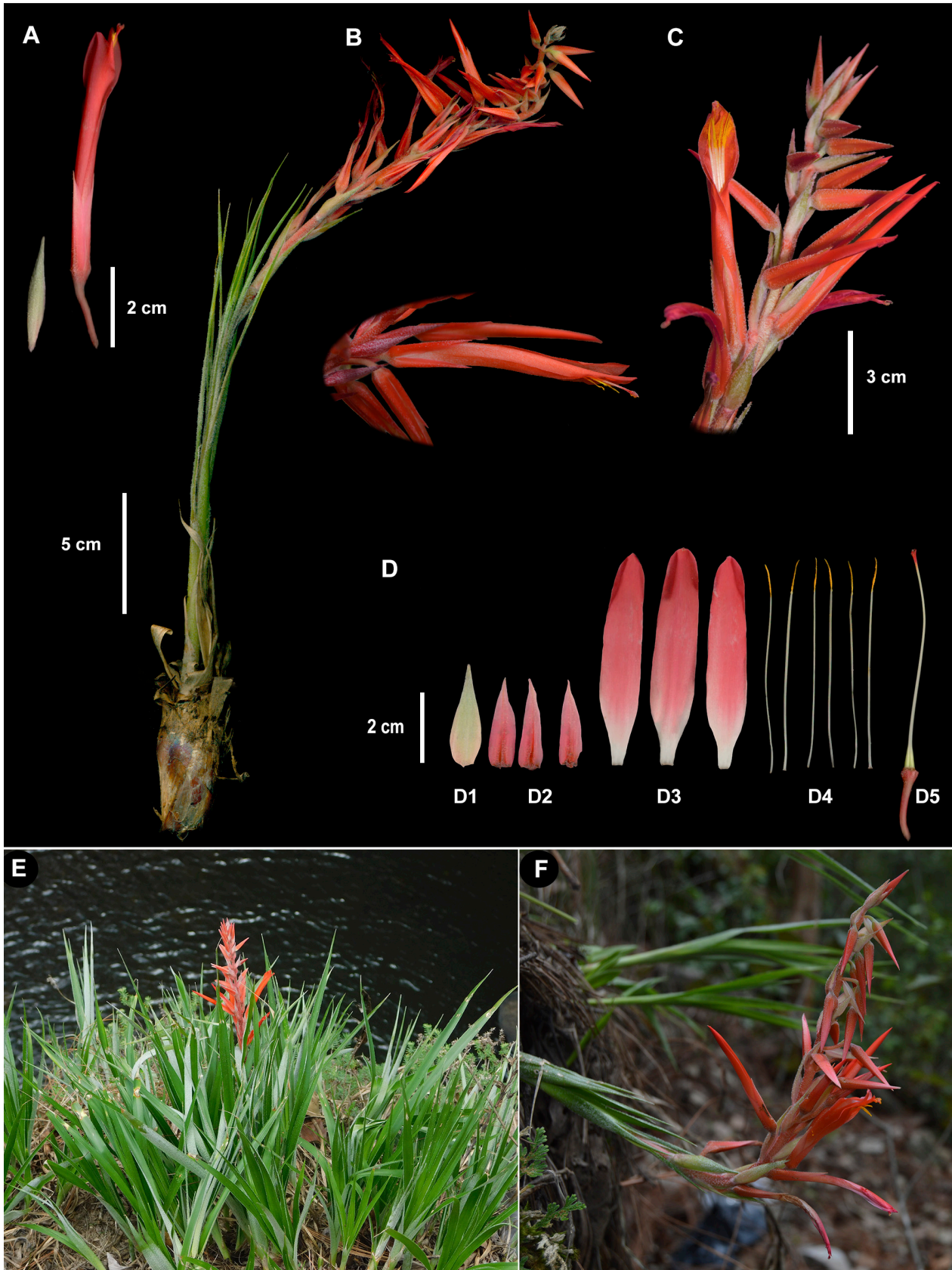
**Habitat, distribution and phenology:**—*Pitcairnia pugana* is known so far only from the state of Jalisco, in the biogeographic Transmexican Volcanic Belt, Sierra Madre del Sur and Chihuahuan Desert provinces (Fig. 1); it grows on rock walls, near streams, in coniferous forests and *Quercus* forests with elements of tropical deciduous forest, at elevations between 1200 and 2200 m. The species flowers during May to June and has immature fruits in August and September.

**Etymology:**—The species honors Luz María Villarreal de Puga (1913–2013) (Fig. 4C), an outstanding professor and dedicated botanist who carried out extraordinary work as a teacher and educator, and promoted studies on the flora and vegetation in the state of Jalisco for many years, and contributed noticeably in expanding the herbarium of Instituto de Botánica de la Universidad de Guadalajara (IBUG).



**TABLE 1.** Morphological differences between *Pitcairnia aleserratoae*, *P. gracielae*, *P. pugana*, *P. jaliscana*, *P. karwinskyana*, *P. micheliana*, *P. palmeri*, and *P. pteropoda*.

Characters	<i>Pitcairnia aleserratoae</i>	<i>Pitcairnia gracielae</i>	<i>Pitcairnia pugana</i>	<i>Pitcairnia jaliscana</i>	<i>Pitcairnia karwinskyana</i>	<i>Pitcairnia micheliana</i>	<i>Pitcairnia palmeri</i>	<i>Pitcairnia pteropoda</i>
Plant length in flower	22–55 cm	21–48 cm	23–54 cm	20–80 cm	25–53 cm	27–56 cm	7–39 cm	20–52 cm
Indument on the main green leaves	glabrous adaxially, densely white-lepidote abaxially	glabrous on both surfaces, except the white-lepidote margins	glabrous adaxially, densely white-lepidote abaxially	glabrous adaxially, densely white-lepidote abaxially	glabrous on both surfaces, except the sparsely white-lepidote margins	glabrous adaxially, densely white-lepidote abaxially	glabrous adaxially, sparsely white-lepidote abaxially	glabrous on both surfaces, except the sparsely white-lepidote margins
Presence/absence of the main leaves during the flowering season	present	missing	missing	missing	missing	present	missing	missing
Inflorescence type and orientation	spike, erect	raceme, curved	raceme, curved	raceme, erect	raceme, erect	spike, erect	raceme, curved	raceme, erect
Peduncle length, and indument	11–31 cm, densely white-lepidote	13–34 cm, sparsely to densely white-lepidote at the internodes	16–25 cm, densely white-lepidote	12–40 cm, sparsely white-lepidote	9–31 cm, sparsely white-lepidote to glabrescent	16–28 cm, sparsely white-lepidote	3–24 cm, densely to sparsely white-lepidote	10–31 cm, glabrescent to glabrous
Basal peduncle bracts	6–8.5 × 0.9–1.6 cm, ovate-lanceolate	4–11 × 0.8–1.2 cm, narrowly triangular	12–29 × 0.8–1.1 cm, linear	12–44(–57) × 0.5–1 cm, linear	4–40 × 1–1.2 cm, linear to lanceolate	5.5–10 × 0.8–1.3 cm, lanceolate	2–9 × 0.3–0.8 cm, lanceolate	3.5–12(–24) × 0.6–1.7 cm, linear-lanceolate
Inflorescence fertile part length	16–27 cm	7–17 cm	7–22 cm	8–40 cm	10–29 cm	12.5–25 cm	2–24 cm	7–26 cm
Arrangement of flowers on the rachis of inflorescence during anthesis	not secund and densely arranged	secund and loosely arranged	not secund and loosely arranged	not secund and loosely arranged	not secund and loosely arranged	not secund and more or less densely arranged	secund and loosely arranged	not secund and loosely disposed
Flowers per inflorescence	19–34	9–24	10–27	7–43	10–30	18–45	3–24	6–52
Floral bracts	22–35 × 8–15 mm, triangular-ovate	13–26 × 4–11 mm, ovate	15–35 × 6–10 mm, ovate-lanceolate	20–50 × 6–14 mm, very widely ovate	22–67 × 10–22 mm, narrowly triangular-ovate	17–33 × 5–7 mm, triangular	10–28 × 2–5 mm, narrowly triangular	16–28 × 8–13 mm, ovate
Position of flowers during anthesis	ascending to appressed	spreading to nutant	erect to divaricate	ascending	ascending	ascending to appressed	erect to ascending	ascending to divaricate
Sepals size	19–27 × 4–5 mm	20–27 × 3–7 mm	20–27 × 5–7 mm	17–30 × 3–6 mm	20–36 × 3–7 mm	23–25 × 3–5 mm	14–25 × 3–4 mm	15–24 × 4–6 mm
Petals	46–60 × 7–10 mm, oblanceolate	53–61 × 8–12 mm, very narrowly oblong	54–62 × 6–12 mm, very narrowly oblong	50–62 × 6–9 mm, very narrowly oblong to very narrowly elliptic lanceolate	45–65 × 9–12 mm, very narrowly oblong to lanceolate	50–56 × 6–8 mm, narrowly elliptic to very narrowly oblong	37–56 × 6–9 mm, lanceolate	51–53 × 7–9 mm, very narrowly oblong
Distribution	Guerrero, Morelos, and Puebla	Morelos, and Estado de México	Jalisco	Aguascalientes, Guanajuato, Jalisco, and Zacatecas	Guerrero, Estado de México, and Morelos	Colima, Jalisco, and Michoacán	Chihuahua, Durango, Jalisco, Nayarit, Sinaloa, and Zacatecas	Guerrero, and Michoacán
Flowering time	September–December	March–June	May–June	July–October	May–August	September–December	May–August	June–August



**FIGURE 6.** *Pitcairnia pugana*, A) floral bract and flower, lateral view, B) flowering plant, C) inflorescence and flowers detail, D) dissected flower: D1 floral bract, D2 sepals, D3 petals, D4 stamens, D5 pistil and flower base, E) plant flowering in habitat, F) inflorescence in habitat, E. González-Rocha & P. Carrillo-Reyes 403, 404 (UAMIZ!). Photos: E. González-Rocha (A, B, D, F), and P. Carrillo-Reyes (C, E).

**Comments:**—Specimens of the new species had previously been identified as *P. karwinskyana*, *P. pteropoda* and/or *P. jaliscana*. However, the detailed analysis of the material allowed us to conclude that it was novelty. The new species here proposed, which is distinguished by the presence of a dense and white indument that covers almost all vegetative and floral structures, a character not present in any of the afore mentioned species (see Table 1).

**Examined specimens (paratypes):**—JALISCO. **Chapala.** Sin localidad, *E.W.D. Holway No. A* (GH). **Jocotepec.** San Juan Cosalá, serranía Tecuán, *L.M. Villarreal de Puga 440* (ENCB); Sierra del Tecuán, San Juan Cosalá, *L.M. Villarreal de Puga 3203* (IBUG). **Mazamitla.** Jardín Encantado, ca de 2.5 km al SW de Mazamitla, *E. González-Rocha & P. Carrillo-Reyes 404* (UAMIZ); a 4 km al sur de Mazamitla, *R. Hernández M. 406* (MEXU); sierra del Tigre, 3 miles south of Mazamitla, *R. McVaugh 13091* (MEXU, MICH, TEX, US). **Quitupan.** Cerro de Quitupan, *J.F. Barragán C. 47* (IBUG); 22 km al E de la Puerta del Zapatero, brecha al Montoso, *J. Villa C. & I. Tejada P. 766* (IEB, IBUG, MICH). **Tlajomulco de Zúñiga.** Cerro Viejo, frente a San Miguel Cuyutlán, *J.A. Machuca N. 5855* (XAL). **Tolimán.** Rancho San Pedro Toxín, *A. Rodríguez C., C. Ramírez S. & H. Arreola 2051* (IBUG). **Zapotlán el Grande.** Barrancas near Zapotlán, *C.G. Pringle 5372* (MEXU).

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## Appendix 1

### *Pitcairnia jaliscana* S. Watson

**ESPECIMENS EXAMINED.** AGUASCALIENTES. **Aguascalientes.** Presa el Ocote, *G. Nieto S. 1* (INEGI); alrededor de antenas del cerro de Los Gallos, *G. González Adame 1045* (HUAA). **Calvillo.** Rancho El Carrizo, Sierra del Laurel, *G. González Adame 926* (HUAA); W de Los Alisos, *M. de la Cerda L. 7120* (HUAA). **Jesús María.** 1 km al NE del Ocote, *G. García R. 2633* (HUAA). GUANAJUATO. **Pénjamo.** 5 km al N de la peña de la Iglesia, *J. I. Guadián Marín 938* (UAMIZ, MEXU). JALISCO. **Ameca.** A 47 km al W de Ameca, *R. Hernández M., E. J. Lott & A. Delgado S. 9040* (MEXU). **Atenguillo.** Volcanes. La Campana, *C. L. Díaz Luna 1384* (ENCB, MEXU). **Ayotlán.** Steep rocky hillsides 3 miles east of Ayo el Chico, *R. McVaugh 17166* (MICH). **Bolaños.** Arroyo La Mulera, 1-3 km al SW de Las Berenjenas, *G. Flores F. & J. Calónico S. 4907* (MEXU, UAMIZ); **Chimaltitán.** km 32 del camino Florencia (Zacatecas)-Chimaltitán, *J. A. Pérez de la Rosa 1593* (IBUG). **Ejutla.** Cima del cerro localizado al SW de Ejutla, junto al cerro el Narigón, carretera Ejutla-El Grullo, *A. Rodríguez C. & A. Castro-Castro 4001* (IBUG). **Encarnación de Díaz.** La Magdalena Vieja, *R. Ramírez D., R. González Tamayo & F. Reyna B. 1716* (IBUG, MEXU). **Guadalajara.** Near Guadalajara, *J. N. Rose & Jos. H. Painter 7464* (US). **Jesús María.** Rocky (rhyolitic) hills ca. 35 km east of Arandas, *R. McVaugh 24351* (MICH, MEXU). **Mascota.** El Coamil, *A. Dávalos M. 13* (IBUG); 30 km después de Mascota, rumbo a Ameca, *J. Ceja, A. Mendoza R., A. Espejo & A. R. López-Ferrari 2082* (UAMIZ); a 6 km después de Mascota, rumbo a Ameca, *A. Espejo & A. R. López-Ferrari 4180* (UAMIZ); precipitous south-facing mountainsides 4 miles north-northeast of Talpa de Allende, *R. McVaugh 20112* (MICH). **San Cristóbal de la Barranca.** La Planilla de arriba, rancho Pericos, aprox. 2.5 km al NW de Las Carboneras y 5.5 km al NE de La Lobera, *P. Carrillo-Reyes & F. Nicolade 4318* (IBUG, UAMIZ); 10 km al N de la desviación de la carretera a Tesistán, antes de llegar al devisadero, *A. Flores Macías, R. González Tamayo & O. Reyna B. 1015* (IBUG, MEXU, XAL); brecha a Los Pueblitos, km 12 aproximadamente, *R. Ornelas U. 793* (IBUG). **San Martín Hidalgo.** Sierra de Quila, Cerro de la Cruz, ladera rocosa SW, *A. Flores Argüelles, L. Hernández L., E. A. Suárez-Muro, M. Leyra L. & R. Sevilla P. 503* (IBUG). **San Sebastián del Oeste.** Camino antiguo a Los Reyes, saliendo de San Sebastián del Oeste, *R. Ramírez D., I. Ortiz & G. González 7688* (IBUG). **Tala.** Arroyo el Taray, bosque escuela La Primavera, *A. Rodríguez C. & J. Reynoso D. 1608* (IBUG); Camino entre el rancho Presitas, bosque escuela La Primavera, *A. Rodríguez C. & O. Vargas P. 2100* (IBUG). **Talpa de Allende.** Precipitous south-facing mountainsides 4 miles north-northeast of Talpa de Allende, *R. McVaugh 20112* (ENCB, US). **Tecalitlán.** ca. 10 km al E de Tecalitlán, sobre la brecha a La Nogalera y Jilotlán, *J. Villa C. & J. Chávez L. 087* (IEB, MICH); 50.7 km al SSE de Cd. Guzmán, carr. Llanitos y brecha Plan de Lego; luego 3 km al E de Puente de Lego por la brecha a Las Ánimas, *M. Fuentes O. 440* (MICH, IEB). **Tecolotlán.** Sierra de Quila, 28 km al NW de Tecolotlán, cascada conocida como el Salto del Venado, *A. Flores Argüelles, L. Hernández L. & E. A. Suárez-Muro 414* (IBUG). **Tenamaxtlán.** Presa del Durazno, al noroeste de Tenamaxtlán, *J. A. Machuca N. 7153* (IBUG). **Tequila.** Steep rocky hills 2 miles northwest of Tequila, *R. McVaugh 18651* (ENCB, MICH, US); cerro de Tequila, *S. López & J. Leos 11* (IBUG). **Totatiche.** 1 km al E de Totatiche, *F. J. Santana M. et al. 1737* (IBUG). **Tuxpan.** Puente San Pedro, 5 miles southwest of Tecalitlán, *R. McVaugh 15453* (MICH). **Unión de Tula.** La Soledad, 5-6 km al W de Unión de Tula, *F. J. Santana M. 7210* (ZEA). **Zapopan.** Barranca de San Lorenzo, 6 km al NW de Tesistán, *G. Nieves H. 507* (IBUG); cerro al N del poblado de La Primavera, *M. Huerta M., J. Metzger & R. Acevedo 169* (ENCB, MEXU, TEX, XAL); arroyo los Guayabos, *Hervey R., Hugo P. & Rodolfo R. 17* (CHAPA); Mesa Colorada, *A. Rodríguez C. & J. Suárez J. 1448* (ENCB, IBUG); cerro el Tepopote o Chiquihuite, subiendo por la falda hacia la carretera Guadalajara–Nogales, *A. Castro-Castro & A. Rodríguez 1849* (IBUG, MEXU); lado E del cerro de Tepopote, *Z. Dellamary 70* (IBUG); km 12-13 carretera Guadalajara-Ixtlahuacán del Río, 1 km al N de la planta tratadora de aguas negras, *A. Rodríguez C., D. Juárez-Martínez & T. Méndez-López 5129* (IBUG, IEB, MEXU); Baños del Padre, sierra de la Venta; 33 km al W de Guadalajara, *L. M. Villarreal de Puga 902* (IBUG); sierra de La Venta, cerro El Tepopote, 20 km al SW, *L. M. Villarreal de Puga 14584* (IBUG); área de Protección de Flora y Fauna La Primavera, cima del volcán El Colli, *A. Rodríguez & E. García 7724* (IBUG, INEGI); about 4 mi S of Hwy 15 along road to Primavera, about 17 mi W of Guadalajara, *W. D. Stevens & M. Fairhurst 1918* (ENCB, MICH); cerro del Colli, a 1.5 km al SE de Ciudad Granja, *G. González M., R. Delgadillo D. & M. A. Macías R. 11* (IBUG, MEXU); cerro del Colli (Volcán), suburbio occidental de Guadalajara, *M. Cházaro B. & J. A. Lomelí S. 7216* (CHAPA, MICH, MEXU, TEX, XAL); Santa Cruz del Astillero, *R. Hernández Magaña, R. Hernández V. & U. Hernández V. 9517* (MEXU); Agua Dulce, hacienda de Huaxtla, río Salado, 30 km al W de Guadalajara, *L. M. Villarreal de Puga 15577* (IBUG, MEXU); Los Camachos al norte de Guadalajara, carretera a Saltillo, al principiar el descenso a barranca del Río Santiago, *C. L. Díaz Luna 246* (MICH); rumbo a Guadalajara, 10 km después de El Escalón, *A. R. López-Ferrari & A. Espejo 1352* (UAMIZ); El Mirador, 0.3 km al E de la carretera Guadalajara-Colotlán, sobre el camino a Huaxtla, *E. González-Rocha, P. Carrillo-Reyes & M.*

*Padilla 405* (UAMIZ); a 13 km sobre el camino a San Cristóbal de la Barranca, a partir de la carretera Guadalajara-Tesistán, *A. R. López-Ferrari & A. Espejo 2089* (UAMIZ); brecha a Huaxtla, a partir de la carretera Tesistán-San Cristóbal de la Barranca, *A. R. López-Ferrari & A. Espejo 2094* (UAMIZ); bosque La Primavera, *J. F. Gómez M. 26* (IBUG); mirador km 23, carretera a Colotlán, *P. Carrillo-Reyes 58* (IBUG); colonia La Primavera a 0.79 km lineares al O de la caseta de entrada a la Primavera, *A. Villalvazo-H. 31* (IBUG); falda NNE y ladera N del cerro del Colli, *S. Carvajal H., G. Briseñas & M. Carvajal M. 278* (IBUG, ZEA); cerro del Diente, ladera de exposición sur, Río Blanco, *A. Rodríguez C. & L. Guzmán H. 330* (IBUG); cerro el Diente, camino de la peña que escalan hacia las positas, *J. Aragón-Parada, G. Munguía L. & M. Harker 1388a* (IBUG); cerro de Montichelli Tesistán (cerro Monticello), *J. A. Vázquez G., N. Cervantes & G. Nieves 426* (IBUG); km 28 de la carretera 15 que conduce a Nogales, *A. Rodríguez C. 440* (IBUG); Las Agujas, brecha Santa Lucía, al noroeste de Tesistán, *L. A. García R. 934* (IBUG); cerro del Colli, suburbio oeste de Guadalajara, *M. Cházaro B. & A. Fayad Ch. 6467* (IEB, XAL, ENCB); el cerro del Colli, al oeste de Guadalajara, 2 km al W de Ciudad Granja, *A. Flores Macías 1035* (IBUG); 10 km de la desviación a Tesistán, carretera a Zapopan por San Cristóbal de la Barranca, antes de llegar al rancho El Escalón, *A. Flores Macías 1141* (IBUG); El Mirador, carretera Guadalajara-Colotlán, *F. J. Santana M. 2822* (IBUG); Río Caliente, Sierra de la Venta, *L. M. Villarreal de Puga 4676* (IBUG); bosque La Primavera, frente al km 15 de la carretera México 15 entre Guadalajara y Tequila, *A. Rodríguez C. & P. Montiel-Moncayo 6333* (IBUG); cerro del Colli, 10 km al W de Guadalajara, *L. M. Villarreal de Puga et al. 9584* (IBUG); La Herradura, villa Primavera, *L. M. Villarreal de Puga et al. 17022* (IBUG); cercanías del hospital Ángel Leño, *L. M. Villarreal de Puga 17444-a* (IBUG); cerro del Colli, *E. Estrada F. s. n.* (IBUG); cerro El Colorín, al N de Zapopan, *E. Estrada F. s. n.* (IBUG); fraccionamiento La Venta, en una orilla de las calles interiores, *J. T. Guzmán A. s. n.* (IBUG); barranca de Los Camachos, *L. M. Villarreal de Puga 269* (IBUG). **Zapotiltic.** A 26 km de Ciudad Guzmán, carretera a Tamazula, 25 km de brecha de San Cruz a Concepción de Buenos Aires, *M. Fuentes O. 386* (MICH); cliffsides E Volcano Colima, *P. Goldsmith 19* (GH, MO, UC, US); La Palma, *M. E. Jones 466* (US); 5.5 km adelante del rancho Las Ánimas, rumbo a Jilotlán de los Dolores, *R. Ornelas U., A. Flores Macías & A. Alvarado C. 933* (IBUG); ZACATECAS. **Nochistlán.** El Capulín, *R. Pérez Pérez s.n.* (IBUG). Between Bolaños & Guadalajara, *J. N. Rose 3041* (GH, K, US).

***Pitcairnia karwinskyana*** Schult. & Schult. f.

**SPECIMENS EXAMINED.** ESTADO DE MÉXICO. **Almoloya de Alquisiras.** Las Peñas de Texcalapa, aproximadamente 10 km al SW de Almoloya de Alquisiras, *M. Flores C. & F. Riveros 782* (UAMIZ); Cuautenco, S de Almoloya de Alquisiras, arriba de Los Papalotes, *M. Flores C. 910* (UAMIZ); cerro de Ahuacatlán, Almoloya de Alquisiras, *E. Matuda et al. 30590* (CODAGEM, MEXU, MO, US); at Almoloya, *Bird Rock Tropicals MG* (SEL). **Ixtapan de la Sal.** Ixtapan, *R. Hernández M. 145* (MEXU); barranca Nenetzingo, entre el Abrojo y el puente Nenetzingo, carretera libre Toluca-Ixtapan, *J. A. López S. & S. E. Hernández J. 1394* (CHAPA); Barranca de Malinaltenango, cerca del río, *A. García-Mendoza, A. Gutiérrez, A. Castañeda & A. Téllez 6626* (MEXU); **Luvianos.** 7.2 km después de Puerto del Salitre rumbo a Cañadas de Nanchititla, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & L. G. Galván 362* (UAMIZ); 18.4 km después de Puerto del Salitre rumbo a Cañadas de Nanchititla, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & L. G. Galván 363* (UAMIZ); Torrecillas, km 15 carretera El Estanco-Cañadas de Nanchititla, *A. Rodríguez, D. Szesko & E. J. López-Patiño 6051* (IBUG, IEB, MEXU); cerro Huistepeque, 8 km al W de la Peña Blanca, N de Luvianos, *F. González Medrano, R. M. López-Franco & R. Dirzo M. 6068* (MEXU); faldas del cerro Nariz, 6 km adelante de la desviación a Palmar Chico, carretera El Estanco-Cañadas de Nanchititla, *A. R. López-Ferrari y A. Espejo 1631* (UAMIZ); Nanchititla, *G. B. Hinton 3621* (K, US). **Malinalco.** Cañada San Miguel, paraje El rincón de San Miguel, barrio Santa Mónica, *Ó. López Zamora 78* (MEXU); sobre el camino a las ruinas de Malinalco, *A. García M. 3208* (MEXU). **San Simón de Guerrero.** ca. 3 km sobre la brecha que va a la cumbre a partir de la carretera que va a Temascaltepec-Tejupilco, *J. Ceja Romero & A. Mendoza Ruiz 1500* (UAMIZ). **Sultepec.** 9 km sobre el camino desde Juluapan a El Cristo, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & L. G. Galván 358* (UAMIZ); La Ciénega, 5 km al S de Sultepec, *J. Rzedowski 30470* (ENCB, IEB); La Ciénega, 5 km al S de Sultepec, sobre el camino a Amatepec, *J. Rzedowski 30866* (ENCB); 11.1 km después de Sultepec hacia San Miguel Totolmaloya, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & L. J. Hernández-Barón 417* (UAMIZ); 7.3 km después de Sultepec hacia San Miguel Totolmaloya, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & L. J. Hernández-Barón 418* (UAMIZ). **Tejupilco.** Rincón de Ugarte, ca. 3 km por el camino de terracería, rumbo a Rincón de Ugarte, a partir del camino Tejupilco—Luvianos, *J. Santana C., R. Grether, M. E. Fraile O., A. Martínez B. & S. Camargo R. 77* (UAMIZ); Rincón de Ugarte, *I. Reyes J. s. n.* (UAMIZ); alrededores de Rincón de Ugarte, *A. Espejo, A. R. López-Ferrari 5547* (UAMIZ); cumbre de Tejupilco, *G. B. Hinton 1057* (US); a 3 km sobre el camino a Almoloya de las Granadas, a partir de la carretera Temascaltepec—Tejupilco, *A. Flores C., A. Espejo & A. R. López-Ferrari 1007* (UAMIZ); El Divisadero,



5 km adelante de Cañadas de Nanchititla, rumbo a La Piaxtlera, *A. R. López-Ferrari & A. Espejo 1639* (UAMIZ); cerro de la Muñeca, *E. Matuda & col. 30520* (CODAGEM, MEXU, US). **Temascaltepec.** Tejupilco, District of Temascaltepec, *G. B. Hinton 1219* (GH, K, US); La Sierrita, *G. B. Hinton 7677* (K, US); Carboneras, *G. B. Hinton 7719* (K); a 8 km east of Temascaltepec, *G. B. Hinton 26000* (TEX); 15.2 km después de Oxtotilpan hacia Temascaltepec, carretera Toluca-Temascaltepec, *E. González-Rocha, A. González & Y. González 389* (UAMIZ); 5.7 km después de Carboneras hacia Temascaltepec, carretera Toluca-Temascaltepec, *E. González-Rocha, A. González & Y. González 390* (UAMIZ). **Valle de Bravo.** Arriba cortina presa Valle de Bravo, *H. Sánchez Mejorada & C. Chávez Arias 266* (MEXU). GUERRERO. **Buenavista de Cuéllar.** 10 km del camino La Tigra-El Zapote, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & I. N. Gómez E. 247* (UAMIZ); camino a la estancia, al SW del poblado de Buenavista de Cuéllar, *S. Valencia A. 4842* (FCME). **Chilpancingo de los Bravo.** Rincón de la Vía, *H. Kruse* (FCME); a 25 miles south of Chilpancingo, *J. B. Paxson, G. L. Webster & F. A. Barkley 17M793* (LL). **Coyuca de Catalán.** Carrizera/Mina, *G. B. Hinton 10090* (K, US). **Malinaltepec.** Malinaltepec, *I. Wagenbreth 676* (MEXU). **Mochitlán.** 3 km al sureste de Acahizotla, *A. Nuñez 703* (FCME, UAMIZ). **Taxco de Alarcón.** 4.5 km al NE de Taxco de Alarcón, *J. Calónico S. & Karina J. D. 9375* (FCME); cerro Casallas, Las Martelas, 1.5 km al NE de Taxco Guerrero, carretera a Cuernavaca, *R. Torres C., O. Dorado & S. Zona 9953* (MEXU); cerro Casallas, Las Martelas, 1.5 km al NE de Taxco Guerrero, carretera a Cuernavaca, *R. Torres C., O. Dorado & S. Zona 9953* (UAMIZ); north of Taxco, *O. M. Clark* (MO). **Teloloapan.** Tehuixtla, área minera Rey de Plata, *D. Tejero-Díez & C. Ledesma-Corral 5449* (MEXU). **Tetipac.** Aproximadamente 2 km al S de Tetipac, *F. Lorea 4313* (FCME). MORELOS. **Ayala.** Periferia de la mina de tezontle, 7 km al SE de Moyotepec (en línea recta), *R. Cerros Tlatilpa, L. Rodríguez, I. Arnelas, A. Flores M. & C. Montealbán 2943* (UAMIZ). **Cuautla.** Sin localidad, *E. Matuda 26329* (MEXU). **Cuernavaca.** Barranca a un costado la Calle prolongación El Amate, atrás de la Col. Primavera rumbo a la Col. La Unión, *L. J. Hernández Barón, R. Cerros T., I. Matias & K. Juan Baeza 151* (UAMIZ); barranca El Litroero, entrando por la colonia Altapalmira, Cuernavaca, *E. González-Rocha 236* (UAMIZ); 1.42 km al SW de Lomas del Sol (en línea recta), barranca La Tilapeña, *E. González-Rocha, R. Cerros T., A. Flores M., Y. Montoya M. & Ó. Villafranco 267* (UAMIZ); barranca L'Amagatall, *J. Vázquez 349* (MEXU); barranca Zompantle, *J. Vázquez 1602* (MEXU); camino Santa Maria Ahuacatitlán, El Tepeite, *A. R. López-Ferrari, A. Espejo, R. Jiménez M., L. Sánchez S. & A. Flores C. 2174* (UAMIZ); laderas barrancas Atzingo, *J. Vázquez S. 2449* (MEXU); 1 km después de la Colonia del Bosque, rumbo a Mexicapa, *A. R. López-Ferrari, J. Ceja R., A. Espejo & V. Sosa 2879* (UAMIZ); barranca, arriba de El Salto, *J. Vázquez S. 3264* (MEXU); sierra de Ocuila, barranca de la Canoa, *E. Lyonnet & R. Chávez 3287* (US); barranca Atzingo, *J. Vázquez 3298* (MEXU); near Cuernavaca, *J. N. Rose & W. Hough 4421* (US); loma entre la barranca El Zompantle y la barranca Ahuatlán, al NW de Cuernavaca, *A. Espejo y A. R. López Ferrari 5010* (UAMIZ); barranca de La Canoa, al NW de Cuernavaca, *A. Espejo, J. García C., R. Jiménez M., L. Sánchez S., A. R. López-Ferrari & A. Flores-Castorena 5693* (UAMIZ); Salto, Cuernavaca y cercanía, *E. Matuda 26319* (MEXU, US); aprox. 4 km al E de Ahuatepec, 8 km al E de Cuernavaca, Morelos, por la carr. a Tepoztlán, *J. L. Villaseñor R., R. Medina, P. Ramírez & E. Martínez 948a* ((MEXU); in barranca Tinaja, near Cuernavaca, *C. Halbinger s. n.* (GH); 500 m al W de la Col. El Zompantle, Barranca de Atzingo, *D. Martínez Alvarado & A. Flores-Castorena sn* (MEXU); in mountain above Cuernavaca, *F. A. Barkley 37464* (GH). **Huitzilac.** Autopista México-Cuernavaca, km 53, *J. Espinosa 88* (ENCB); autopista México- Cuernavaca, km 56, *J. Espinosa 138* (MEXU). **Jantetelco.** 0.5 km al SE de la zona arqueológica de Chalcatzingo, entre los cerros Delgado y Chalcatzingo, *E. González-Rocha, R. Cerros T., A. Espejo, A. R. López-Ferrari & I. Mejía M. 149* (UAMIZ). **Puente de Ixtla.** 3.5 km después de El Zapote, rumbo al poblado de La Tigra, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & I. N. Gómez-Escamilla 260* (UAMIZ); 0.85 km al NE del poblado de El Zapote, camino a Cerro Frío, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & I. N. Gómez-Escamilla 263* (UAMIZ); Tilzapotla, 2.3 km al SW, camino al cerro Frío, *A. Bonfil C. 322* (UAMIZ). **Temixco.** Barrancas ubicadas aproximadamente 1 km al NE del poblado de Cuatepec, *E. González-Rocha, R. Cerros T., A. Flores Morales & J. Hernández B. 119* (UAMIZ); barrancas ubicadas aproximadamente 1 km al NE del poblado de Cuatepec, *E. González-Rocha, R. Cerros T., A. Espejo, A. R. López-Ferrari & I. Mejía M. 131* (UAMIZ); 0.7 km al SW del poblado de Cuatepec, al lado de la zona arqueológica sobre el sendero ecoturístico al río Tembembe, *E. González-Rocha, A. Flores M., R. Cerros T., J. Hernández & Ó. Villafranco 161* (UAMIZ); barrancas ubicadas aproximadamente 1 km al NW del poblado de Cuatepec, *E. González-Rocha, A. Espejo, A. R. López-Ferrari & I. N. Gómez E. 239* (UAMIZ); Xochicalco, *L. Hahn s. n.* (P). **Tepoztlán.** Cañada, cerca de la autopista México-Cuernavaca, por la curva La Pera, *R. Medina 2* (MEXU); pedregal basáltico del derrame del Chichinautzin, *A. G. Miranda M. 6* (UAMIZ); la Pera, carretera de cuota México-Cuernavaca, *N. Martínez-Correa, A. Espejo, A. R. López-Ferrari & J. García-Cruz 40* (UAMIZ); a 4 km de la desviación al campamento Camohomila carretera a Tepoztlán, *M. Olvera 92* (MEXU); 9.2 km después de Topilejo rumbo a Cuernavaca, sobre la carretera cuota México-Cuernavaca, *E. González-Rocha, A. Espejo-Serna, A. R. López-Ferrari & I. Mejía Marín 129* (UAMIZ); 4.6 km al S

de Santa Catarina, El Texcal, *E. González-Rocha, R. Cerros T., A. Flores M., L. L. J. Hernández B., Ó. Villafranco G., F. García, J. I. Matías, L. Gil G. & L. Rodríguez* 232 (UAMIZ); 9.6 km después de Topilejo rumbo a Cuernavaca, sobre la carretera cuota México-Cuernavaca, *E. González-Rocha, A. Espejo, A.R. López-Ferrari & I. N. Gómez-Escamilla* 237 (UAMIZ); Toll road from México to Cuernavaca, La Pera, *L. I. Nevling Jr. & A. Gómez-Pompa* 341 (GH, MEXU); La Pera, km 66 de la carretera cuota México-Cuernavaca, *E. González-Rocha, Y. Campos & A. González* 406 (UAMIZ); carretera México-Cuernavaca, 5.5 km al E de Coajomulco, 500 m al N de la carretera, en la Sierra de Chichinautzin, *M. Ishiki I.* 899 (MEXU); carretera México-Cuernavaca, 5.5 km al E de Coajomulco, 500 m al N de la carretera, en la Sierra de Chichinautzin, *M. Ishiki I.* 899 (CHAPA, ENCB); autopista México-Cuernavaca, km 64, derrame de lava, Sierra de Chichinautzin, *A. Bonfil C.* 978 (MEXU); a 3 km por la barranca de la Puerta desde el pueblo de Amatlán de Quetzalcoatl, *A. Flores-Palacios & Q. T. Cruz-Fernández* 1016 (HUMO); La Pera, *A. Flores-Castorena* 1125 (UAGC); km 68 carretera de cuota México-Cuernavaca, *A. R. López-Ferrari & A. Espejo* 1739 (UAMIZ), *A. R. López-Ferrari, A. Espejo, R. Jiménez M. & L. Sánchez S.* 2169 (UAMIZ), 2170 (UAMIZ); km 3 de la carretera La Pera—Tepoztlán, *A. R. López-Ferrari, A. Espejo, J. García-Cruz & R. Jiménez M.* 2449 (IEB, UAMIZ); autopista México—Cuernavaca, saliendo de la curva de La Pera, km 56. Derrame de lava (malpaís) en el declive sur de la sierra de Chichinautzin, *E. Guízar N.* 2770 (CHAP, IEB, MEXU, XAL); km 66 carretera de cuota México—Cuernavaca. 1 km adelante de La Pera, rumbo a Cuernavaca, *A. Espejo, A. R. López-Ferrari & V. Sosa* 3619 (IEB, UAMIZ); km 66 carretera de cuota México—Cuernavaca. 1 km adelante de La Pera, rumbo a Cuernavaca, *A. Espejo & A. R. López-Ferrari* 4804, (UAMIZ); derrame del Chichinautzin, *J. Arellano s. n.* (MEXU, FCME); ladera sur del cerro de Chichinautzin, *F. Morales Ordoñez s. n.* (UAGC); 12 km al ESE de Cuajomulco, sobre la autopista a Cuernavaca, *J. Rzedowski* 35309 (ENCB). **Totolapan.** 0.6 km al E (en línea recta) de San Sebastián La Cañada, ladera E del cerro, *E. González-Rocha, L. J. Hernández B., R. Cerros, A. Espejo & A. R. López-Ferrari* 301 (UAMIZ); San Sebastián la Cañada, *R. Cerros Tlatilpa, A. Flores M., Ó. Villafranco & Y. Montoya* 2952 (UAMIZ). **Zacualpan de Amilpas.** 2.6 km después de Zacualpan rumbo Cohuecán, barranca al lado del camino de terracería, ejido de Tlacotepec, *E. González-Rocha, R. Cerros-Tlatilpa, A. Espejo-Serna, A. R. López-Ferrari & I. Mejía Marín* 136 (UAMIZ).

#### *Pitcairnia micheliana* André

**SPECIMENS EXAMINED.** COLIMA. **Minatitlán.** 4–5 km SW de Platanarillos, 11–12 km al ESE de Minatitlán, 1–2 km al W de Estanques, *L. Guzmán H. & R. Cuevas G.* 179 (IBUG, ZEA); ejido Agua Fría, parte superior del arroyo Agua Fría, *E. Padilla-Velarde* 1654 (ZEA). JALISCO. **Autlán de Navarro:** a 2 km beyond puerto Los Mazos toward Barra de Navidad on road from Autlán, *W. R. Anderson* 13565 (CHAPA, IEB, MEXU, MICH, MO); along the main highway from Guadalajara to Autlán and Barra de Navidad, 17–18 km SW of Autlán, *J. V. A. Dieterle* 4106 (ENCB, IEB, MEXU, MICH); reserva Biósfera Sierra de Manantlán. Above road from Autlán to Casimiro Castillo, 1 km SE of and below Puerto Los Mazos, *H. H. Iltis, B. F. Benz, A. Viquez G. & M. Cházaro B.* 29456 (MEXU, MICH, US); 20 km al ESE de Autlán, 3–4 km al W de Tecopatán, camino Manantlán, *R. Cuevas & L. Cruz* 2634 (ZEA); 7–8 km al SSW de Autlán, 2.5 km al W de Los Mazos, carretera Autlán-Casimiro Castillo, *F. J. Santana M., H. Iltis & R. Cuevas* 4264, (ZEA); 2 km al SW de Ahuacapán, 11–12 km al SW de Autlán, Sierra de Manantlán, *F. J. Santana M.* 8884 (ZEA); cerro El Colorado, 5–6 km al W de Autlán, *F. J. Santana M. & E. O. Padilla V.* 9553 (ZEA); 12–13 km al S de Autlán, 1–2 km al S de Ahuacapán, camino a estación científica Las Joyas, *F. Ornelas sn.* (ZEA). **Ayutla.** Alrededores de la peña La Tortuga, al W de Ayutla, *A. Espejo, A. R. López-Ferrari, J. Ceja & A. Mendoza R.* 6546 (UAMIZ). **Casimiro Castillo.** Sierra Madre Occidental, Sierra de Autlán (West end of Sierra de Manantlán), on N-facing cliffs ca. 2 km, E of and above firetower along highway from Casimiro Castillo to Autlán 10 km N of Casimiro Castillo (km 175), *H. H. Iltis, S. Solheim & R. Guzmán M. (with L. Nault and D. DeLong)* 3116 (MICH, US); 13 miles by rd. SW of Autlán, rd. to Barra de Navidad (hwy. 80), *G. L. Webster & G. J. Breckon* 16020 (MEXU, MICH); Los Mazos, 7–8 km al SSW de Autlán, 1 km al W del puesto de vigilancia SARH, *L. Guzmán & G. López* 342 (MEXU, ZEA); puerto Los Mazos, *R. Cuevas G.* 1702 (ZEA); 9 km al N de Casimiro Castillo, 5–6 km al N de El Zapotillo, *L. Guzmán & R. Cuevas* 538 (ZEA); adelante del arroyo el Conejo camino a Charco Azul, *R. Cuevas G. & G. Zermeño* 9254, (ZEA); Along Hi 80, 11 miles S of Autlán, *F. C. Boutin & F. K. Brandt* 2477 (US); Sierra de Autlán, carretera a Barra de Navidad, *L. M. Villarreal de Puga* 69 (ZEA). **Cuatitlán de García Barragán.** 14–15 km al E de Cuatitlán. 1 km al N de Las Marías, *R. Cuevas & L. Guzmán* 3634 (ZEA); 6–7 km al NW de Minatitlán. Peña Colorada, cerca del poblado Potros, *F. J. Santana M. & S. Lemus J.* 6095 (ZEA); 6–7 km al NW de Minatitlán. Peña Colorada, cerca de El Rincón, *F. J. Santana M. & S. Lemus J.* 6108 (ZEA). **Ejutla.** El Estanco, 1 km al S de Amacuautilanejo, *F. J. Santana M. & J. L. Esquivel* 6993 (MEXU, ZEA); arroyo El Zalatlillo, 8 km al N de El Grullo por la carretera el Grullo-Ejutla, *F. J. Santana M.* 8312 (ZEA); arroyo El Zalatlillo, 8 km al N de El Grullo por la carretera el Grullo-Ejutla, *F. J. Santana M.* 8313 (ZEA). **El Grullo.** 4 km al NE de El Grullo, *F. J. Santana M.* 6252 (ZEA); arroyo El Almur, 5–6 km al W de

Ejutla, carr. Ejutla-El Grullo, *F. J. Santana M. 7600* (ZEA); 1 km al NW de la Laja, 10 km al NW de El Grullo, *F. J. Santana M., M. Vázquez & D. Hernández C. 8385* (ZEA). **La Huerta**. Mountains 3 miles above (south of) La Huerta, road to Barra de Navidad, *R. McVaugh 19813* (MICH, US). **Puerto Vallarta**. Ejido El Jorullo, río Torresillas, aprox 6.5 km al SW de Llanitos, *A. Flores-Argüelles & A. R. Romero-Guzmán 678* (ZEA). **San Martín Hidalgo**. Sierra de Quila. Río Grande, *J. J. Guerrero N. 1010* (MEXU). **Tecalitlán**. Mata de Bule, Sierra de los Corales, *J. Rzedowski 17328* (ENCB, MICH, US). **Tecolotlán**. sierra de Quila, camino a cascada Santa Rosa, 14.7 km al NW de Tecolotlán, *A. Flores Argüelles & E. A. Suárez-Muro 384* (IBUG); sierra de Quila, arroyo la Angostura, zona rocosa abierta, ejido Ambrosio, *A. Flores Argüelles, L. Hernández L. & E. A. Suárez-Muro 555* (IBUG); sierra de Quila, Potrero Grande, claro rocoso en una cañada, ladera W, al NW del poblado, *A. Flores Argüelles, L. Hernández L. & E. A. Suárez-Muro 616* (IBUG). **Zapotitlán de Vadillo**. 5 km al N de Zapotitlán de Vadillo, por la breca Copala-Zapotitlán, *F. J. Santana M. & E. V. Sánchez V. 7050* (ZEA). **Municipality not indicated**. Along road between Colima and Puente San Pedro, state of Jalisco, *H. E. Moore Jr. 8165* (US); MICHOACÁN: **Ario**. El Cangrejo, *S. Zamudio & I. Ruiz 8309* (IEB). **Gabriel Zamora**. Nuevo San Martín (Piedra Partida), *P. Carrillo-Reyes, E. Pérez C. & I. García 1398* (IEB, UAMIZ); en Barranca Honda, 9 km al N de Lombardía, *J. C. Soto N. 10871* (MEXU, UAMIZ); 13 km al norte de Nueva Italia, sobre la carretera a Uruapan, *S. D. Koch & P. A. Fryxell 77433* (CHAPA). **La Huacana**. Santa Mónica, sierra de Inguarán, *A. R. López-Ferrari, A. Espejo, J. Ceja & A. Mendoza R. 2057* (UAMIZ); alrededores de la presa gral. Francisco J. Múgica, cerro de la cortina, *J. Cortés Flores & P. del C. Coba Pérez 67* (IEB). **Uruapan**. West-facing slopes of cerro de Carboneras above the río Cupatitzio, ca. 22 km south of Uruapan, *R. M. King & T. R. Soderstrom 4869* (MICH, TEX, UC, US); about 8 km beyond Uruapan on road to Apatzingán, *H. E. Moore Jr., E. Hernández X. & H. Porras H. 5725* (GH, UC, US).

*Pitcairnia palmeri* S. Watson

**SPECIMENS EXAMINED**. CHIHUAHUA. **Chínipas**. 7.8 miles by road south of Tecoragui, sierra Sahuaribo, on road to Álamos, Sonora, *D. Felger 5559* (MEXU). **Guadalupe y Calvo**. Llano Grande, *C. W. Pennington 113* (US). **Madera**. Santa Rosa, *C. W. Pennington* (LL). **Maguarichi**. Rokoloibo region, on east side of barranca de Chinipas, below waterfall at end of valley of Rokoloibo, *D. Burges & R. A. Bye, Jr.* (ECON). **Ocampo**. Hills S of Candemeña river (Río Mayo headwaters), *H. de LeSueur 1258* (TEX, GH); ca. 5 rd km N of Basaseachic up the Río Basaseachic, on summit of ridge W of river, on open E-facing rock, *R. Spellenberg & P. Martin 10803* (CIIDIR, IEB, MEXU). DURANGO. **Canelas**. 3 km de Canelas, *O. Bravo B. 1101* (CIIDIR). JALISCO. **Ameca**. Majistral [SIC], *Bravo Pacheco s. n.* (IBUG). **Autlán de Navarro**. Wooded slopes south of the road above pass 10 miles south of Autlán toward La Resolana, *R. L. Wilbur & C. R. Wilbur 1445* (MICH, US). **Bolaños**. La Toma, aprox. 25 km al NW de Bolaños, hacia el Puente de Camotlán, *C. Martínez-Hernández & P. Carrillo-Reyes 13* (IBUG); La Toma, unos 20 km al NW de Bolaños, brecha Bolaños, *A. Flores M., G. Martínez P. & N. P. Ramos G. 1903* (CHAPA, IEB). **Cuautitlán de García Barragán**. 20 km due S of El Chante, 7 km ENE of El Durazno. E facing slopes of cerro San Miguel (a part of Sierra de Manantlán) just below (N of) Saddle at La Ventana just E of an Indian hut surrounded by 5 gigantic Yucca (elephantippes?), *H. H. Iltis, R. Guzmán M., J. Doebley & A. Lasseigne s. n.* (IBUG). **Guadalajara**. Barranca del Mirador, *J. F. Barragán C. 32* (IBUG); barranca de Huentitán, *A. Ayala R. 42* (IBUG); barranca de Huentitán, junto al zoológico, *J. J. Guerrero N. 837* (IBUG, XAL); ladera SW de la barranca del río Santiago (Ibarra), abajo del zoológico Guadalajara, *M. Harker & F. Covarrubias 2379* (IBUG); barranca de Oblatos, *V. Godínez de la T. s. n.* (IBUG). **Ixtlahuacán del Río**. Barranca du Río Santiago, environs de Guadalajara, *M. L. Diguet s. n.* (US, P). **Jocotepec**. Cerro Viejo, 2 km al este de Huejotitán, *J. A. Machuca N. 1277* (XAL). **Mixtlán**. Mountain summits about 25 km west of Ameca, between La Estanzuela and Mixtlán, locally abundant on step side of arroyo 4 miles south of Estanzuela, *R. McVaugh 12177* (MEXU, US). **San Cristóbal de la Barranca**. Arroyo Los Cuartos (El Escalón), 2 km al O de La Arena por el camino a Los Pueblitos, *P. Carrillo-Reyes, L. Ortiz-Catedral & F. Puig Magrinyá 1210* (IBUG); cerca de La Mesa de Los Caballos, 8 km (en línea recta) al NE de San Cristóbal de la Barranca por el camino de La Lobera, *P. Carrillo-Reyes, J. A. Lomelí & C. González-Paredes 2018* (IBUG). **Tala**. La Primavera, Bosque Escuela, Distrito 7, *A. Rodríguez C. 290* (IEB, XAL, IBUG). **Tecalitlán**. 8 km al SW de Tecalitlán, carretera a Pihuamo, *J. A. Solís, S. Bustamante & L. de la Cruz 2305* (MEXU). **Tecolotlán**. Sierra de Quila, cima del cerro El Huehuentón, 25 km al NE de Tecolotlán, *A. Flores Argüelles & E. A. Suárez-Muro 292* (IBUG); Sierra de Quila, *J. A. Machuca N., M. Cházaro B. & R. Magaña E. 7000* (IBUG). **Villa Guerrero**. 8 km después de Villa Guerrero, sobre el camino a Bolaños, *A. Espejo, A. R. López-Ferrari & J. García-Cruz 4954* (UAMIZ). **Zapopan**. Tesistán, a 8 km del balneario El Encanto, *C. Ramírez 25* (CORU); falda oeste del cerro Río Blanco, *S. Carvajal H., C. L. Díaz Luna, R. Guzmán M. & R. T. Clausen 126* (IBUG); cerro de Colli, west edge of Guadalajara plain. About 1 mille west of Ciudad Granja, a few mi. west of Guadalajara, *D. P. Gregory & G. Eiten 147*, (GH, MEXU, P); bosque del Nixticuil, *F. Mercado-Muñoz, R. Ramírez-*



*Delgadillo & A Castro-Castro 149* (IBUG); brecha a San Isidro Mazatepec, por la prolongación de Mariano Otero, km 12, *O. Reyna B. 369* (IBUG); brecha a Huaxtla, a partir de la carretera Tesistán-San Cristóbal de la Barranca, *A. R. López-Ferrari & A. Espejo 2097* (UAMIZ); verge of cliffs, barranca near Guadalajara, *C. G. Pringle 2552* (BR, BM, GH, K, MEXU, NY, P, UAMIZ, UC, US); on ledges and banks near Guadalajara, *C. G. Pringle 7559* (ENCB, MEXU); cerro el Diente, al norte del poblado de Río Blanco, *A. Espejo, A. R. López-Ferrari & J. García-Cruz 4969* (UAMIZ); volcán del Colli, al W de Guadalajara, *L. M. Villarreal de Puga 3109* (IBUG); W volcán Colli y S de La Venta, *L. M. Villarreal de Puga 4613* (IBUG); bosque La Primavera, sierra La Venta, arroyo SE de la Venta del Astillero, saliendo de la calle la Primavera, *M. Harker & E. Villa-G. 3961* (IBUG); La Venta, Sierra de la Primavera, *L. M. Villarreal de Puga 4081* (ENCB, IBUG); cerro del Colli, orilla W de Guadalajara, *M. Cházaro B., R. Acevedo R. & E. Lomeli M. 6974* (XAL); sierra de la Primavera, *S. Zamudio R. 7886* (IEB); barranca de Río Blanco, *A. Espejo & A. R. López-Ferrari 4969* (UAMIZ); cerro de Santa Ana, al sur de Santa Ana Tepetitlán, *N. Corona G. s. n.* (IBUG); Calabazas, *B. P. Reko 4863* (US). NAYARIT. **Ahuacatlán.** New lava flows crossing highway, 6–7 miles northwest of Ahuacatlán, *R. McVaugh 15390* (MEXU, US); volcán Ceboruco, lado N, entre km 124 y 125 por la carretera maxipista. 1 km antes del mirador La Joya, *M. Harker et al. 849* (IBUG); derrame de lava del Volcán Ceboruco, al N de Ahuacatlán, *A. Espejo & A. R. López-Ferrari 5261* (UAMIZ). **Amatlán de Cañas.** Mountains 10 miles southeast of Ahuacatlán, on road to Barranca del Oro, *R. McVaugh 15142* (US). **Ixtlán del Río.** Ixtlán, near the state border of Jalisco, *Thomas H. Lewis s. n.* (US). **Jala.** Volcán Ceboruco, N de Ahuacatlán, *R. Medina L. & E. M. Martínez S. 5377* (MEXU); volcán Ceboruco, sobre la brecha de Jala a la estación de microondas, *M. Cházaro B., R. Acevedo R. & E. Lomeli M. 6961* (MEXU, XAL); volcán Ceboruco, 7.6 km al NW de Jala, *E. González-Rocha & F. Bonilla-Badía 394* (UAMIZ), volcán Ceboruco, 8 km al NW de Jala, *E. González-Rocha & F. Bonilla Badía 394bis* (UAMIZ). **Xalisco.** Km 12 de la terracería a El Cuarenteño, que empieza a 300 m al W del Izote, carretera Tepic—Miramar, *O. Téllez, J. S. Miller & T. Chehaibar 10404* (MEXU); mountains 9 miles north of Compostela, *R. McVaugh 16496* (MEXU). SINALOA. **Choix.** Cajón de Cancio a La Meza, a ca. 20 km al oriente de Choix, *R. Vega A. 4398, H. Aguiar H. & A. Hernández V. 4398* (CHAPA, MEXU). ZACATECAS. **Teúl de González Ortega.** 8.5 km al SW de El Conejo, por la carretera a Milpillás Allende (6.4 km en línea recta), *P. Carrillo-Reyes 4049* (IBUG); cerca de la Calera, 4 km al E de El Conejo, por el camino a Milpillás Allende, *P. Carrillo-Reyes & A. Castro-Castro 6003* (IBUG).

***Pitcairnia pteropoda*** L.B. Sm.

**SPECIMENS EXAMINED.** GUERRERO. **Coyuca de Catalán.** Manchón/District Mina, Aguazarca, *G. B. Hinton et al. 9450* (GH, K, US); Tierras Blancas, *G. B. Hinton et al. 10141* (GH (right side of the sheet), K, MEXU); Aguazarca, *G. B. Hinton et al. 10456* (GH, K, UC, US). **Teloloapan.** Along Mexico highway 51, 17 km. W of Teloloapan between km 77–78 (50 yards above Teloloapan-Arcelia road), *H. H. Iltis & T. S. Cochran 29* (ENCB, MICH, US). MICHOACÁN. **Coalcomán de Vázquez Pallares.** S. Torricillas, *G. B. Hinton 13984* (GH, LL); S. Torricillas, *G. B. Hinton 15012* (GH, LL, US); Coalcomán, *G. B. Hinton 13890* (GH, LL, US); 6.2 km O de El Manguito, *T. P. Ramamoorthy, E. Martínez S. & F. Barrie 4664* (MEXU). **La Huacana.** Sierra Las Cruces, ca. 6.5 km west of Los Ranchos, near Los Cueros, *V. W. Steinmann 4340* (UAMIZ); Jorullo, *K. Reiche 160* (GH). **Los Reyes.** C. La Agura-Atapan, *J. N. Labat 955* (MEXU, P, ENCB). **Tingambato.** Pedregales basálticos en los alrededores de Tingambato, *A. R. López-Ferrari, A. Espejo & H. Diaz-Barriga 1468* (UAMIZ). **Tocumbo.** 3 km al NE de la cabecera municipal Los Reyes de Salgado, *M. C. Macías F. 22* (INEGI). **Uruapan.** 5 km después de Charapendo, rumbo a Uruapan, viniendo de Nueva Italia, *A. Espejo & A. R. López-Ferrari 4488* (UAMIZ); cerca de 9 km al W de Uruapan, rumbo a Pátzcuaro, *A. Espejo, A. R. López-Ferrari, B. Pérez G., J. Ceja & A. Mendoza R. 5224* (UAMIZ); west-facing slopes of cerro de Carboneras, above the río Cupatitzio, ca. 22 km south of Uruapan, *R. M. King & T. R. Soderstrom 4846* (US); pedregal de Uruapan, más o menos 5 km al SW de San Andrés Coru, *S. Zamudio R. & R. González T. 8249* (IEB, UAMIZ); 8 miles south of Uruapan, *F. A. Barkley & D. J. Carr 36096* (GH); aproximadamente 1 km al E de San Lorenzo, *I. García R. & A. Olmos 3305-E* (IBUG, IEB). **Zacapu.** La Angostura, hacia el Reventón, *A. Grimaldo N. 87* (CIIDIR, IEB, XAL); *A. Grimaldo N. 133* (IEB, MEXU); el Pinal, cerca de Santa Gertrudis, *H. Díaz Barriga & A. Grimaldo N. 4503* (ENCB, IEB); Malpaís Negro, ca. 7 km al SW de Los Espinos, *S. Zamudio R. & A. Grimaldo N. 6667* (IEB, MEXU, UAMIZ); zona arqueológica de Milpillás, *S. Zamudio R. & B. Gutiérrez 17289* (UAMIZ). 3 km carretera Zacapu-Zamora, *A. Grimaldo N. 75* (IEB). **Ziracuaretiro.** A 5 km adelante de San Andrés Coru, carretera Pátzcuaro-Uruapan, *A. R. López-Ferrari & A. Espejo 914* (IEB, UAMIZ).