Architrypethelium barrerae sp. nov.
from a cloud forest in Veracruz, Mexico

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ABSTRACT—A new species of corticolous microlichen, Architrypethelium barrerae, is described from the cloud forest in the ecological park ‘El Haya’ in Xalapa, Veracruz, Mexico. It is characterized by two-spored asci, cortex UV+ yellow, and an internal K+ pigment in its pseudostromata. Photographs of macro- and microscopic structures are presented.

KEY WORDS—tropical lichens, Trypetheliales, Trypetheliaceae

Introduction
Cloud forests contain the highest vascular plant diversity in Mexico (Rzedowski 1996). Despite the rich documentation of the vascular flora there, lichen diversity from these, as with other tropical regions in Mexico, is poorly known. Although some monographs and synopses have improved our understanding of tropical lichens for some genera (e.g., Ahti 2000, Kurokawa 1962, Lücking 2008), overall little is known about the entire tropical lichen flora. New species have been described from tropical regions (e.g., Córdova-Chávez & al. 2014, Guzmán-Guillermo & al. 2019, Hodkinson & al. 2014) at a rather fast rate considering the paucity of specimens from such regions. This highlights the potential for a great number of overlooked species yet to be described.

Tropical Mexican lichens such as Trypetheliaceae are very poorly known, and few reports have been published. This family comprises 16 mostly corticolous genera with perithecioid ascomata, with or without stromatic tissues, and
sometimes with xanthones and anthraquinones (Aptroot & Lücking 2016). Within this family, *Architrypethelium* Aptroot contains perithecioid crustose lichens similar to *Astrothelium* Eschw., but with large (>100 µm), brown, often 3-septate ascospores (Aptroot 1991). To date, this genus includes eight accepted species, of which six are known to occur in the neotropics (Aptroot & al. 2008, Aptroot & Lücking 2016, Flakus & al. 2016, Lücking & al. 2016), one is paleotropical (Luangsuphabool & al. 2018), and one has a pantropical distribution (Aptroot & Lücking 2016).

As part of a larger project, a survey was carried out to collect microlichens in the megadiverse region in the center of Veracruz, a state of Mexico. We collected corticolous microlichens in tropical vegetation, such as the cloud forest in the ecological park ‘El Haya’ in Xalapa city. One result of our efforts was the discovery of a previously unknown *Architrypethelium*, which we propose as the new species *A. barrerae*.

**Materials & methods**

The material studied is preserved in the mycology collections in the herbarium of Universidad Veracruzana, Xalapa, Veracruz, Mexico (XALU) and the herbarium of Escuela Nacional de Ciencias Biológicas, Mexico City, Mexico (ENCB). Specimens were collected in El Haya ecological park in Xalapa, Veracruz, México, located at 19.5181°N 96.9436°W and 1300 m a.s.l. Terminology is based on Aptroot & al. (2008) and Aptroot & Lücking (2016), and morphological analysis was conducted by conventional lichenological techniques following Brodo & al. (2001). Sections for anatomical examination were made by hand under a Zeiss Stemi Dv4 stereoscope and microscopical measurements were taken in Lugol’s solution using a Zeiss Primo Star microscope. Thin layer chromatography (TLC) was performed using solvent C following conventional chromatography techniques described in Elix (2014). Spot tests used were C (NaClO) and K (KOH 5%). To test hymenium amyloidity, sections of ascomata were mounted with I (Lugol’s solution) and resultant coloration was observed.

**Taxonomy**

*Architrypethelium barrerae* Guzm.-Guill. & Llar.-Hern., sp. nov. Figs 1, 2

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Differ from *Architrypethelium hyalinum* by its larger ascospores, its two-spored asci, and K+ internal pigment in its pseudostromata.


**Etymology:** dedicated to Dr. Clementina Barrera-Bernal who supported the lichenological studies by the first author.
Architryptethelium barrerae sp. nov. (Mexico) ...

Fig. 1. Architryptethelium barrerae (holotype, XALU 25326): A, B. Immature ascospores; C. Mature ascospore; D. Ascus with two spores. Scale bar: A–C = 20 µm; D = 40 µm.

Thallus corticate, green to yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, 0.7–1.2 mm diam., erumpent to prominent, covered by thallus except for the ostiolar area. Ascomata internally with a yellow pigment. Wall fully carbonized and K+ olive green, apical and lateral portions thick, base thin and touching the substrate. Hamathecium not inspersed. Ascii cylindrical, longer than 300 µm. Ascospores two per ascus, 160–200 × 50–75 µm, oblong-ellipsoid, triple-septate, outer lumina much smaller than inner lumina, lumina rounded in the corners, brown when free from the ascomata.

Chemistry—Cortex UV+ yellow, thallus K–, yellow pigment K+ yellow to dark red. TLC: lichexanthone and an unidentified anthraquinone.

Ecology & distribution—Corticolous in open areas, in cloud forest at 1300 m a.s.l. Sometimes covered with moss. Known only from the type locality in the El Haya ecological park in Xalapa city, Veracruz, Mexico.
COMMENTS—*Architrypethelium barrerae* is morphologically similar to the other *Architrypethelium* species but contains lichexanthone in its cortex. Within the genus, only *A. hyalinum* Aptroot is known to have this chemistry, but its spores are shorter (160–200 × 30–50 µm) and its asci are 4–8-spored (Aptroot & Lücking 2016). Another characteristic only found in *A. barrerae* is the pseudostromata with a conspicuous internal yellow pigment which is K+ yellow to dark red.


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**Literature cited**


Aptroot A. 1991. A monograph of the *Pyrenulaceae* (excluding *Anthracothecium* and *Pyrenula*) and the *Requienellaceae*, with notes on the *Pleomassariaceae*, the *Trypetheliaceae* and *Mycomicrothelia* (lichenized and non-lichenized *Ascomycetes*). Bibliotheca Lichenologica 44. 178 p.


Architrypethelium barrerae sp. nov. (Mexico)...

Fig. 2. Architrypethelium barrerae (holotype, XALU 25326): A. Thallus; B. Thallus with UV reaction; C. Pseudostroma detail; D. Arrow shows the yellow pigment inside of pseudostroma; E. Yellow pigment reacting to K. Scale bars: A, B = 2 mm; C = 0.4 mm.


