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Three new mosses records from the Andes of northwestern Argentina

MARÍA J. CANO[1] and MARTA ALONSO[1,2]

Summary: Two mosses are newly reported for Argentina based on recent collections from Salta province: *Aligrimmia peruviana* R.S. Williams and *Conostomum cleistocarpum* Herzog. Hitherto, they were considered endemic to Bolivia and Peru, respectively. In addition, *Crossidium squamiferum* (Viv.) Jur., a species distributed in Europe, North America, Mexico, Asia, North Africa, and Macaronesia, is here reported for the first time in South America.

Key words: *Aligrimmia, Conostomum, Crossidium*, distribution, flora, Salta, South America.

Resumen: Tres nuevos registros de musgos de los Andes del noroeste de Argentina. A partir de recolecciones recientes en la provincia de Salta (Argentina), se citan como novedad para este país dos musgos, *Aligrimmia peruviana* R.S. Williams y *Conostomum cleistocarpum* Herzog, considerados hasta ahora endémicos del Perú y Bolivia, respectivamente. Además, *Crossidium squamiferum* (Viv.) Jur., una especie distribuida por Europa, Norte América, México, Asia, Norte de África y Macaronesia, se cita por primera vez en Sudamérica.

Palabras clave: *Aligrimmia, Conostomum, Crossidium*, distribución, flora, Salta, Sudamérica.

Introduction

Salta, in northwestern Argentina, is a transitional region between the tropics and subtropics. In this area, the bryophyte flora has been poorly studied. Matteri (2003) reported 69 mosses for Jujuy province and 149 for Salta. Recently, numerous floristic works have been published that focus on Yungas in Salta province (e.g. Schiavone & Suárez, 2007; Fuertes, 2012; Fuertes & Prada, 2014; Suárez *et al*., 2014; Colotti *et al*., 2016). They have notably improved the knowledge of the bryophytes in this area. However, the dryer regions of the biomes of High Andes, Puna and Prepuna, and the xeric scrublands of the Monte are still practically unknown bryologically.

In order to increase the bryological data from these regions, the authors undertook fieldwork in arid areas of Jujuy and Salta in northwestern Argentina. About 420 specimens of bryophytes were collected, most of them belonging to the family Pottiaceae. Among these samples, three species hitherto unknown from Argentina were found: *Aligrimmia peruviana* R.S.Williams, *Conostomum cleistocarpum* Herzog and *Crossidium squamiferum* (Viv.) Jur. The former two species were considered to be endemic to Bolivia and Peru, respectively, while *Crossidium squamiferum* (Viv.) Jur. had never been reported from South America.

In this paper, we have detailed these new records and discussed the diagnostic characters and distributions of each species.

Material and Methods

Moss species presented here were collected by the authors on a field trip to northwestern Argentina in March 2014. The localities can be consulted on the web site www.pottiaceae.com. Specimens are deposited at MUB, with duplicates in CORD.

[1] Departamento de Biología Vegetal (Botánica), Facultad de Biología, Universidad de Murcia, Campus de Espinardo, E-30100 Murcia, Spain, E-mail: mcano@um.es
[2] Departamento de Biología, Herbario HULE, Universidad Nacional Autónoma de Nicaragua, León (UNAN-León), León, Nicaragua.

Results

Aligrimmia peruviana R.S.Williams

ARGENTINA. *Prov. Salta: Seclantás, laguna Brealito*, 25º19'S 66º21'W, 18-II-2008, 2730 m, M.J. Cano & M. Alonso 8172, 8176 (MUB).

Williams (1903) established *Aligrimmia* R.S.Williams (Ptychomitriaceae) as a new monotypic genus based on *A. peruviana*. Its leaves are characterized by the lamellae on the ventral surface of the costa, a unistratose lamina and being imbricate when dry. The spore capsule is exserted, plicate or wrinkled, with 16 truncate peristome teeth that are divided only at the apex, and has a large and persistent annulus, consisting of several rows of vesiculose cells (Murray, 1984).

Aligrimmia peruviana was previously known only from its type locality in Arequipa, Peru (Williams, 1903). After 76 years it was rediscovered by Jim Solomon in the same Department, in hills to the east of Yura (Churchill, 2017). In Peru, the species grows on dry rocks in dry inter Andean valleys (quebrada) between 2250 and 2700 m a.s.l.. Now, it has been found in Argentina, where it grows on dry rocks at 2585 m a.s.l., in Monte Desert formations with *Puya* Molina and Cactaceae, associated with *Ptychomitrium chimborazense* (Spruce *ex* Mitt.) A.Jaeger. No morphological differences were found between the Peruvian material and the new Argentinian record. A complete description of the species is available in Williams (1903), Murray (1984) and Deguchi (1987). Illustrations can be found in Deguchi (1987).

Conostomum cleistocarpum Herzog

ARGENTINA. *Prov. Salta, abra Colorada*, 23º11''S 65º03''W, 4570 m, 24-III-2014, M.J. Cano & M. Alonso 8293 (MUB).

Conostomum Sw. *ex* F.Weber & D.Mohr is a genus in the Bartramiaceae, which contains seven species distributed mainly in temperate regions. Characteristically, its leaves are arranged in five rows on the stem. Three species of *Conostomum* have been reported in the tropical Andes: *C. pentastichum* (Brid.) Lindb., distributed throughout Southern hemisphere, *C. cleistocarpum,* and *C. macrotheca* Herzog, the latter two both endemic to Bolivia. On the other hand, just three species were known from Argentina: *C. magellanicum* Sull., *C. pentastichum* and *C. perpusillum* Cardot & Broth.

Conostomum cleistocarpum is easily distinguishable from other species of the genus by its cleistocarpous capsules, and leaves with an excurrent costa and smooth laminal cells.

This species is known from the type locality, collected by Herzog from Hochtal, in Viloco, and from two recent collections by M. Lewis (Churchill *et al.*, 2009). All of them were found in the Department of La Paz (Bolivia). In this country, the species has been reported from rocky areas, along streams or by waterfalls in puna formations at 4460-5080 m a.s.l. (Herzog, 1916; Churchill *et al.*, 2009). The new Argentinean collection occurred in a soil crevice in a puna formation. Illustrations of the species can be found in Herzog (1916) and Frahm *et al*. (1996).

The original description (Herzog, 1916) and a later description by Frahm *et al*. (1996) were based on the holotype. This Argentinean material possessed some morphological differences from the holotype. In addition, some characters that were not considered in previous descriptions are included here: Plants 5-6 mm high; axillary hairs 2-3 cells, basal cells brownish, the rest hyaline; leaves 0,8-1,3 mm long; middle laminal cells 26-63,5 x 7-10 µm; basal cells 51-72 x 11-19 µm; setae 0,5-0,6 mm long; capsule 1-1,8 mm long; calyptra 1,0-1,3 mm long; spores 50-60 µm in diameter.

Crossidium squamiferum (Viv.) Jur.

ARGENTINA. *Prov. Salta: Puente del Diablo*, 24º46'S 66º11'W, 2960 m, 21-III-2014, M.J. Cano & M. Alonso 8206 (MUB).

Crossidium Jur. (Pottiaceae) is a genus of about 11 species occurring mainly in arid and semiarid areas worldwide (Cano *et al*., 1993).

In South America, two species of this genus had previously been reported: *C. rosei* R.S.Williams, endemic to Peru, and *C. woodii* (Delgad.) R.H.Zander, known from the type locality in Yemen and recently reported in puna formations in Bolivia and Argentina (Cano *et al.*, 2011).

Crossidium squamiferum is known from Europe, North America, Mexico, Asia, North Africa, and Macaronesia (Dirkse & Bouman, 1995). Therefore, the Argentinean specimen represents the first record of this species in the southern hemisphere. The new record was collected on slopes in a scrubland formation of *Larrea* Cav. and Cactaceae at 2960 m a.s.l.

Crossidium squamiferum is characterized by its deltoid to oblong-ovate leaves, with plane margins, and a costa excurrent in a long hair-point. The costa has ventral filaments up to 10 cells high whose terminal cell is conical and bears 1-3(5) papillae. The upper and middle laminal cells are smooth and thick-walled, with the lumina nearly obliterated toward the leaf margins. Two varieties are recognized within this species, the typical variety with ovoid-cylindrical spore capsules, a long, twisted peristome, and leaves with distinctly differentiated lower margins composed of thin-walled cells. In contrast, var. *pottioideum* (De Not.) Mönk. has cylindrical capsules with a short, cribose peristome, and marginal cells in the lower half of the leaf similar to adjacent cells, not forming a differentiated band. The South American specimen had immature sporophytes, and capsules from the year before, but it was possible to observe its cylindrical capsules with short peristomes. In the leaves, cells forming the lower margins appeared similar to adjacent cells. These features thus corresponded with those of var. *pottioideum*. Complete descriptions and illustrations of this species are available in Delgadillo (1975), Cano *et al*. (1993) and Dirkse & Bouman (1995).

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