

***Lycianthes glabripetala* (Solanaceae) a New Species of series  
*Strigulosae* from Queretaro, Mexico**

**Ellen A. Dean and Mayra Huerta**

UC Davis Center for Plant Diversity, Plant Sciences M.S. 7, One Shields Avenue Davis, California  
95616, USA eadean@ucdavis.edu

and

**Darrell Brandon**

University of Memphis Herbarium, Department of Biological Sciences, 3700 Walker Avenue, Ellington  
Hall Room 113, Memphis, Tennessee 38152-6080, USA

**ABSTRACT**

A new species, *Lycianthes glabripetala* E. Dean (Solanaceae), is described from the state of Queretaro, Mexico. *Lycianthes glabripetala* is closely related to *Lycianthes amatitlanensis* in series *Strigulosae*. It differs from that species in having curled trichomes on the underside of the leaves, a larger corolla, and nearly glabrous corolla lobes. Published on-line [www.phytologia.org](http://www.phytologia.org) *Phytologia* 100(1): 27-36 (Mar 16, 2018). ISSN 030319430.

**KEY WORDS:** *Lycianthes*, Solanaceae, Mexico, Queretaro, taxonomy

---

With approximately 150 to 200 species, the genus *Lycianthes* (Dunal) Hassler (Solanaceae) contains taxa in both the New and Old Worlds (Hunziker, 2001). The majority are distributed in the New World (from Mexico to Argentina), with about 43 taxa native to Mexico (ca. 18 endemic, one of them described here) (Villaseñor, 2016). The genus is the closest relative of the chili pepper genus *Capsicum* L. (Bohs & Olmstead, 1997; Särkinen et al., 2013; Walsh & Hoot, 2001); the German botanist Georg Bitter, who monographed the genus *Lycianthes*, first pointed out the similarity in calyx structure between *Lycianthes* and *Capsicum* (Bitter, 1919). In both genera, the five sepal lobes are truncated into a sleeve, below which may protrude five to ten appendages (commonly called calyx teeth). However, while *Capsicum* species have anthers that dehisce by longitudinal slits, the species of *Lycianthes* typically have poricidal anther dehiscence.

In his monograph on *Lycianthes*, Bitter created a series *Strigulosae*, for a cohesive group of 24 mostly South American species distinguished by their simple strigose hairs, shrub life form, and stellate corollas (Bitter 1919). In Mexico and Central America, the most commonly collected member of series *Strigulosae* is *Lycianthes amatitlanensis* (J.M.Coult. & Donn.Sm.) Bitter, originally described from Guatemala (Donnell Smith, 1904) but thought to occur from Mexico to South America (Benítez.de Rojas & D'Arcy, 1997; Villaseñor, 2016). While working on the treatment of *Lycianthes* for "*Flora del Bajío y de Regiones Adyacentes*" (Instituto de Ecología, A.C., ongoing), we were sent three collections of a new *Lycianthes* belonging to series *Strigulosae* from the state of Queretaro that differs from *L. amatitlanensis* in several characters (Table 1). It is described as a new species below.

**METHODS**

The species concept used in this taxonomic treatment is a morphological one (Cronquist, 1978), and the circumscription of the species described here is based on examination of herbarium specimens. For the species description, we measured three specimens sent to us as gifts from the Instituto de Ecología del Bajío (IEB) now housed at the UC Davis Center for Plant Diversity (DAV). Our observations were compared with measurements on specimens of other species of series *Strigulosae*, including type

specimens, from: MO, NY, and US. Throughout this work, herbarium specimens with an accession number are cited with the herbarium acronym followed by the number. In cases where the specimen has an accession number and a barcode number, only the barcode number is cited. Herbarium codes were obtained from Index Herbariorum online (Theirs, Continuously Updated). In order to create maps, specimens were georeferenced using google maps online or Geolocate, an online software-mapping package (Rios and Bart 2010). Terminology here follows that of previous papers on this genus (Dean et al., 2017).

***Lycianthes glabripetala*** E. Dean, sp. nov. TYPE: Mexico: State of Queretaro, Mpio. Landa, 10 Km al noreste de Agua Zarca, sobre camino a Neblinas, 1100 m, 23 Jun 1988, *Jerzy Rzedowski 46837* (holotype: DAV-217731 [Figure 1]; isotype: IEB-193504).

**Diagnosis.** This species is similar to *Lycianthes amatitlanensis* but differs in having diagnostic characters such as wavy to curved trichomes along the midvein of the abaxial side of the leaf and larger flowers that are nearly glabrous on the abaxial side of the corolla lobes.

**Herbs to small shrubs**, 0.5–2 m tall. **Indument** of off-white to tan, multicellular, simple, eglandular, acute, curved to wavy, usually appressed-antrorse [rarely patent] trichomes 0.25–1.25 mm long. **Stems** green when young, somewhat compressed upon drying, becoming light brown and woody with age, moderately to densely pubescent. Upper sympodial branching points mostly monochasial with a few dichasial branching points, the upper sympodial units 1–4 cm long, 1–2.5 mm in diameter, difoliate, the leaves usually geminate. **Leaves** simple, those of a geminate pair unequal in size, the larger ones with blades (4.5–) 8.5–13 × (1.8–) 2.5–4.5 cm, ovate to elliptic, the smaller ones with blades 1.3–4.5 × 0.8–2.1 cm, usually ovate, moderately to densely pubescent with soft, appressed to patent, often curved or bent trichomes to 1.25 mm long, these more numerous on the veins and appearing woolly along the midvein of the abaxial side, the major veins on large leaves (6–) 8–11 on each side of the midvein, the base cuneate, usually oblique (sometimes rounded in smaller leaves), the margin entire to delicately wavy, the apex acute to acuminate, the petioles absent or 0.1–1.5 cm long. **Flowers** 5-merous, solitary, axillary, the axes moderately to densely pubescent with usually appressed [rarely ascending] trichomes 0.25–1 mm long; peduncles absent; pedicels 9–15 mm long and arching in flower, 12–20 mm long and arching in fruit; calyx 2–2.5 mm long, 2.5–3 mm in diameter, obconic to narrowly campanulate, moderately pubescent with hairs similar to stem, the margin truncate to undulate, with 5–10 spreading linear appendages 0.5–2 mm long emerging 0.25–0.5 mm below rim; fruiting calyx slightly accrescent, widely bowl-shaped to plate-shaped, ca. 1.5–2 mm long, 4–6 mm in diameter, the teeth withering with age; corolla oriented horizontally to nodding, 1–1.2 cm long, campanulate, to reflexed, stellate, white, adaxial markings unknown, abaxially nearly glabrous (sparsely pubescent along the midvein); stamens equal, the filaments ca. 0.75–1 mm long, glabrous, the anthers ca. 3 mm long, lanceolate, abruptly narrowed at the tip, not connivent, the anther color unknown, the pores ovate, apical, opening upwards; pistil with glabrous ovary, the style ca. 8 mm long, linear, glabrous, widened distally into the stigma, the stigma capitate. **Fruit** a berry, ca. 3.2–6 mm long, 3.1–7 mm diameter, globose, orange at maturity, glabrous, lacking sclerotic granules; seeds ca. 30–60 per fruit, 1–1.2 × 0.5–1 mm, compressed but not flat, irregular in shape, semi-circular, depressed-ovate, triangular, or rhombic, orange, sometimes with one shallow ridge, the surface with shallow serpentine pattern.

**Distribution.** All three currently known *Lycianthes glabripetala* collections are from the Municipio of Landa on the east side of the state of Queretaro, Mexico (Figure 2).

**Habitat.** Shady canyons, slopes. Vegetation types include: bosque mesofilo de montaña (cloud forest), including oak forest at 1,040–1,100 m in elevation.

**Phenology.** Flowers present in June, and fruits present in July.

Etymology. The specific epithet describes the nearly glabrous corolla lobes, which differ from the closely related *Lycianthes amatitlanensis*.

Additional Specimens Examined. Mexico: State of Queretaro, Mpio. Landa, 1 Km al oriente del Puerto del Sabino, 1040 m, 4 Oct 1988, *H. Rubio* 190 (DAV-214479, IEB-193287); Mpio. Landa, 1 Km al sureste de El Naranjo, 1050 m, 24 Jul 1989, *H. Rubio* 909 (DAV-217888, IEB-193286).

## DISCUSSION

The species of series *Strigulosae* are poorly studied, and we hesitated to describe this new species, given the work that still needs to be done on the series. However, as part of a project to prepare species descriptions for the Mexican and Central American species of *Lycianthes*, we have attempted to understand the morphological variation of the populations of series *Strigulosae* in this region and assign names to populations. We found that the populations of *Lycianthes glabripetala* are disjunct from known populations of *Lycianthes amatitlanensis* in Mexico (Figures 2 and 3). In addition, *Lycianthes glabripetala* differs from other members of series *Strigulosae* known from Mexico and Guatemala (Table 1) in combining woolly curved trichomes on the abaxial side of the leaves, a relatively large corolla (to 1.2 cm long), nearly glabrous surfaces on the abaxial side of the corolla lobes, and a pedicel length of 9–15 mm in flower and 12–20 mm in fruit (Figures 4a, 5a). The only other member of series *Strigulosae* known from Mexico, *L. amatitlanensis*, usually has straight trichomes that project at a 90-degree angle from the midvein of the abaxial leaf surface, corollas 0.5–0.8 cm long, and very evident long trichomes on the abaxial side of the corolla lobes with these hairs usually tufted at the tip of the lobe (Figures 4b, 5b). *Lycianthes inconspicua* Bitter, a member of series *Strigulosae* described from Guatemala (Bitter, 1919) with a distribution that likely ranges to Panama, can have flowers as long as *L. glabripetala*, and has variable pubescence on the abaxial side of the corolla lobes, but it has longer pedicels (15–30 mm in flower and 30–35 mm in fruit), and it has delicate straight trichomes that are tightly appressed to the midvein of the abaxial leaf surface. *Lycianthes glabripetala* is known at this time from the highlands of central Mexico in the state of Queretaro in cloud forest vegetation above 1000 m in elevation; this habitat is similar to that of *L. inconspicua* but differs from the most common habitat of *L. amatitlanensis*, a species that is usually found below 1000 m in elevation, often below 500 m, in humid tropical forest.

## ACKNOWLEDGEMENTS

We thank: Jean Shepard for her help with receiving loans at UC Davis; the IEB, MO, NY, and US herbaria for loans and access to specimens used in this project; DAV, MO and US for granting permission to scan the specimens used in Figures 1, 3, 4, and 5; Daniel McNair for photographing the leaf in Figure 5B for our poster on series *Strigulosae* and permitting us to crop and adapt his photograph for this publication; Victoria Sosa and Michael Nee for helpful comments which much improved the manuscript; Michael Nee for helpful suggestions on the morphology and evolution of series *Strigulosae*; NSF award 1457351 to Ellen Dean for working on species descriptions for *Lycianthes*; NSF award 1457351 for Research Experience for Undergraduates support for Mayra Huerta; and Shirley Tucker for salary support for Daniel McNair.

## LITERATURE CITED

- Benítez de Rojas, C. and W. D'Arcy. 1997. The genus *Lycianthes* (Solanaceae) in Venezuela. *Ann. Missouri Bot. Gard.* 84: 167–310.  
 Bitter, G. 1919. Die Gattung *Lycianthes*. *Abh. Nat.Ver. Bremen* 24(2): 292–520.  
 Bohs, L. and R. Olmstead. 1997. Phylogenetic relationships in *Solanum* (Solanaceae) based on *ndhF* sequences. *Syst. Bot.* 22: 5–17.

- Cronquist, A. 1978. Once again, what is a species? Pp. 3–20. In: J. A. Romberger (ed.), Biosystematics in agriculture. Allanheld and Osmun, Montclair, New Jersey.
- Dean, E., M. Reyes, R. Fauré, G. Walden, D. Brandon, D. Canington, and D. McNair. 2017. Identification of the species of *Lycianthes* series *Tricolores* (Capsiceae, Solanaceae). *Syst. Bot.* 42: 191–209.
- Donnell Smith, J. 1904. Undescribed plants from Guatemala and Other Central American Republics XXVI. *Bot. Gaz.* 37: 417–423.
- Hunziker, A. T. 2001. *Genera Solanacearum: The genera of Solanaceae illustrated, arranged according to a new system*. Ruggell, Liechtenstein: A. R. G. Gantner.
- Instituto de Ecología, A.C. Ongoing. *Flora del Bajío y Regiones Adyacentes*. Centro Regional del Bajío Pátzcuaro, Michoacán, Mexico.
- Särkinen, T., L. Bohs, R. Olmsted, and S. Knapp. 2013. A phylogenetic framework for evolutionary study of the nightshades (Solanaceae): a dated 1000-tip tree. *BMC Evol. Biol.* 13: 214.
- Thiers, B. Continuously Updated. Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium.  
<http://sweetgum.nybg.org/science/ih/>.
- Villaseñor, J. 2016. Checklist of the native vascular plants of Mexico. *Revista Mexicana de Biodiversidad* 87: 559–902.
- Walsh, B. and S. Hoot. 2001. Phylogenetic relationships of *Capsicum* (Solanaceae) using DNA sequences from two noncoding regions: the chloroplast *atpB-rbcL* spacer region and nuclear *waxy* introns. *Internatl. J. Pl. Sci.* 162: 1409–1418.



Figure 1. Image of holotype of *Lycianthes glabripetala*, (Rzedowski 46837, DAV-217731). Use of specimen image courtesy of the UC Davis Center for Plant Diversity.

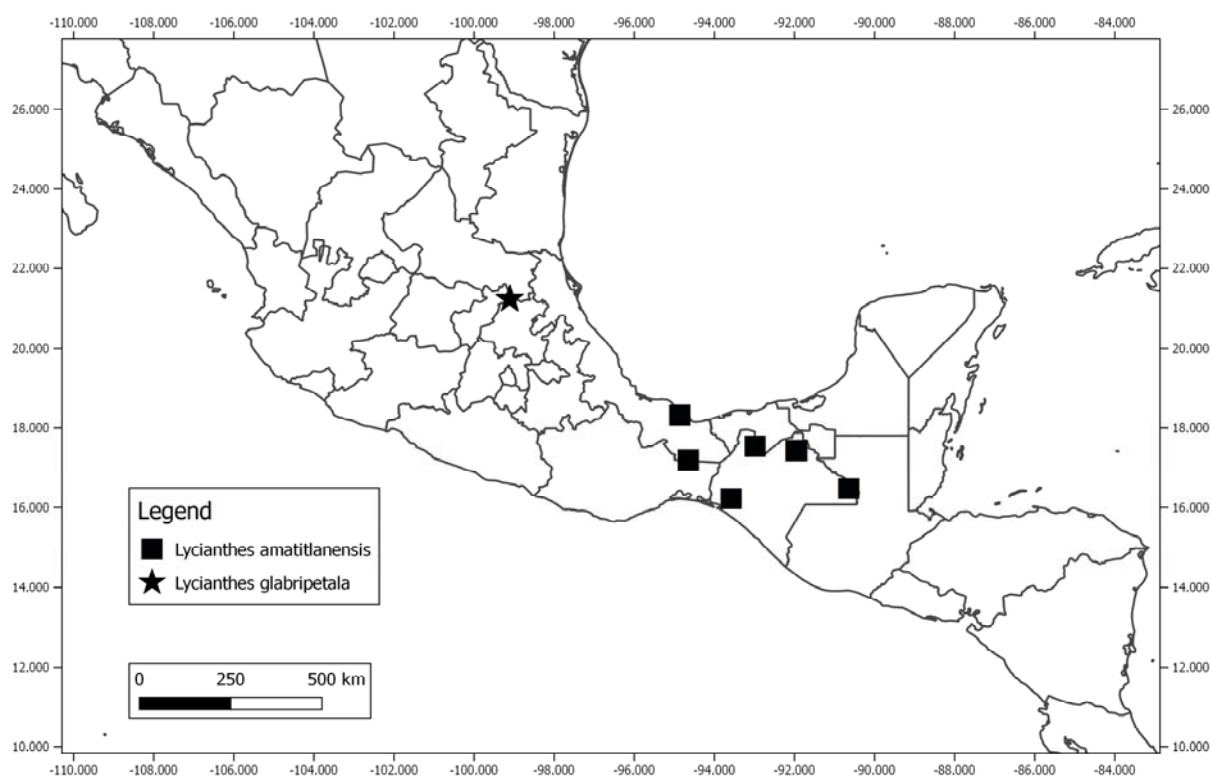


Figure 2. Map of known specimens of *Lycianthes glabripetala* and specimens of *Lycianthes amatitlanensis* in Mexico that have been confirmed by the first author.





Figure 3. Image of isoelectotype of *Solanum amatitlanense* Coul. & Donn.Sm. (*Lycianthes amatitlanensis*), (von Tuerckheim 8488, US-01014253). Use of specimen image courtesy of the Smithsonian Institution.

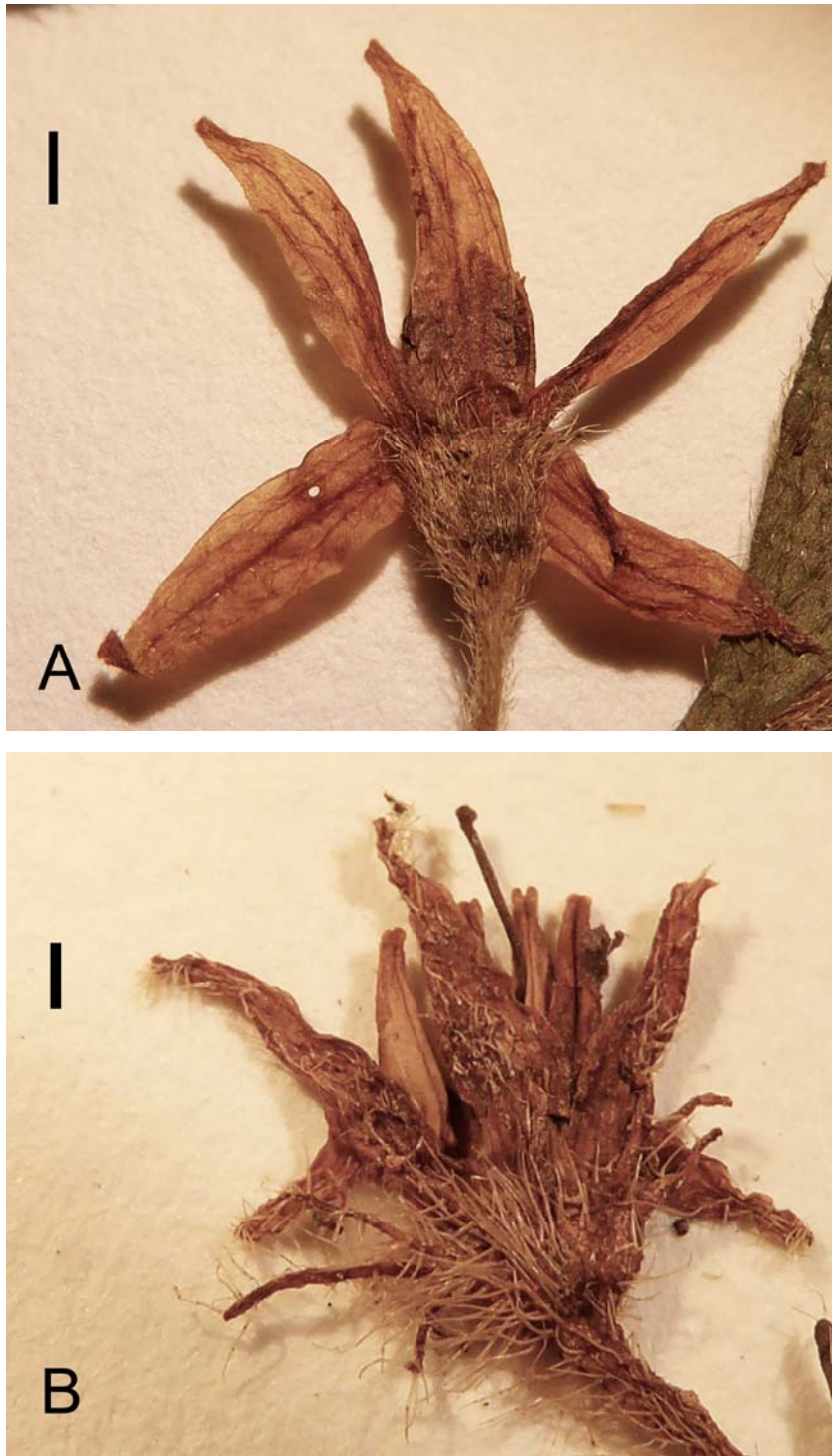


Figure 4. A. Scale bar equals 2 mm. Flower of *Lycianthes glabripetala* (Rzedowski 46837, DAV-217731) showing the relatively large corolla with nearly glabrous abaxial surfaces. B. Scale bar equals 1 mm. Flower of *Lycianthes amatitlanensis* (D'Arcy 18034, MO-4401624) showing the relatively small corolla with pubescent abaxial surfaces. Use of specimen images courtesy of the UC Davis Center for Plant Diversity and the Missouri Botanical Garden.



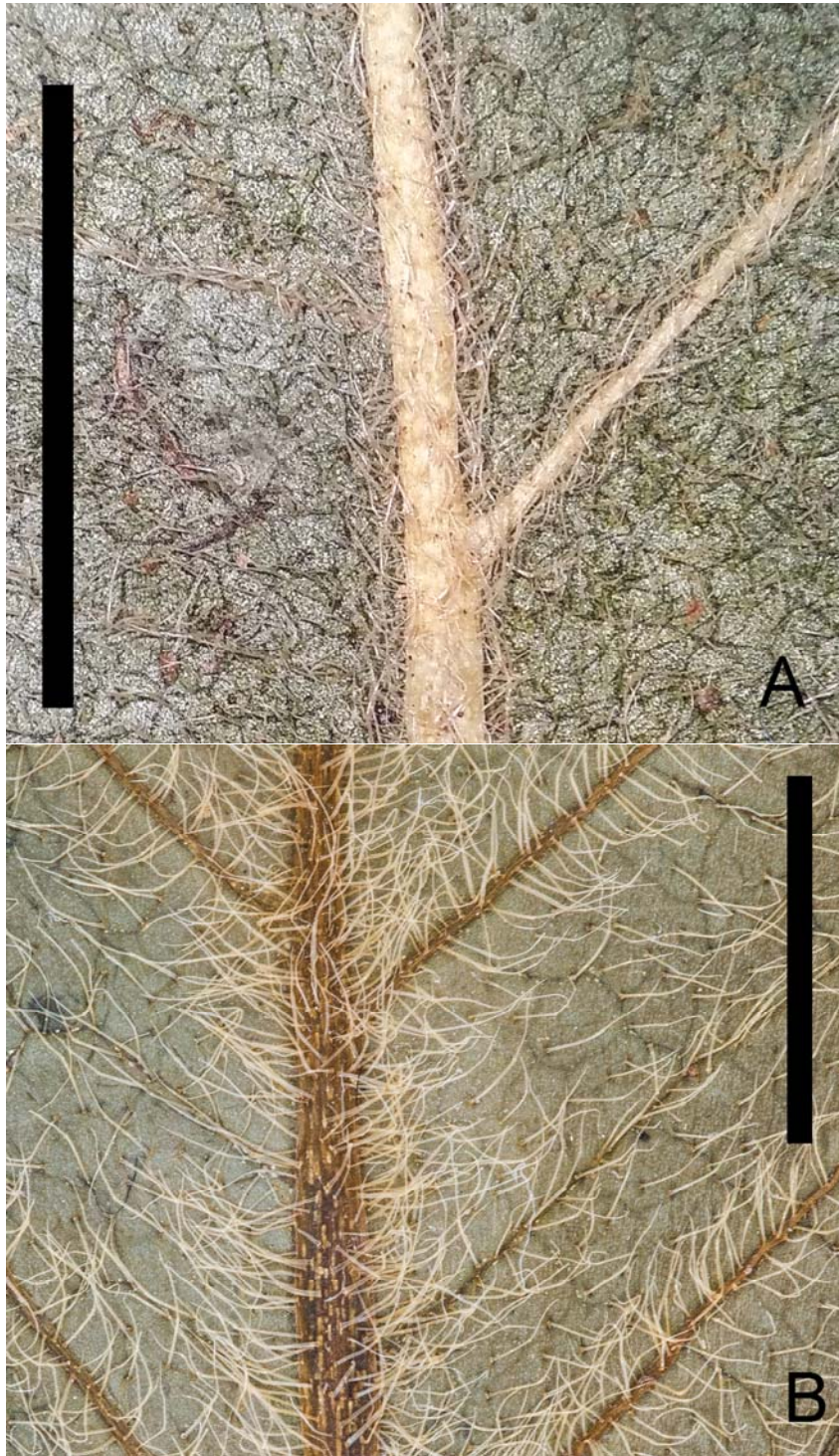


Figure 5. Scale bar equals 5 mm. A. Abaxial leaf surface of *Lycianthes glabripetala* (Rubio 190, DAV-217888) showing wavy to bent trichomes along midvein. B. Abaxial leaf surface of *Lycianthes amatitlanensis* (von Tuerckheim 8488, US-01014253) showing straight trichomes that project at a 90-degree angle from the midvein. Use of specimen images courtesy of the UC Davis Center for Plant Diversity and the Smithsonian Institution.

Table 1. Comparison of seven characters in *Lycianthes glabripetala*, *L. amatitlanensis*, and *L. inconspicua*.

Species	<b>L. glabripetala</b>	<b>L. amatitlanensis</b>	<b>L. inconspicua</b>
<b>Trichomes on abaxial side of the leaf</b>	Bent to wavy, appearing woolly along the midvein	Mostly straight, projecting at a 90-degree angle from the midvein	Mostly straight, appressed to the midvein
<b>Number of major veins on large geminate leaf</b>	(6–) 8–11	(7–) 10–22	6–12
<b>Pedicel length</b>	9–15 mm in flower; 12–20 mm in fruit	4–12 mm in flower; 6–16 mm in fruit	15–30 mm in flower; 30–35 mm in fruit
<b>Calyx appendage number</b>	5–10	10	10
<b>Corolla length</b>	1–1.2 cm	0.5–0.8 cm	0.8–1.2
<b>Pubescence on abaxial side of corolla lobes</b>	Sparse, short trichomes; nearly glabrous, not tufted at tip	Moderately to densely pubescent with long trichomes, these tufted at lobe tip	Sparsely to densely pubescent with wavy trichomes, not tufted at lobe tip
<b>Seed length</b>	1–1.2 mm	0.9–1.1 mm	1–1.5 mm