Lycianthes textitlaniana, a New Species from Southern Mexico

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ABSTRACT

A new species, *Lycianthes textitlaniana* E. Dean (Solanaceae), is described from the Sierra Madre del Sur of the state of Oaxaca, Mexico. The affinities of *L. textitlaniana* are uncertain, because it differs from other known species of *Lycianthes* in its combination of glandular pubescence, long calyx appendages, and turbinate fruit with dry mesocarp. The seeds and pubescence of *L. textitlaniana* are somewhat similar to those of *L. pringlei* (B. L. Rob. & Greenm.) Bitter of western Mexico. To help with identification of this new species, *L. textitlaniana* is compared here with *L. pringlei*, *L. surotatensis* Gentry, *L. gorgonea* Bitter, *L. purpusii* (Brandegee) Bitter, and *L. dejecta* (Fernald) Bitter, and a photograph of the seed is provided. Published on-line www.phytologia.org *Phytologia 99(4): 241-248 (Dec. 18, 2017).* ISSN 030319430.

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Lycianthes (Dunal) Hassler (Solanaceae) is native to both the New and Old Worlds and includes 150 to 200 species (Hunziker, 2001). The majority of its taxa are distributed in the New World (from Mexico to Argentina), with ca. 40 taxa native to Mexico (ca. 15 endemic, one of them described here) (Villaseñor, 2016). The genus is the closest relative of the chile pepper genus *Capsicum* L. (Walsh & Hoot, 2001; Bohs & Olmstead, 1997). The German botanist Georg Bitter, who monographed the genus *Lycianthes*, was the first worker to point out that *Lycianthes* and *Capsicum* share a similar calyx morphology in which the five sepal lobes are truncated into a sleeve, below which may protrude five to ten appendages (commonly called calyx teeth) (Bitter, 1919). However, while *Capsicum* species have anthers that dehisce by longitudinal slits, the species of *Lycianthes* typically have poricidal anther dehiscence.

While working on species descriptions for all Mexican and Central American species of *Lycianthes*, the first author found a specimen of a new *Lycianthes* species under the name *Lycianthes gorgonea* Bitter at the Herbario Nacional, Universidad Nacional Autónoma de México (MEXU). It was immediately obvious that this was a new species due to a unique combination of characters: glandular pubescence, long calyx appendages, turbinate fruits with dry mesocarp, and seeds with deeply indented "pits" between wavy cell walls, producing an ornamented surface (Figures 1 and 2). The turbinate fruits with dry mesocarp are unlike any other known *Lycianthes*. The pubescence and seed surface somewhat resemble those of *L. pringlei*, but it differs from that species in having very long calyx appendages.

This species is only known from one locality in Mexico and a single collection made in August, 2006 by Alma Zárate-Marcos in a canyon by Colonia Nueva, to the west of the town of Santiago Textitlán, Sierra Madre del Sur, Oaxaca. Ms. Zárate-Marcos made the collection as part of a floristic project managed by one of the co-authors (Salas-Morales) in her role as Director of the "Sociedad para el Estudio de los Recursos Bióticos de Oaxaca" (SERBO). Santiago Textitlán is a community with forest management practices certified by the Forestry Stewardship Council and has been recognized for its good forest management (Blackman et al., 2015). Before this project, the flora of the region of Santiago Textitlán was undocumented. Since the initiation of the Santiago Textitlán floristic project, nearly 7500 specimens in 140 families, 517 genera and 1172 species have been collected in the region (figures from the SERBO database). In addition, several new species from this region have been described (Borhidi et al., 2008; Turner, 2013).

Although we are describing this species based on very limited material (only the type collection), the material is very complete, with flowers, mature fruits, and seeds. By describing and naming this very unusual species of *Lycianthes*, we are adding to the knowledge of the biodiversity of Oaxaca, as well as facilitating the identification of future collections of this species. Terminology here follows that of previous papers on this genus (Dean, 1998; Dean et al., 2007).

Lycianthes textitlaniana E. Dean, sp. nov. TYPE: Mexico: State of Oaxaca, Distrito Sola de Vega, Municipio Santiago Textitlán, Colonia Nueva, 1562 m, 18 Aug 2006, *Alma Zárate Marcos AZM-274* (holotype: MEXU-1229513 (Figure 1); isotype: SERO-45464).

Diagnosis. This species is unlike any other *Lycianthes* species in its combination of glandular trichomes, long calyx appendages, dry turbinate and apiculate berries lacking fleshy mesocarp, and round-edged seeds with pitted surfaces. Indument and seeds are somewhat similar to those of *L. pringlei*, but *L. pringlei* lacks calyx appendages and has ovoid fruits with fleshy mesocarp.

Shrub or vine, ca. 0.5 m tall (reported as an herb on the label of the only known collection, but stems are obviously woody). **Indument** of clear to white, multicellular, simple, glandular (glandular tip golden-yellow to grey), wavy to patent trichomes 0.25–1.5 mm long. **Stems** pale green (drying tan) when young, not much compressed when dried, becoming brown and woody with age, moderately to densely pubescent. Upper sympodial branching points a mixture of dichasial and monochasial branching (mostly monochasial), the upper sympodial units 1–5 cm long, 1–2.5 mm in diameter, difoliate, the leaves often geminate or unifoliate due to loss of small geminate leaves. **Leaves** simple, usually paired and unequal in size, the large ones with blades 3–7 × 1.5–3 cm, the smaller ones 1.5–5 × 0.5–2 cm, the leaf pairs similar in shape, the blades ovate, to elliptic, chartaceous, moderately to densely pubescent; major veins 4–5 on either side of the midvein; base truncate, cuneate, or attenuate, sometimes oblique; margin irregularly wavy; apex acuminate; petioles absent or 0.1–1 cm long. **Flowers** 5-merous, solitary, axillary, the axes moderately to densely pubescent; peduncles absent; pedicels ca. 20–25 mm long and erect in flower, 20–30 mm long and arching to deflexed in fruit; calyx 3–3.5 mm long, 3.5–4 mm in diameter, campanulate, moderately to densely puberulent, the margin truncate, with 10 spreading, linear, basally flattened appendages, 7–10 mm long emerging ca. 0.5 mm below calyx rim; fruiting calyx accrescent, widely bowl-shaped, 4–6 mm long, 9–12 mm in diameter, the appendages to 15 mm long; corolla oriented horizontally, 1.2–1.5 cm long, rotate, mostly entire (with shallow notches), with abundant interpetalar tissue, purple adaxially, color of abaxial side unknown, glabrous, open when collected, uncertain of timing of diurnal movements; stamens unequal, with four short filaments 1–2 mm long and one long filament 2–3 mm long, glabrous, anthers 3.5-4 mm long, elliptic to lanceolate, not connivent, yellow, the pores ovate, nearly terminal, dehiscing upward, not opening into longitudinal slits; ovary not examined; style linear, ca. 7 mm long, glabrous; stigma capitate, decurrent down two sides. **Fruit** a dry berry lacking juicy mesocarp, 13–15 mm long, 9–12 mm in diameter, turbinate, the tip apiculate, pale greenish orange

(possible darker) when mature, glabrous, lacking sclerotic granules; seeds ca. 50–80 per fruit, 1.75–2 × 1.25–1.5 mm, round-edged, laterally compressed, reniform, tan-orange, the surface pitted (Figure 2).

Distribution. *Lycianthes textitlaniana* is only known from the type collection from the state of Oaxaca, Mexico, in the District of Sola de Vega, just outside of the town of Santiago Textitlán at 1562 m in elevation (Figure 3).

Habitat. Three of the co-authors (Dean, Torres-Colín, and Hinojosa-Espinosa) attempted to locate the new species in the field on September 7–8, 2017, after obtaining permission to explore the collection area from local authorities on September 7. Despite extensive exploration of the canyons near the latitude/longitude coordinates given on the collection label, the species was not located, although another *Lycianthes* species, *L. acapulcensis* (Baillon) D'Arcy, collected by Ms. Zárate-Marcos in the same location on the same date was encountered. The vegetation of the canyons that we explored consisted of Pine-Oak forest with elements of cloud forest and palms with the following species: *Quercus peduncularis* Née, *Arbutus xalapensis* Kunth, *Oreopanax, Senna hirsuta* (L.) H. S. Irwin & Barneby, *Piper umbellatum* L., *Miconia glabrata* Cogn., *Psacalium cirsiifolium* (Zucc.) H. Rob & Brettell, *Bidens pilosa* L., *Podachaenium eminens* (Lag.) Sch. Bip., *Achimenes antirrhina* (DC.) C. V. Morton, *Crusea hispida* (Mill.) Rob., *Begonia gracilis* Kunth, *Hyptis capitata* Jacq., *Micropleura renifolia* Lag., *Phaseolus leptostachyus* Benth., and *Canavalia hirsuta* (M. Martens & Galeotti) Standl. The trunks of the trees in the areas had fire scars, and members of the community reported that a fire went through the area sometime after 2006. The effect of the fire on this species is not known but could be one reason that we could not locate it at the type locality.

Phenology. The type specimens, collected in mid-August, each have one flower and several mature fruits. Therefore, the species most likely begins flowering in July, near the beginning of the rainy season, and probably continues fruiting in September.

Etymology. The specific epithet honors the community of Santiago Textitlán, Oaxaca.

DISCUSSION

Lycianthes textitlaniana is unlike any other known species in the genus, and it can be easily distinguished from other Mexican species with glandular trichomes (*L. pringlei* and *L. surotatensis*) by its turbinate fruit shape and dry mesocarp (Table 1). A number of *Lycianthes* species have calyx appendages as long as those found in *L. textitlaniana*, but none of the other species with long calyx appendages also have simple, glandular trichomes and turbinate fruit. Table 1 provides the characteristics of four other species with relatively long calyx appendages for comparison (*L. surotatensis*, *L. gorgonea*, and *L. purpusii*). Turbinate fruits are found in several of the Mexican species of series *Meizonodontae* (such as *L. ciliolata* (M. Martens & Galeotti) Bitter and *L. dejecta* (Fernald) Bitter) (Bitter, 1919). The other species with turbinate fruits have eglandular trichomes. The seeds of *L. textitlaniana* are most similar to those of *L. pringlei* in having a pitted seed surface (Table 1; Dean et al., 2007). The closest relative of *L. textitlaniana* is not known.

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Figure 1. Image of holotype of *Lycianthes textitlaniana*, *Alma Zárate Marcos AZM-274* (MEXU-1229513). Use of specimen courtesy of the Herbario Nacional de México, Universidad Nacional Autónoma de México.

Figure 2. Seed of *Lycianthes textitlaniana* (taken from the holotype *Alma Zárate Marcos AZM-274* (MEXU-1229513)); scale bar equals 0.3 mm. Photograph, by D. McNair, produced by stacking 45 images taken with a 10x objective lens attached to a Nikon DSLR. Use of specimen courtesy of the Herbario Nacional de México, Universidad Nacional Autónoma de México.

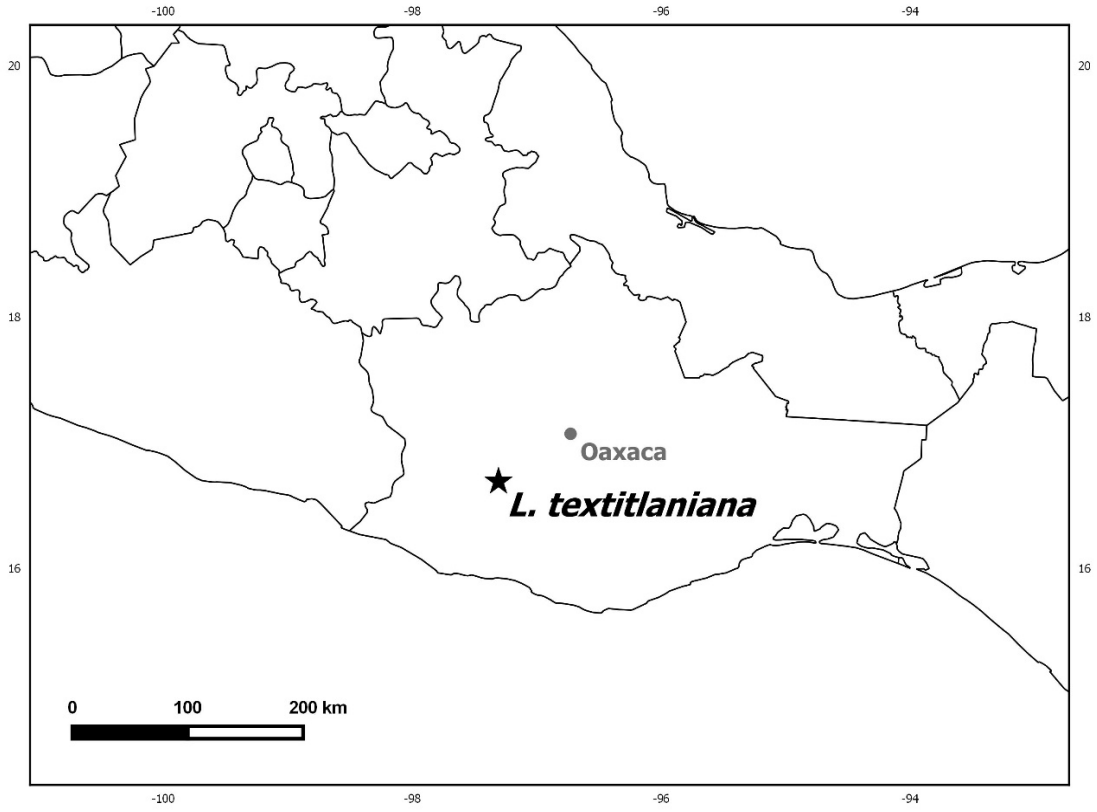

Figure 3. Map of known distribution of *Lycianthes textitlaniana*.

Table 1. Comparison of six characters in *Lycianthes textitlaniana, L. pringlei, L. surotatensis, L. gorgonea, L. purpusii*, and *L. dejecta.*

Species	**textitlaniana**	**pringlei**	**surotatensis**	**gorgonea**	**purpusii**	**dejecta**
Habit	Probably shrub or vine	Shrub	Shrub	Vine	Vine	Perennial herb
Trichome type	Simple, glandular	Simple, glandular	Simple, glandular and eglandular	Simple, eglandular	Simple to branched, eglandular	Branched to stellate, eglandular
Calyx appendage length in flower	7–10 mm long	Appendages reduced to protuberances	2–10 mm long	7–15 mm long	8–12 mm long	2–7 mm long
Fruit shape	Turbinate, tip apiculate	Ovoid, tip rounded	Spheric to depressed spheric, tip rounded	Spheric to depressed spheric, tip rounded	Spheric, tip rounded	Turbinate, tip apiculate
Mesocarp	Scant pulp, appearing dry, seeds free	Juicy pulp, surrounding seeds	Juicy pulp, surrounding seeds	Juicy pulp, surrounding seeds	Juicy pulp, surrounding seeds	Juicy pulp, surrounding seeds
Seed surface	Pitted	Pitted	Lacking pits	Lacking pits	Lacking pits	Lacking pits, fibrils on walls