



## *Tillandsia chalcatzingensis*, a new species from the state of Morelos, Mexico

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### Abstract

*Tillandsia chalcatzingensis* from Morelos, Mexico is described and illustrated. The new species is compared with *T. superinsignis*, *T. thyrsgera* and *T. tonalaensis*, taxa with similar morphological features. A comparative table and a distribution map of these taxa are included.

### Resumen

Se describe e ilustra *Tillandsia chalcatzingensis* procedente del estado de Morelos, México. Se compara la nueva especie con *T. superinsignis*, *T. thyrsgera* y *T. tonalaensis*, especies que presentan características morfológicas similares. Se incluyen un cuadro comparativo y un mapa de distribución de estos taxa.

### Introduction

In the course of the botanical exploration of the state of Morelos for the postgraduate project of the first author (González-Rocha, 2014), we located a colony of saxicolous plants of a *Tillandsia* L. (1753: 286) that we could not identify (Mez, 1896; Smith & Downs, 1977) at Chalcatzingo. Morphologically these plants resemble *T. superinsignis* Matuda (1973: 189), *T. thyrsgera* Morren ex Baker (1889: 185) or *T. tonalaensis* Ehlers (2003: 17).

A detailed comparison of our material collected at Chalcatzingo with the type specimens of *Tillandsia thyrsgera* (Uhde 181, type B!), *T. superinsignis* (Matuda *et al.* 38531, holotype MEXU!, isotypes BR!, CAS!, ENCB!, MO!, XAL!) and *T. tonalaensis* (Ehlers & Ehlers EM8922305, holotype MEXU!) (Table 1), allowed us to conclude that it was an undescribed taxon.

### Material and methods

The botanical material was collected at Chalcatzingo, Morelos. The plants grow on the rock cliffs of the Cerro Gordo, which required rappelling to access. Herbarium specimens, including flower dissections, were prepared in situ. Digital images of the plants in situ were obtained. Morphological features of the Chalcatzingo material was compared with the specimens of *Tillandsia superinsignis* and *T. tonalaensis* deposited in the collections of the following Herbaria (BR, CAS, ENCB, HUMO, IEB, MEXU, MO, UAMIZ, XAL), including the type material, and with high resolution images of *T. thyrsgera* type specimens deposited at B (Röpert, 2000+ [continuously updated]). The protologues of the three species mentioned above are revised below to compare their features with those of *T. chalcatzingensis*. The description of the new taxon was based upon examination of living and dry material. The holotype was deposited at Herbario Metropolitano (UAMIZ) at the Universidad Autónoma Metropolitana Iztapalapa (Mexico City).

**TABLE 1.** Comparative characters of *Tillandsia chalcatzingensis*, *T. superinsignis*, *T. thyrsigera*, and *T. tonalaensis*.

	<i>T. chalcatzingensis</i>	<i>T. superinsignis</i>	<i>T. thyrsigera</i>	<i>T. tonalaensis</i>
Plant height (m)	1.5–2	2–2.5	1.2–1.5	0.6–1.2
Adaxial surface of blades	glabrous	sparsely punctulate lepidote	glabrous	grey brown lepidote
Spike length including stipe (cm)	28–45	60–73	24–31	10–45
Number of spikes	25–32	20–40	10–13	3–15
Number of flowers per spike	17–19	30–38	10–12	5–18
Primary bracts width (sheath in mm)	19–23	70–71	30–38	17–20
Basal ebracteate spike portion length (mm)	21–32	46–58	16–20	15–18
Floral bract length (mm)	35–42	48–58	42–50	30–40
Sepal length (mm)	28–33	39–40	35–38	30–35
Petal length (mm)	44–49	59–62	60–63	42–48
Rachis internodes	covered	visible	visible	visible
Flower	sessile	pedicellate	subsessile	pedicellate

## Taxonomy

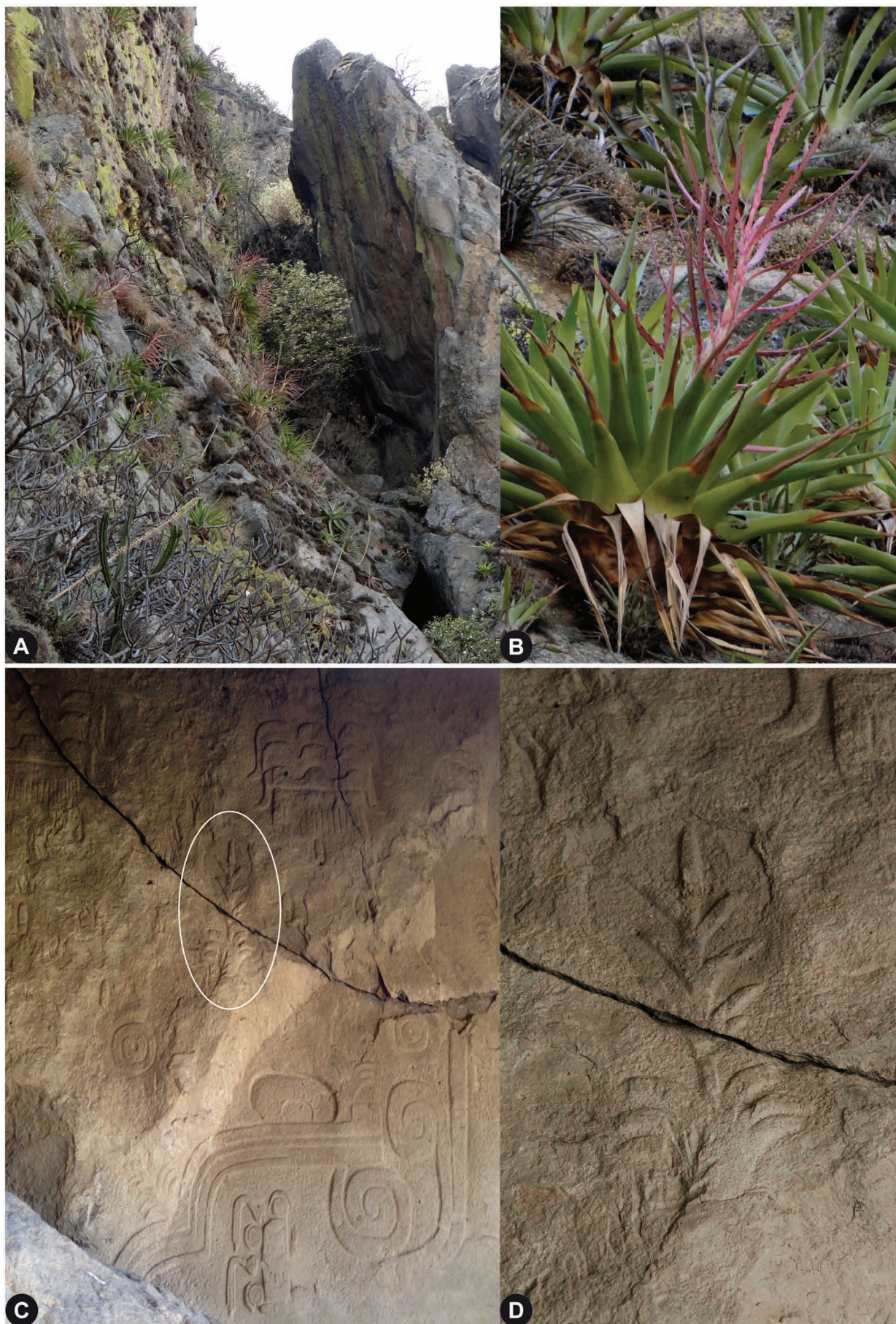
*Tillandsia chalcatzingensis* González-Rocha, Cerros, López-Ferr. & Espejo, *spec. nov.* Figures 1, 2, 3A, 4.

*Tillandsia chalcatzingensis* is closely related to *T. superinsignis* Matuda from which it differs by having narrowly triangular vs. sublingulate leaf blades, a shorter peduncle, longer stipes of the spikes, spikes 28–45 vs. 60–73 cm long, flowers sessile vs. pedicellate, sepals 28–33 vs. 39–40 mm long, and dark violet vs. violet petals.

Type:—MEXICO. Morelos: municipio de Jantetelco, en el peñón de Chalcatzingo creciendo rupícola en las paredes verticales del peñón con vegetación xerófila, 18° 40' 32" N, 98° 46' 18" W, ca. 1400 m, 4 March 2014, R. Cerros T., L. G. Ávila T. & A. Barranco 2969 (holotype UAMIZ(x11!), isotypes HUMO(x4!), IEB(x8!), MEXU(x5!)).

*Plant* saxicolous, stemless or short caulescent, solitary, flowering 1.5–2 m tall; rosette of the tank type, 1–1.25 m diam. in its broadest part; the stem, when produced, 20–35 cm long, 9–10 cm diam. *Leaves* rosulate, numerous; *sheaths* pale brown abaxially, dark brown adaxially, oblong to suborbicular, densely punctate-lepidote on both surfaces, glabrous towards the base and margins, 16–22 cm long, 17–22 cm wide; *blades* green, narrowly triangular, abaxially lepidote between the veins and adaxially glabrous, 51–54 cm long, 10–14 cm wide, long attenuate. *Inflorescence* paniculate, terminal, erect, once branched, with 25–32 ascending spikes; *peduncle* green, terete, erect, glabrous, 30 cm long, 5.4 cm diam. at the base, fully covered by the sheaths of the bracts; *peduncle bracts* green, the lower ones foliaceous, similar in shape and size to the leaves, exceeding the peduncle, decreasing gradually in size towards distal portion of the peduncle, 49–72 cm long, densely imbricate, the upper ones with oblong to suborbicular sheaths, 9–11 cm long, 6–7.7 cm wide, the blades narrowly triangular, glabrous to sparsely punctulate-lepidote adaxially and punctulate-lepidote between the veins abaxially, 39–40 cm long, 4.2–4.7 cm wide; *primary bracts* with recurved blades, upward decreasing gradually in size, the basal ones green, foliaceous and extended, longer than the spikes, similar in shape and size as the upper peduncle bracts, upward soon shorter than spikes, rose, vaginiform, with the sheaths ovate-elliptic, glabrous adaxially, very sparsely punctulate-lepidote abaxially; *spikes* divergent and slightly ascending, long stipitate, complanate, linear, acute, 17–19-flowered, 28–45 cm long including the stipe, 1.5–1.9 cm wide; *stipes* initially erect then curving outward, 9–16(–25) cm long, the basal ebracteate portion 2.1–3.2 cm long, 9–12 mm diam.; *floral bracts* rose, ovate when flattened, glabrous and waxy pruinose abaxially, adaxially lepidote at the apex and sparsely so at the base, imbricate, bicarinate towards the base, conspicuously veined towards the apex, 12–42 mm long, 19–20 mm wide, acute, with hyaline margins, exceeding the internodes and sepals; *flowers* distichous, erect, sessile, corolla tubiform; *sepals* free, pale green, elliptic, glabrous, 28–33 mm long, 10–13 mm wide, acute, the two adaxial ones slightly carinate at the base; *petals* dark violet in the apical half, white in the basal half, very narrowly oblong-elliptic, glabrous, 44–49 mm long, 6–7 mm wide, emarginate and slightly divergent at the apex; *stamens* subequal, exerted, filaments free,





**FIGURE 1.** *Tillandsia chalcatzingensis* A. Habitat. B. Habit. C, D. Monument called “el rey”, include petroglyphs that resembles *Tillandsia chalcatzingensis*. Photos R. Cerros and A. Espejo.





**FIGURE 2.** *Tillandsia chalcatzingensis* A. Inflorescence. B. Spike and detail with a flower. C. Floral bract. D. Flower. E. Petals. F. Androecium and gynoecium. Photos. R. Cerros and A. Espejo.



**FIGURE 3.** Spike details of A. *Tillandsia chalcatzingensis*. B. *T. superinsignis*. C. *T. thysigera*. D. *T. tonalaensis*. Abbreviations used: FbL. Floral bract length; BeP. basal ebracteate portion of pedicle.

white, flattened for its entire length and twisted in basal portion, 44–55 mm long; *anthers* yellow, oblong, 4–5.5 mm long, 1–1.4 mm wide, dorsifixed below the center; *ovary* green, ovoid, 6.9–10 mm long, 4–5 mm diam.; *style* white to distally violet, slender, 46–52 mm long, exceeding the stamens; *stigma* of the conduplicate spiral type (Brown & Gilmartin, 1984), stigmatic branches violet, 2–3 mm long. *Capsule*, oblong-elliptic, shortly rostrate, 20–23 mm long, 5–6 mm diam.; *seeds* brown, fusiform, 3–4 mm long, with a yellowish or whitish, 9–16 mm long coma.

**Distribution and habitat:**—So far, the new species is known only from the Peñón de Chalcatzingo, also called Cerro Gordo or Cerro de la Cantera, that is part of the Sierra del Camello or Sierra de Chalcatzingo, an igneous rock formation (granodiorites) located in the eastern part of the state of Morelos, Mexico (Figure 4). There it grows saxicolously on the vertical rock walls of the peñón with xerophilous scrub (Figures 1A, B). The vegetation in the surroundings of the Peñón region is tropical dry forest with a warm sub-humid climate.

**Etymology:**—The specific epithet refers to the place where this species was collected: the archaeological site of Chalcatzingo, an important pre-classic ceremonial center, known for its monuments and petroglyphs of Olmec influence. It should be noted that some monuments founded in the area, particularly the “el rey” include petroglyphs that resembles *Tillandsia chalcatzingensis* (Figure 1C). There are only two saxicolous native plants of the genus in this area, *Tillandsia hubertiana* Matuda (1975: 8) and *T. chalcatzingensis*. Both were compared with this petroglyph and the second ones matches better (Figures 1B, D).

**Comments:**—The new species can be confused with *Tillandsia superinsignis*, *T. thyrsigera* and *T. tonalaensis* (Figure 3) due to its saxicolous habit, violet flowers and complanate, linear and acute spikes. However, it differs from these two species by the number of flowers per spike and by the size of the flowers (Table 1). The geographical distribution of all mentioned species are also different (Figure 4).

**Additional specimens examined (paratypes):**—MEXICO. Morelos: municipio de Jantetelco, en el peñón de Chalcatzingo, ladera E, 18° 40' 26" N, 98° 46' 14" W, 1415 m, collected 4 February 2014, pressed 13 May 2015, E. González-Rocha, R. Cerros T., L. G. Ávila T. & A. Barranco 315 (UAMIZ!).

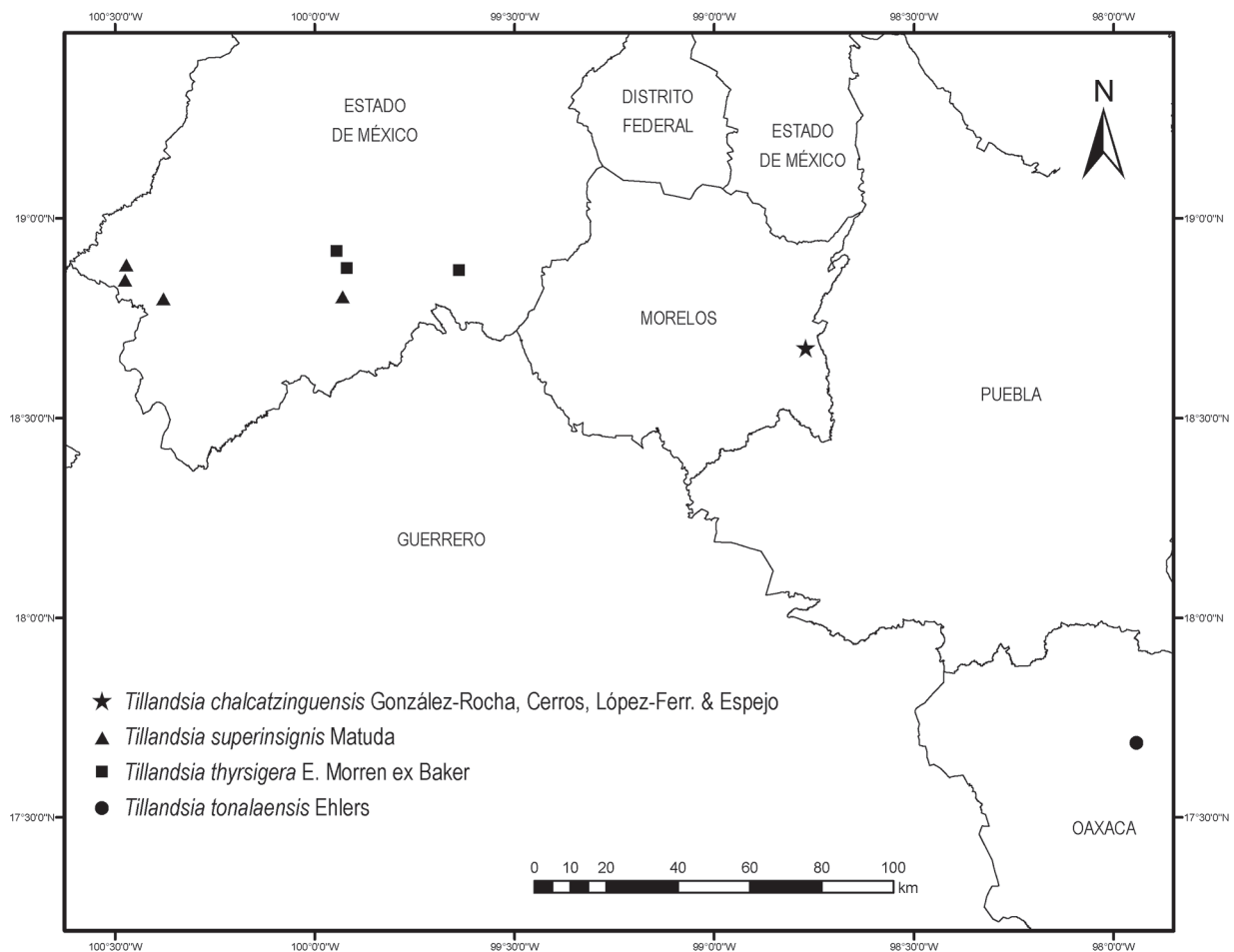


FIGURE 4. Distribution map of *Tillandsia chalcatzingensis*, *T. superinsignis*, *T. thyrsigera*, and *T. tonalaensis*.



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