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About the first record of the genus *Chonecolea* (Chonecoleaceae, Marchantiophyta) in Paraguay and its differences to related species

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Abstract – *Chonecolea doellingeri* (Nees) Grolle, whose South American record is restricted to Argentina and Brazil, is reported for the first time for Paraguay. Additionally, its differences to related species are discussed and SEM microphotographs are provided.

Bryophytes / *Chonecolea doellingeri* / Liverworts / Marchantiophyta / Paraguay

The bryophyte flora of Paraguay is poorly known (Söderstrom et al., 2013, Ellis et al., 2014). During a field trip to Paraguay in 2012, some interesting liverworts were found. Among these, a foliose liverwort genus, *Chonecolea* Grolle was never before recorded for Paraguay. This genus, as originally defined by Grolle (1956), included a single species, *Chonecolea doellingeri* (Nees) Grolle, known from Brazil, Argentina, U.S.A. (Florida) and Australia (e.g., Schuster, 1980; Engel, 1980 [as *Clasmatocolea doellingeri*]; Ramsay et al., 1993; Drehwald, 1995; Drehwald & Reiner-Drehwald, 1996; Brown & Coveny, 1999; Gradstein & Costa, 2003; Yano & Luizi-Ponzo, 2006; Hässel de Menéndez & Rubies, 2009). Subsequently, Grolle and Váña (in Váña, 1980) described *Chonecolea andina* Grolle & Váña, based on collections of E. & P. Hegewald from Peru. A further taxon, *Chonecolea acutiloba* (Schiffn.) R.M.Schust., was registered for Brazil and Argentina (Schuster, 1980; Drehwald, 1995); although this last species was not accepted by Yano & Luizi-Ponzo (2006). Thus, three species are currently distributed in the Neotropics.

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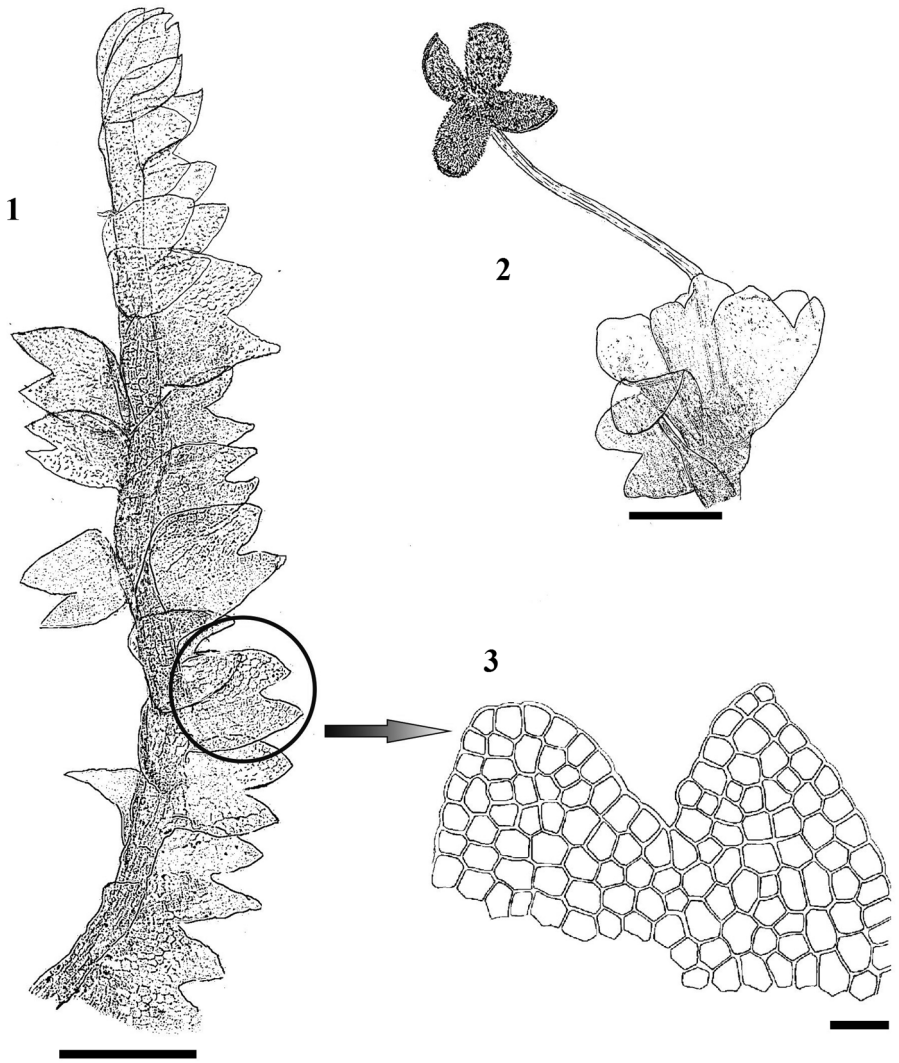
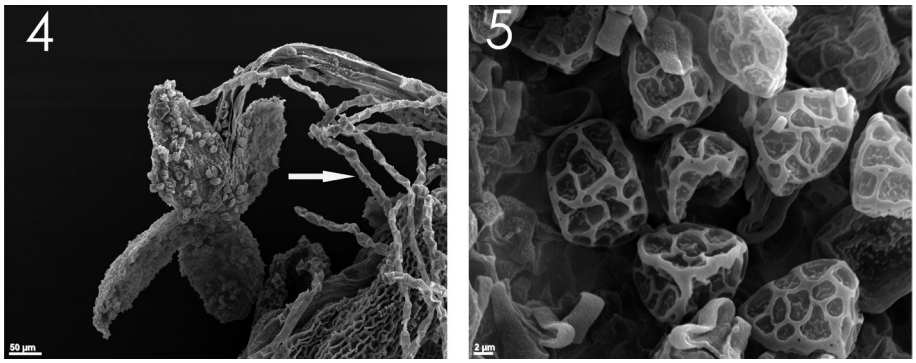
After an extensive study of the collected material using light and scanning electron microscopy, we were able to identify the sample as *Chonecolea doellingeri*. This species is characterized by its small size (< 1 mm wide), a pale green stem, succubous, bilobed leaves reaching the dorsal midline of the stem, and rounded to acute lobes with entire margins. The leaf cells of *Chonecolea doellingeri* are 16.25-20.0 µm long × 12.5-15.0 µm wide, thin-walled and with smooth cuticle. The sporophyte is covered by a campanulate perianth with a wide, 3-4 plicate mouth (Figs 1-3). *Chonecolea doellingeri* is often growing in dry or open habitats, on the base of trunks, e. g. of palm trees (Schuster, 1980; Drehwald, 1995; Yano & Luizi-Ponzo, 2006). *Chonecolea* is frequently associated with Lejeuneaceae species (Yano



Figs 1-3. *Chonocolea doellingeri* (Nees) Grolle: **1.** Mature plant aspect. **2.** Perianth and sporophyte with the open capsule. **3.** Leaf cells detail, showing the thin-walled cells. Scale bar: 1 and 2: 250 µm; 3: 25 µm.



Figs 4-5. *Chonoceolea doellingeri* (Nees) Grolle: **4.** Sporophyte, with the open capsule, intermixed with filamentous algae (arrow). **5.** Areolate spores in proximal and distal view.

& Luizi-Ponzo, 2006). In addition, the specimen from Paraguay is intermingled with filamentous algae (Fig. 4).

Yano & Luizi-Ponzo (2006) discussed the distribution of *C. doellingeri* in Brazil, and described its spore morphology (Figs 4-5). From the complete geographical range of *Chonecolea* in Brazil, Mato Grosso do Sul is the nearest location to Cerro Yaguarón (Paraguay). The spore size from Brazilian specimens ranged from 11.5 to 12.6 µm diameter (equatorial view), whereas the material from Paraguay had spores with a diameter of up to 20 µm.

Chonecolea andina can be differentiated from *C. doellingeri* on the base of its narrow-acute leaf sinus, unequal leaf lobes, underleaves present on sterile shoots, and by spore ornamentation (Váña, 1980). In addition, both species have a different ecology. In Paraguay, *Chonecolea doellingeri* was found on trunks in humid, subtropical Chaco forest at 168 m, while *C. andina* grows on soil and rocks in dry, alpine environments between 2690 and 4300 m (Váña, 1980).

Another taxon which resembles *C. doellingeri* is *Cylindrocolea* R.M.Schust. Two species of this genus are listed for Brazil (Gradstein & Pinheiro da Costa, 2003) that grow in environments similar to that of *C. doellingeri* in Paraguay. Although *Cylindrocolea* species are likely confused with *Chonecolea*, several morphological characters separate these two genera. In the first place, *Choneocolea* plants are pale to light greenwhile those of *Cylindrocolea* are brownish to reddish; also, leaf insertion reaches stem midline in *C. doellingeri* but it does not in *Cylindrocolea*. The sporophyte of *C. doellingeri* is covered by a relatively short perianth with truncate mouth which does not fully surpass the capsule level. In *Cylindrocolea*, by contrast, perianths extensively overpass the capsule level and the mouth is often strongly crenate with thick walled cells. Oil bodies are finely granular in *Cylindrocolea* but in *Chonecolea* they are homogeneous. *Cylindrocolea* infrequently produces gemmae and shows also vegetative reproduction by caducous perianths. Further on, *Chonecolea doellingeri* is almost exclusively growing as epiphyte whereas *Cylindrocolea* usually grows on soil and rock.

To date, only a single locality of *Chonecolea* is known from Paraguay. However, additional field work is necessary to investigate if the genus is more widespread in the region.

Specimen examined: PARAGUAY. Dpto Paraguarí: Cerro Yaguarón, 25°34’01’’S, 57°17’35’’W, 168 m, 04-08-2012, *G. Suárez, M. Dematteis, E. Mesa Torres & A. Vega 1480* (CTES, LIL).

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