

NEW RECORDS OF POTTIACEAE (BRYOPHYTA) FOR VENEZUELA

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Abstract. *Bryoerythrophyllum andersonianum* R. H. Zander & Sharp, known previously from Mexico, is newly reported for South America. The diagnostic characters of this species are illustrated and its distribution mapped. In addition, five species of mosses, *Chenia leptophylla* (Müll. Hal.) R. H. Zander, *Globulinella globifera* (Hampe) Steere, *Hyophiladelphus agrarius* (Hedw.) R. H. Zander, *Sagenotortula quitoensis* (Taylor) R. H. Zander, and *Tortula atrovirens* (Sm.) Lindb. are recorded for the first time for Venezuela.

Key words: Bryophyta, distribution, Pottiaceae, South America, Venezuela.

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INTRODUCTION

The first checklist of bryophytes of Venezuela was published by Pitier (1936) and later updated by Pursell (1973). Moreno (1992a) published an overview of the bryological studies of Venezuela and Moreno (1992b) summarized the geographical distribution of 383 species of hepatics and 1009 of mosses in this country. According this author, some parts of the country such as the Andes region of Mérida, lowlands forest of rivers and Guyana highlands from the state of Bolivar and Amazonas and parts of the Costal Range of Aragua and Distrito Federal have been moderately well collected. However, some states such as Apure, Barinas, Cojedes, Guárico, Monagas, Nueva Esparta, Portuguesa, and Delta Amacuro are practically unknown from a bryological point of view. Delgadillo *et al.* (1995) summarized the state of knowledge of the distribution of mosses in the Neotropics in the database LATMOSS. Later, Churchill *et al.* (2000) reduced the number of entries and updated the distribution data of the mosses of tropical Andean countries. Recently, O'Shea (2010) published a checklist of Venezuela but it is based on bibliographic records and there were no new additions or significant changes in the number of taxa.

Churchill *et al.* (2000), in their catalogue of tropical Andean countries, reported 57 species and 22 genera of Pottiaceae. From Churchill *et al.* (2000) catalogue, the number of species of this family has mainly increased due to the floristic studies carried out by Venezuelan bryologist and the taxonomic studies carried out in diverse genera of Pottiaceae. Thus, several new records such as *Didymodon pruinosus* (Mitt.) R. H. Zander (Jiménez & Cano 2008), *Erythrophyllopsis zanderi* M. J. Cano & J. A. Jiménez (Cano *et al.* 2010b), *Tortella tortuosa* (Hedw.) Limpr. (Morales *et al.* 2008) and *Tortula porteri* (James) Broth. (Zander & Eckel 2007; Cano & Gallego 2008) have been added to the flora of Venezuelan Pottiaceae.

Over the last several years we have been engaged in studies of the South American Pottiaceae (Cano 2008; Cano & Gallego 2008; Cano *et al.* 2010a, b; Jiménez *et al.* 2012). Due to the scarcity of collections in this territory, we are conducting field work in unexplored areas mainly of the Andes (Cano 2003; Cano *et al.* 2008, 2011). These new collections are providing a better means to assess the variability of many species, which were previously only known from one or a few localities. In 2010, an expedition was made to the Guyana Highlands, Costal Range and Andes of

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Venezuela. We identified some interesting specimens of this family which represent new records for this country. The new findings add six species Pottiaceae to the bryoflora of Venezuela.

MATERIAL AND METHODS

The moss species presented in this paper were collected by the authors on one collecting trip to Venezuela (Aragua, Bolivar, Caracas, Distrito Capital, Lara, Mérida, Portuguesa, Táchira, Trujillo and Vargas) in July–August 2010. The localities are listed on the web site www.pottiaceae.com. Specimens were deposited at MUB and VEN. In addition, we include some specimens collected by Dana Griffin III and sent for identification from FLAS.

LIST OF NEW POTTIACEAE RECORDS FOR VENEZUELA

The new Pottiaceae records for Venezuela are listed below. Notes about the habitat where the specimens occur, distribution and differentiation of the species are also provided.

1. *Bryoerythrophyllum andersonianum* R. H. Zander & Sharp

SPECIMENS EXAMINED. VENEZUELA: MÉRIDA, *pr.* La Venta, 8°54'23"N 70°47'29"W, 2 Aug. 2010, *Grande, Cano & Jiménez* 5853 (MUB 36883).

Bryoerythrophyllum andersonianum was previously described from Cofre de Perote (Veracruz) in Mexico (Zander & Sharp 1982). Later, Zander (1993, 1994) reported a new Mexican locality (Mexico, south slope of Ixtaccíhuatl, *Horton* 7481). Therefore, the Venezuelan specimen is the first record of this species in South America and the third in the world. The new report was found on road bank in an altered paramo formation at 3150 m in elevation. In Fig. 1 the known distribution of the species is mapped.

According to Zander and Sharp (1982) the species is mainly characterized by ligulate, dentate leaves, plane to weakly recurved at midleaf margins, and a laminal border of less papillose and thick-walled cells. In addition it has abundant propagula on rhizoids. It is close to the Asian *Bryoerythrophyllum wallichii* (Mitt.) P. C. Chen,

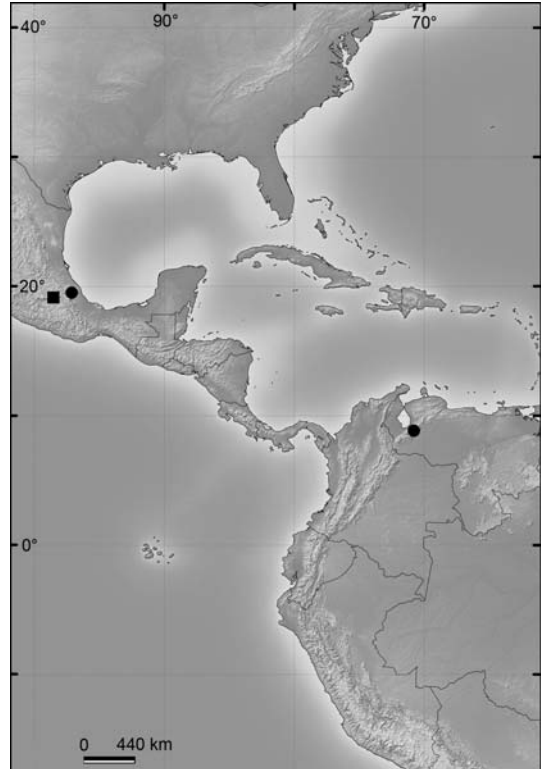


Fig 1. Distribution of *Bryoerythrophyllum andersonianum* R. H. Zander & Sharp based on literature records (■) and studied material (●).

but the latter can be distinguished from *B. andersonianum* by the absence of propagula on the rhizoids and an epapillose laminal border. We have studied the isotype of *B. andersonianum* deposited at MO (Veracruz, road from Perote to Cofre de Perote, 3750 m, *Sharp et al.* 53) and there are no significant morphological features distinguishing the Andean sample from the Mexico one. The Andean specimen differs from type material only in the greater size of the plants which reach 1.6 cm high (0.5 cm the Mexican specimens). A description and drawings are provided by Zander and Sharp (1982). In Fig. 2, the diagnostic characters of this species are illustrated.

2. *Chenia leptophylla* (Müll. Hal.) R. H. Zander

SPECIMENS EXAMINED. VENEZUELA: CARACAS, Quinta de Antuco, 10°30'39"N 66°53'57"W, 17 Aug. 2010, *Cano & Jiménez* 6073 (MUB 36931).

Chenia leptophylla is a mundivagant species that is apparently distributed in association with human activities (Zander 2007a). In South America it has been reported from Argentina (Townsend 2002), Brazil (Costa *et al.* 2011; Yano 2011), and Chile (Müller 2002). The report for Bolivia of this species (Churchill *et al.* 2000) has been tentatively excluded by Churchill *et al.* (2009). The Venezuelan specimen was found on soil accumulated on a wall in the city of Caracas at 890 m in elevation.

This species is easily differentiated by its red KOH colour reaction of the leaves, with plane, crenulate to serrulate above margins, and smooth laminal cells. It is close related to *Chenia ruigtevleia* Hedderson & R. H. Zander described recently from South Africa (Hedderson & Zander 2008),

however this latter species has smaller and papillose laminal cells and generally more short-ovate leaves. A complete description and illustrations are provided by Mishler (1994) and Zander (2007a). Hedderson and Zander (2008) provide a key to the genus *Chenia* R. H. Zander in the world.

3. *Globulinella globifera* (Hampe) Steere

SPECIMENS EXAMINED. VENEZUELA: ARAGUA, *pr.* Colonia Tovar, 10°19'59"N 67°19'02"W, 14 Aug. 2010, Grande, Cano & Jiménez 6070 (MUB 37011).

This species was previously known from Central America (Guatemala, El Salvador), USA (Texas) and Mexico (Magill 1977) and recently reported from Ecuador (Cano *et al.* 2008). Therefore, it is the second report of this species in

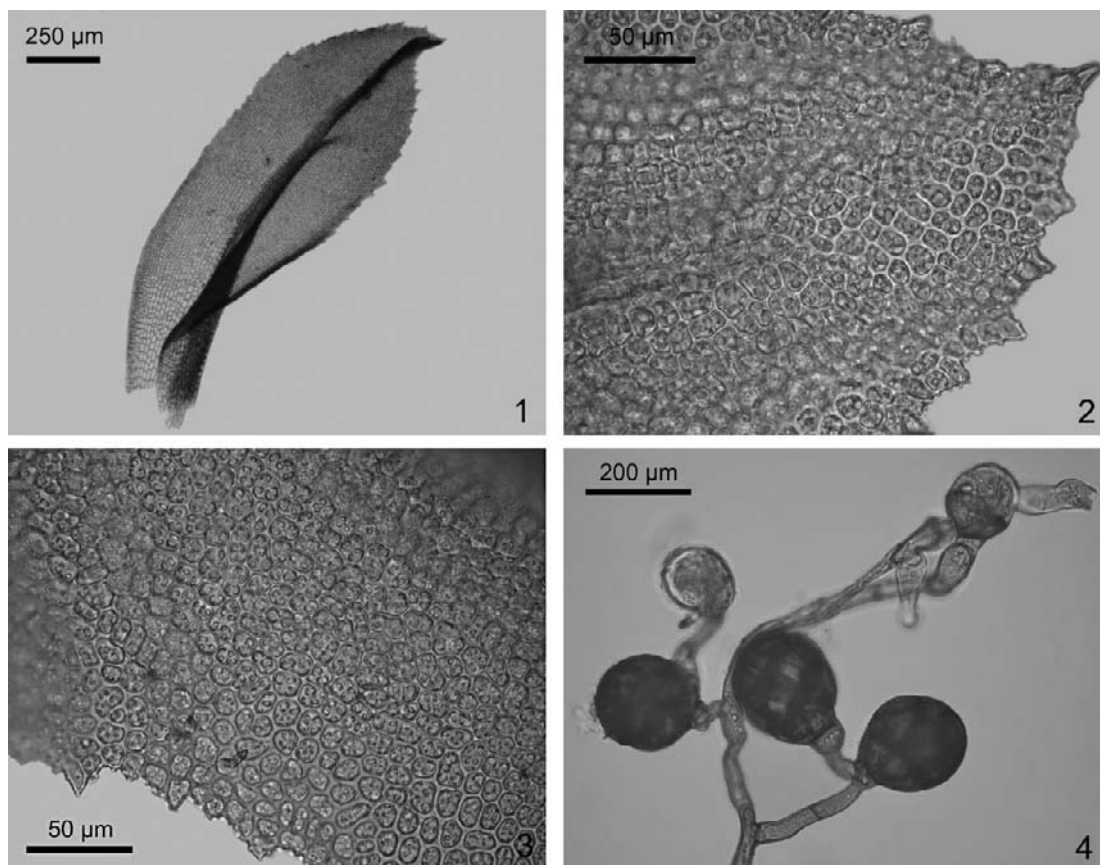


Fig 2. *Bryoerythrophyllum andersonianum* R. H. Zander & Sharp. 1 – leaf, 2 – apex, 3 – middle marginal cells of the leaf, 4 – rhizoidal gemmae. All from Grande, Cano & Jiménez 5853

South America. In Venezuela, the specimen was collected on bare soil in formations with *Agave* L. and Cactaceae at 1280 m in elevation on the Costal Range of Venezuela.

It is a distinctive moss characterized by oval to elliptic leaves, with cucullate apex, costa spurred and with single band of stereids. *Globulinella halloyi* M. Schiavone & G. Suárez, a recent species described from Argentina, can be distinguished from *G. globifera*, by its more robust habit, costa dorsally and ventrally spurred and with two stereid bands, and elongate propagula *ca* 200 mm long (Schiavone & Suárez 2009). A complete description and illustrations of this species are given by Crum (1994) and Zander (2007b).

4. *Hyophiladelphus agrarius* (Hedw.) R. H. Zander

SPECIMENS EXAMINED. VENEZUELA: BOLÍVAR, Canaima, 6°14'47"S 62°51'10"W, 20 July 2010, *Cano & Jiménez 5715* (MUB 37030). LARA, vía Barquisimetro-río Claro, parada manzano, 24 May 1978, *Griffin III et al. s.n.* (FLAS).

This species was previously known from South Central and Southeastern North America, Mexico, West Indies, South and Central America (Zander 2007c). In South America, it has been reported from Brazil (Costa *et al.* 2011; Yano 2011), French Guiana, Guyana, and Surinam (Florschütz-de Waard 1990). The new records were found growing on a wall at 398 m in elevation and on rock at 300 m in a dry forest.

This species is easily recognized by its elliptic to oblong-spathulate leaves, upper and middle laminal cells bulging on the ventral surface, two stereid bands in the costa, and the twisted peristome teeth. A complete description and illustrations are provided by Allen (2002) and Zander (2007c).

5. *Sagenotortula quitoensis* (Taylor) R. H. Zander

SPECIMENS EXAMINED. VENEZUELA: MÉRIDA, *pr.* Bailadores, entre Río Arriba y El Portachuelo, 8°11'04"S 71°54'03"W, 9 Aug. 2010, *Grande, Cano & Jiménez 5982* (MUB 37126); MÉRIDA, Distrito Rangel, Sierra de Santo Domingo, Páramo de Mucubají, above la Laguna Grande, July 1972, *Griffin III, López F. & Ruiz-Terán 871b* (FLAS). TÁCHIRA, *pr.* El Cobre, Páramo del Zum-

bador, 7°55'37"S 72°04'49"W, 10 Aug. 2010, *Grande, Cano & Jiménez 6025b* (MUB 37127).

This species is known from Mexico and the Andes of Bolivia, Chile, Colombia, Ecuador and Peru (Mishler 1994; Churchill *et al.* 2000; Müller 2009). Cano *et al.* (2011) report this species also from Argentina. The new records were collected on banks, wall and soil accumulated on rocks in paramo formation or in rest of cleared cloud forest at 3000–3300 m elevation.

According to Cano *et al.* (2011), *Sagenotortula* is easily differentiated by its lingulate to spathulate, unbordered leaves, with large epipillose distal laminal cells, and costa without stereid band and reniform in shape. A complete description and illustrations of this species are given by Mishler (1994) and Zander (2003).

6. *Tortula atrovirens* (Sm.) Lindb.

SPECIMENS EXAMINED. VENEZUELA: MÉRIDA, *pr.* El Morro, 8°25'07"S 71°10'40"W, 2300 m, 6 Aug. 2010, *Grande, Cano & Jiménez 5925* (MUB 37163).

This species is known from North America, Mexico, South America, Europe, Asia, Africa, Atlantic Islands, Pacific Islands (Hawaii, New Zealand) and Australia (Zander & Eckel 2007). According to Cano and Gallego (2008), it has been recorded in South America from Argentina, Bolivia, Chile, and Uruguay. The new record from Venezuela extends its range to Northern Andes. It was collected on hillside with *Dodonaea viscosa* Jacq. in dry inter-Andean valley at 2300 m in elevation.

Tortula atrovirens is characterized by lingulate to oblong-lingulate leaves, mucronate apex, recurved to revolute margins from near the base to the apex, strongly developed ventral surface cells of the costa and weakly twisted or occasionally rudimentary peristome teeth, with a low basal membrane. A complete description and illustrations of this species are given by Cano (2006).

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