



## Research note

# New records in the Orchidaceae family from Oaxaca, Mexico

## *Registros nuevos en la familia Orchidaceae de Oaxaca, México*

Rodolfo Solano-Gómez<sup>a,\*</sup>, Eduardo Martínez-Ovando<sup>b</sup>, Aarón Martínez-Feria<sup>a</sup>,  
José Antonio Gutiérrez-Caballero<sup>a</sup>

<sup>a</sup> Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional Unidad Oaxaca, Instituto Politécnico Nacional, Hornos 1003, 71230 Santa Cruz Xoxocotlán, Oaxaca, Mexico

<sup>b</sup> Programa de Conservación Voluntaria de Tierras, Pronatura Sur A.C., Calle Pedro Moreno 1, Barrio de Santa Lucía, 29250 San Cristóbal de Las Casas, Chiapas, Mexico

Received 9 March 2016; accepted 1 June 2016

Available online 31 October 2016

### Abstract

Four additions in the Orchidaceae family for Oaxaca, Mexico are reported in this work: *Barkeria skinneri*, *Chysis limminghei*, *Habenaria macvaughiana*, and *Lepanthes vivipara*. The presence of these species in Oaxaca is documented from specimens recently collected during floristic studies. For each species, information about synonyms, voucher specimens, distribution, habitat and comparison with morphologically similar taxa is provided. Also, for each species a photo and a map showing their new localities in Oaxaca are included. With the additions here reported the richness for orchids from Oaxaca rises to 733 taxa.

© 2016 Universidad Nacional Autónoma de México, Instituto de Biología. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Keywords:** *Barkeria skinneri*; *Chysis limminghei*; *Habenaria macvaughiana*; *Lepanthes vivipara*

### Resumen

Se registran aquí 4 adiciones en la familia Orchidaceae para Oaxaca, México: *Barkeria skinneri*, *Chysis limminghei*, *Habenaria macvaughiana* y *Lepanthes vivipara*. La presencia de estas especies en Oaxaca se documenta a partir de ejemplares recientemente recolectados durante estudios florísticos. Para cada especie se proporciona información de sinónimos, ejemplares de respaldo, distribución, hábitat y una comparación con taxones morfológicamente similares. Además, para cada especie se incluye una foto y un mapa mostrando sus nuevas localidades en Oaxaca. Con estas adiciones, la riqueza de orquídeas de Oaxaca se incrementa a 733 taxones.

© 2016 Universidad Nacional Autónoma de México, Instituto de Biología. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Palabras clave:** *Barkeria skinneri*; *Chysis limminghei*; *Habenaria macvaughiana*; *Lepanthes vivipara*

Oaxaca with a surface of 93,757 km<sup>2</sup> represents almost 5% of the Mexican territory and is the state that holds the highest biological diversity. The most well-known plant groups that are well represented in Mexico reach their highest diversity at

national level (García-Mendoza, 2004). One of these groups is the orchid family, which, according to Salazar (2012), includes 721 species in Oaxaca, 6 of them being infraspecific taxa. Recently, 8 additional Orchidaceae species have been discovered or reported for Oaxaca State: *Epidendrum melistagoides* Hágsater et L. Sánchez (Hágsater & Sánchez, 2008); *Habenaria pinzonii* R. González et Cuv.-Fig., *H. rosulifolia* Espejo et López-Ferr., and *H. tetranema* Schltr. (Pichardo, 2011); *Epidendrum eduardo-perezii* Hágsater et E. Santiago (Hágsater &

\* Corresponding author.

E-mail address: [solanogo@yahoo.com.mx](mailto:solanogo@yahoo.com.mx) (R. Solano-Gómez).

Peer Review under the responsibility of Universidad Nacional Autónoma de México.

Santiago, 2013); *Acianthera pollardiana* Solano (Solano, 2015); as well *Habenaria greenwoodiana* R. González and *H. tuerckheimii* Schltr. (Mejía-Marín, Espejo-Serna, López-Ferrari, & Fonseca-Juárez, 2016). With these, the orchid richness for Oaxaca rises to 729 taxa.

Orchidaceae from Oaxaca have been a well-studied group (Hágsater, Salazar, & Soto, 1998; Martínez, 2010; Pichardo, 2011; Salazar, 2012; Solano, Alonso, Rosado, Aguilar, & García, 2008; Solano, Bello, & Vásquez, 2007; Solano, Rubio, Lagunez, & Herrera, 2013; Soto & Salazar, 2004); at national level, the orchid richness present in this state is, together with that from Chiapas, the highest in Mexico. On the other hand, the Oaxacan orchid richness is comparable to that reported for some Central American countries with similar or slightly larger surface, such as Guatemala (108,889 km<sup>2</sup>, 817 species), Nicaragua (130,680 km<sup>2</sup>, 679 species), and Honduras (112,090 km<sup>2</sup>, 621 species) (Ossenbach, Pupulin, & Dressler, 2007). Nonetheless, the orchid inventory of Oaxaca continues to increase as a result of an on-going floristic study, which has been intensified in recent years, both in areas not previously explored and those already studied by botanists. As a result of this floristic work, we have documented here 4 additional orchid species previously unknown for the State. With these additions, the orchid richness for Oaxaca is now increased to 733 species.

*Barkeria skinneri* (Bateman ex Lindl.) A. Rich. et Galeotti, Compt. Rend. Hebd. Séances Acad. Sci. 18: 506. 1844

**Synonyms:** *Epidendrum skinneri* Bateman et Lindl.; *Dothilophis purpurea* Raf., superfluous, based on *Epidendrum skinneri*; *Barkeria skinneri* (Bateman ex Lindl.) Paxton, superfluous; *Barkeria skinneri* var. *major* Paxton; *Epidendrum fuchsii* Regel; *Epidendrum skinneri* var. *superbum* R. Warner.

**Examined specimen:** Mexico. Oaxaca: municipio San Miguel Chimalapa, Congregación 05 de Noviembre (La Cristalina), paraje La Palmita, collected 8 Dec. 2010, pressed 19 Nov. 2014, Martínez s.n. (OAX!).

**Distribution and habitat:** Mexico and Guatemala. In Mexico it was previously known from the Central Plateau and the Sierra Madre of Chiapas (Cabrera, 2006; Soto, 2003). In Oaxaca the species was discovered at the Sierra Atravesada (Fig. 1), where it grows as an epiphyte in the evergreen seasonal forest, at almost 1,000 m asl, and coexists with other orchids such as *Epidendrum chlorops* Rchb. f., *Guarianthe aurantiaca* (Bateman) Dressler et W.E. Higgins, *Lycaste* sp., *Maxillaria variabilis* Bateman ex Lindl., *Nidema boothii* Schltr., *Notylia barkeri* Lindl., *Oncidium lindleyi* (Galeotti ex Lindl.) R. Jiménez et Soto Arenas, *Polystachya cerea* Lindl., *Prosthechea cochleata* (L.) W. E. Higgins, *Scaphyglottis fasciculata* Hook., *Stanhopea saccata* Bateman, *Stelis* sp., and *Trichocentrum cosymbephorum* (C. Morren) R. Jiménez et Carnevali. Flowering is from October to December.

**Remarks:** *Barkeria skinneri* is distinguished among other congeneric species by its long raceme, with star-like, magenta

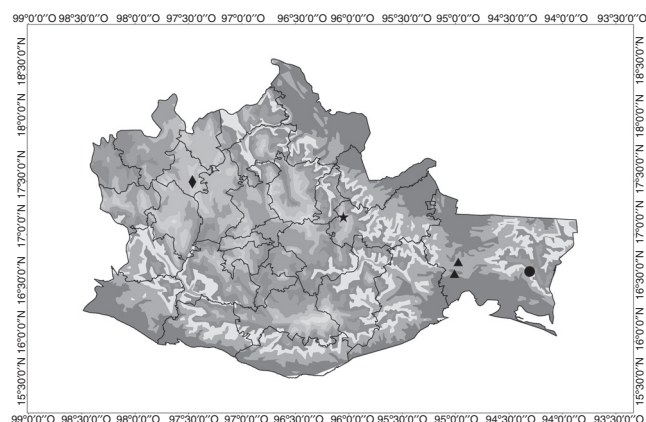


Figure 1. Map of Oaxaca showing the localities for the new orchid records: *Barkeria skinneri* (circle), *Chysis limminghei* (triangle), *Habenaria macvaughiana* (rhomb), and *Lepanthes vivipara* (star).

flowers (Fig. 2). A similar species is *B. strophinx* (Rchb. f.) Halb., especially in the form of floral parts, but it differs in its paniculate inflorescence (vs. racemose), pink-lilac flowers (vs. magenta), and callus on the lip formed by 2 prominent keels (vs. callus with 3–5 keels). In Mexico, *B. skinneri* is considered as a species subject to special protection (Semarnat, 2010) because its populations are facing habitat loss and extraction for illicit trade (Cabrera, 2006; Soto, 2003).

*Chysis limminghei* [as *limminghii*] Linden ex Rchb. f., in C. Koch, Berliner Allg. Gartenzeitung 26: 380. 1858

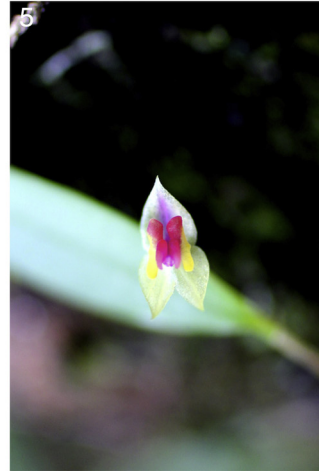
**Synonyms:** *Chysis aurea* Lindl. var. *limminghei* (Linden et Rchb. f.) Lem.; *Chysis aurea* Lindl. var. *limminghei* (Linden et Rchb. f.) Hook., superfluous; *Chysis aurea* Lindl. fo. *limminghei* (Linden et Rchb. f.) P.H. Allen.

**Examined specimens:** Mexico. Oaxaca: municipio Ciudad Ixteppec, Cerro Naranjo, 5 km to N of Nizanda, collected 8 Dec. 2003, pressed Jun. 2004, Pérez and Sierra (MEXU!); municipio Santa Maria Petlapa, Cerro Timbón, Cieneguilla, Juárez and Martínez (OAX in spirit!).

**Distribution and habitat:** Mexico and Guatemala. This is one of the few endemics species, restricted to lowland tropical rain forests from southeastern Mexico and adjacent portions of Guatemala (Chiron & Archila, 2010; Soto & Solano, 2007). In Oaxaca the species was discovered in the Isthmus of Tehuantepec (Fig. 1), where it grows as an epiphyte in tropical rain or semi-evergreen forest, from 350 to 650 m asl. Flowering is in March.

**Remarks:** the original description of *Chysis limminghii* was published in Koch (1858: 380); however, both Missouri Botanical Garden (Tropicos: <http://www.tropicos.org>, recovered May 27, 2016) as International Plant Names Index (IPNI: <http://www.ipni.org>, recovered May 27, 2016) databases presented errors in the page assigned to its reference: page 308 in Tropicos, and page 880 in IPNI. The original citation for *C. limminghei* is corrected here.

*Chysis limminghei* is member of the *C. aurea* complex, which is characterized by the 5–7 subequal and puberulent keels at the



Figures 2–5. 2: *Barkeria skinneri*; 3: *Chysis limminghei*; 4: *Habenaria macvaughiana*; 5: *Lepanthes vivipara* (photograph 2 by E. Martínez; 3 by A. Martínez; 4 and 5 by R. Solano).

base of the lip. *Chysis violacea* Dressler is a similar species, but it differs in its thicker pseudobulbs, more floriferous racemes, and larger flowers with darker spots on sepals and petals; it is also restricted to southern Central America. Another similar species is *C. bruennowiana* Rehb. f. et Warsz., from Nicaragua to Peru, but it differs in its longer and narrower pseudobulbs and different shape of the sepals and petals. Specimens from Oaxaca are different from the typical form of *C. limminghei* in their sepals and petals with yellow background, orange-ochre in the apical half with a magenta subapical spot (Fig. 3). In Mexico the species is considered as threatened (Semarnat, 2010) due to its restricted distribution, low population densities, high habitat specificity, and extraction for illicit trade (Soto & Solano, 2007).

*Habenaria macvaughiana* R. González, Bol. Inst. Bot. (Guadalajara) 3: 64. 1995[1997]

*Examined specimen:* Mexico. Oaxaca: municipio San Pedro y San Pablo Teposcolula, cerro La Campana, 26 Aug. 2010, Solano 3024 et al. (OAX!).

*Distribution and habitat:* Endemic to Mexico. The species was previously known from Jalisco (where the species was originally discovered) and Mexico State (González-Tamayo & Hernández-Hernández, 2010; Szeszko-Fabila, 2011), and most likely also occurs in Michoacán. In Oaxaca the species was discovered at the high Mixtec region (Fig. 1), where it

grows as a terrestrial in patches of thorny scrubland with *Agave nuusaviorum* García-Mend., *Opuntia* sp., *Mammillaria* sp., and *Villadia* sp., surrounded by pine-oak-juniper forest at 1,441 m asl. Flowering is from August to September.

*Remarks:* *Habenaria macvaughiana* (Fig. 4) is similar to *H. diffusa* A. Rich. et Galeotti, but it differs in its longer ovary (21–23 mm vs. ca. 14 mm), sepals obliquely ovate (vs. obliquely lanceolate), posterior lobe of the petals obliquely deltoid (vs. falcate), broader (1–1.7 vs. 1 mm wide) and rounded (vs. acuminate) mid lobe of the lip, and in its more or less cylindrical nectary that is more than twice as long as the midlobe of the lip (vs. clavate-fusiform and slightly longer than the midlobe of the lip). In the original description, *H. macvaughiana* was compared to *H. crassicornis* Lindl.; however, it is different in their petals and lip, which are pubescent with narrower lobes, and the nectary is shorter than the midlobe of the lip.

*Lepanthes vivipara* Salazar et Soto Arenas, *Orquidea* (Mexico City) 14: 207. 1996

*Examined specimens:* Mexico. Oaxaca: municipio Totontepec Villa de Morelos, Santa María Huitepec, 23 Mar. 2013, Gutiérrez s.n. (OAX, in spirit!); municipio Totontepec Villa de Morelos, same locality, 28 Aug. 2015, Solano 4235, 4236, 4243 (OAX!).

*Distribution and habitat:* Endemic to Mexico. This species was previously only known from one locality in the Sierra Madre

of Chiapas. In Oaxaca, this orchid was discovered in the Mixe region, at the southeastern extreme of the Sierra Madre Oriental (Fig. 1), where it grows as an epiphyte on small to medium tree trunks, in shaded, humid, ventilated sites within the cloud forest with pine and oak at 2,412 m asl. Flowering is from March to August.

*Remarks:* *Lepanthes vivipara* exhibits a floral morphology similar to some species of the *L. stenophylla* complex (Salazar & Soto, 1996), but the former differs from the latter in their stems, which produce adventitious plantlets in the zone where the inflorescence normally emerges, the apex stem, and, on the other hand, their petals are proportionally large in relation to the length of sepals (Fig. 5). The locality where *L. vivipara* was discovered in Oaxaca holds the highest richness for Mexican *Lepanthes*; here, it coexists with a dozen congeners: *L. aprica* Catling et V.R. Catling, *L. attenuata* Salazar, Soto Arenas et O. Suárez, *L. calopetala* Salazar et Soto Arenas, *L. catlingii* Salazar et Soto Arenas, *L. gabriellae* Salazar et Soto Arenas, *L. machorroii* Salazar et Soto Arenas, *L. mariae* Salazar et Soto Arenas, *L. mixe* Salazar et Soto Arenas, *L. oreophila* Catling et V.R. Catling, *L. papilionacea* Salazar, Soto Arenas et O. Suárez, *L. rekoii* R.E. Schult., and *L. thurstoniorum* Salazar, Soto Arenas et O. Suárez.

We thank Gabriela Cruz-García, who created the map presented here. The comments and suggestions of two anonymous reviewers were useful to improve the quality of the manuscript.

## References

- Cabrera, T. (2006). Ficha técnica de *Barkeria skinneri*. In E. Palacios (Comp.), *Cuarenta y ocho especies de la flora de Chiapas incluidas en el PROY-NOM-059-ECOL-2000*. Bases de datos SNIB-Conabio. Proyecto W008. Retrieved from [http://www.conabio.gob.mx/institucion/proyectos/resultados/W008\\_Fichas%20de%20especies.pdf](http://www.conabio.gob.mx/institucion/proyectos/resultados/W008_Fichas%20de%20especies.pdf)
- Chiron, G., & Archila, F. (2010). *Conspectus neotropicus Mesoamericanus. Le genre Chysis Lindl. (Orchidaceae)*. *Richardiana*, 10, 161–192.
- García-Mendoza, A. (2004). Integración del conocimiento florístico del estado. In A. J. García-Mendoza, M. J. Ordoñez, & M. A. Briones-Salas (Eds.), *Biodiversidad de Oaxaca* (pp. 305–325). México, D.F.: Universidad Nacional Autónoma de México-Fondo Oaxaqueño para la conservación de la Naturaleza-World Wildlife Fund.
- González-Tamayo, R., & Hernández-Hernández, L. (2010). *Las orquídeas del Occidente de México Volumen 1*. México, D.F.: Consejo Estatal de Ciencia y Tecnología de Jalisco.
- Hágsater, E., Salazar, G. A., & Soto, M. A. (1998). Diversidad y conservación de orquídeas de la región de Chimalapa, Oaxaca, México. Bases de datos SNIB-Conabio. Proyecto G020. Retrieved from <http://www.gbif.org/dataset/802b7bb4-f762-11e1-a439-00145eb45e9a>
- Hágsater, E., & Sánchez, L. (2008). *Epidendrum melistagoides*. In E. Hágsater, & L. Sánchez (Eds.), *The genus Epidendrum, part 7: species news and old in Epidendrum*. *Icones Orchidacearum* 11 (pl. 1141). México, D.F.: Herbario AMO.
- Hágsater, E., & Santiago, E. (2013). *Epidendrum eduardo-perezii*. In E. Hágsater, & L. Sánchez (Eds.), *The genus Epidendrum, part 10: species news and old in Epidendrum*. *Icones Orchidacearum* 14 (pl. 1426). México, D.F.: Herbario AMO.
- Koch, K. (1858). *Berliner Allgemeine Gartenzeitung*. Berlin: Verlag der Nauck'schen Buchhandlung. Retrieved from <http://www.biodiversitylibrary.org/item/181361#pages/5/model/1up>
- Martínez, A. (2010). *Patrones de distribución y áreas prioritarias para la conservación de las orquídeas en riesgo de Oaxaca*. Master thesis. Oaxaca: Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional Oaxaca, Instituto Politécnico Nacional.
- Mejía-Marín, M. I., Espejo-Serna, A., López-Ferrari, A. N., & Fonseca-Juárez, R. M. (2016). Las monocotiledóneas del municipio de San Juan Colorado, Oaxaca, México. *Revista Mexicana de Biodiversidad*, 87, 187–199.
- Ossenbach, C., Pupulin, F., & Dressler, R. L. (2007). *Orchids of the Central American Isthmus*. San José, Costa Rica: Editorial 25 de Mayo.
- Pichardo, A. M. (2011). *Diversidad de la familia Orchidaceae en las sierras Triqui-Mixteca del estado de Oaxaca*. Bachelor thesis. México City: Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México.
- Salazar, G. A. (2012). Orquidaceae Juss. In A. García-Mendoza, & J. A. Meave (Eds.), *Diversidad florística de Oaxaca: de musgos a angiospermas (Colecciones y Lista de Especies)* (pp. 324–339). México, D.F.: Universidad Nacional Autónoma de México-Comisión Nacional para el Conocimiento y Uso de la Biodiversidad-Instituto Estatal de Ecología y Desarrollo Sustentable.
- Salazar, G. A., & Soto, M. A. (1996). El género *Lepanthes* Sw. en México. *Orquídea (México City) nueva serie*, 14, 1–231.
- Semarnat (Secretaría del medio ambiente y Recursos Naturales). (2010). Norma Oficial Mexicana NOM-059-SEMARNAT-2010, *Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y Especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo*. Publicada en el Diario Oficial de la Federación el 30 de diciembre de 2010. México.
- Solano, R. (2015). A taxonomic synopsis of the Mexican species of *Acianthera* (Orchidaceae: Pleurothallidinae) including a new species. *Phytotaxa*, 218, 39–60.
- Solano, R., Alonso, N., Rosado, K., Aguilar, M., & García, R. (2008). Diversidad, distribución y estrategias para la conservación de las Pleurothallidinae (Orchidaceae) en Oaxaca. *Boletín de la Sociedad Botánica de México*, 82, 41–52.
- Solano, R., Bello, R., & Vásquez, A. (2007). Listado de las orquídeas de la región de Juquila, Oaxaca, México. *Naturaleza y Desarrollo*, 5, 5–15.
- Solano, R., Rubio, M., Lagunez, L., & Herrera, O. (2013). Orquídeas de la sierra Mixe de Oaxaca. In M. A. Briones, G. Manzanero, & G. González (Eds.), *Estudios en zonas áridas de Oaxaca* (pp. 57–73). México, D.F.: Instituto Politécnico Nacional.
- Soto, M. A. (2003). *Barkeria skinneri*. In E. Hágsater, & M. A. Soto (Eds.), *Icones Orchidacearum 5 and 6: Orchids of México. Parts 2 and 3* (pl. 528). México, D.F.: Herbario AMO.
- Soto, M. A., & Salazar, G. A. (2004). Orquídeas. In A. J. García-Mendoza, M. J. Ordoñez, & M. A. Briones-Salas (Eds.), *Biodiversidad de Oaxaca* (pp. 271–295). México, D.F.: Universidad Nacional Autónoma de México-Fondo Oaxaqueño para la conservación de la Naturaleza-World Wildlife Fund.
- Soto, M. A., & Solano R. (2007). Ficha técnica de *Chysis lemminghei*. In M. A. Soto (Comp.), *Información actualizada sobre las especies de orquídeas del PROY-NOM-059-ECOL-2000*. Bases de datos SNIB-Conabio. Proyecto W029. Retrieved from [http://www.conabio.gob.mx/institucion/proyectos/resultados/W029\\_Fichas%20de%20especies.pdf](http://www.conabio.gob.mx/institucion/proyectos/resultados/W029_Fichas%20de%20especies.pdf)
- Szeszko-Fabila, D. R. (2011). *La orquídeoflora mexiquense*. Toluca, México: Secretaría de Educación del Gobierno del Estado de México.