






First record of the family Gigaspermaceae (Bryophyta) in Brazil

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ABSTRACT - (First record of the family Gigaspermaceae (Bryophyta) in Brazil). *Lorentziella imbricata* (Mitt.) Broth. belongs to the family Gigaspermaceae and is a common plant in the subtropical regions of the North and South America. This plant can be characterized by presenting leafy stems arising from subterranean rhizomatous axes, pale green or often whitish leaves, and sessile large capsules with large spores. This is the first citation of the genus *Lorentziella* and the family Gigaspermaceae for Brazil, found during field collections in the Pampa biome, state of Rio Grande do Sul.

Keywords: bryophytes, Bryopsida, cleistocarpy, APA of Ibirapuitã

RESUMO - (Primeiro registro da família Gigaspermaceae (Briófita) no Brasil). *Lorentziella imbricata* (Mitt.) Broth. pertence a Gigaspermaceae e é uma planta comum nas regiões subtropicais da América do Norte e do Sul. É caracterizada pelos caulídios com filídios surgindo a partir de eixos rizomatosos subterrâneos, filídios verde-pálidos a frequentemente brancos e pelas cápsulas grandes e sésseis que produzem esporos grandes. Esta é a primeira citação do gênero *Lorentziella* e da família Gigaspermaceae para o Brasil. Esta ocorrência foi registrada durante coletas em campo no Bioma Pampa, no Estado do Rio Grande do Sul.

Palavras-chave: briófitas, Bryopsida, cleistocarpia, APA do Ibirapuitã

Introduction

The moss family Gigaspermaceae (Bryopsida, subclass Gigaspermidae) is found predominantly in the Southern Hemisphere (Sharp *et al.* 1994). These plants are characterized by leafy stems arising from subterranean rhizomatous axes, pale green, often whitish leaves, and big sessile capsules producing large spores (Stech & Frey 2009, Brugués 2010). The family comprises six to nine species, distributed in five (traditionally six) small, mostly monospecific genera: *Chamaebryum* Thér. & Dixon, *Costesia* Thér., *Gigaspermum* Lindb., *Neosharpiella* H. Rob. & Delgad. (nowadays placed in Bartramiaceae), *Oedipodiella* Dixon, and *Lorentziella* Müll. Hal. ex Besch. (Fife 1980, Stech & Frey 2009). Of these, *Gigaspermum*, *Lorentziella*, and *Neosharpiella* occur

in the Neotropics, from Mexico to southern South America (Gradstein *et al.* 2001). In Brazil, however, there were no records of Gigaspermaceae.

Lorentziella is characterized by plants with distally imbricate, concave, broadly ovate to elliptic leaves that are abruptly narrowed to a long awn; a narrow costa extending to the base of the awn and immersed to slightly emergent capsules with truncate base and undifferentiated operculum (Larrain *et al.* 2017). According to Gradstein *et al.* (2001), and Frey & Stech (2009) *Lorentziella* is monospecific (only *L. imbricata*), with occurrences registered for southern United States, Mexico, Uruguay, Paraguay and Argentina (Fife 1980, Gradstein *et al.* 2001). This work aims to report the first record of *Lorentziella imbricata* (Mitt.) Broth. and the family Gigaspermaceae to Brazil.

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Samples were collected at the municipality of Santana do Livramento, in the Environmental Protection Area (APA) of Ibirapuitã, Rio Grande do Sul State, Brazil, 30°46'0.47"S and 55°34'47.7"W. The APA of Ibirapuitã is a direct use Conservation Unit (created in 1992 by Decree No. 529 of May 20, 1992), with an area of 316,790,42 hectares. It is located in the southwest region of the state of Rio Grande do Sul, within the Pampa biome.

The collections were performed with the aid of spatulas to remove the specimens together with the substrate. The samples were kept at room temperature for drying. Identification was performed with the aid of a microscope and optical stereo microscope, using specialized literature and identification keys. The samples were deposited in the Herbarium Instituto de Botânica de São Paulo (SP).

Lorentziella imbricata (Mitt.) Broth., Nat. Pflanzenfam. I(3): 511. 1903 ≡ *Leptangium imbricatum* Mitt., J. Linn. Soc., Bot. 12: 240. 1869. Type: Uruguay, Montevideo, *Gibert 714* [Lectotype NY barcode NY00968176, designated by Fife (1980); Isolectotype PC barcode PC0696100]. Figure 1 and Figure 2

Gametophytes small, firm, forming dense tufts, dark green. Stem erect, sparsely branched, ramifications mostly short, densely tomentose at the base, cross-section showing no central band of stereids. Leaves lanceolate, spiral, acute apex, entire margin; costa narrow, long excurrent, often hyaline; short hexagonal cells, thin cell wall. Perichaetium terminal, leaves 2-4 times larger than vegetative. Capsule immersed, globose, smooth, and wrinkled when dry, cleistocarpic.

Material examined: BRAZIL: Rio Grande do Sul, APA do Ibirapuitã, 02/IX/2017, em barranco, *Peralta, D.F. et al.* 21224, 21262 (SP).

The number of bryophytes species occurring in Brazil was based on literature and herbarium specimens. Many of these names are now synonyms and, after several efforts, Costa & Peralta (2015) reported 1,571 species to Brazil, of which 15 were hornworts, 674 liverworts, and 882 mosses (10% of all known bryophytes in the world). The latter authors excluded 603 names, indicating the need for revisional works (Gradstein & Costa 2003, Costa *et al.* 2011).



Figure 1. Field picture of *Lorentziella* in the Environmental Protection Area of Ibirapuitã (APA), Rio Grande do Sul State, Brazil. The perichaetial leaves have a whitish aspect.

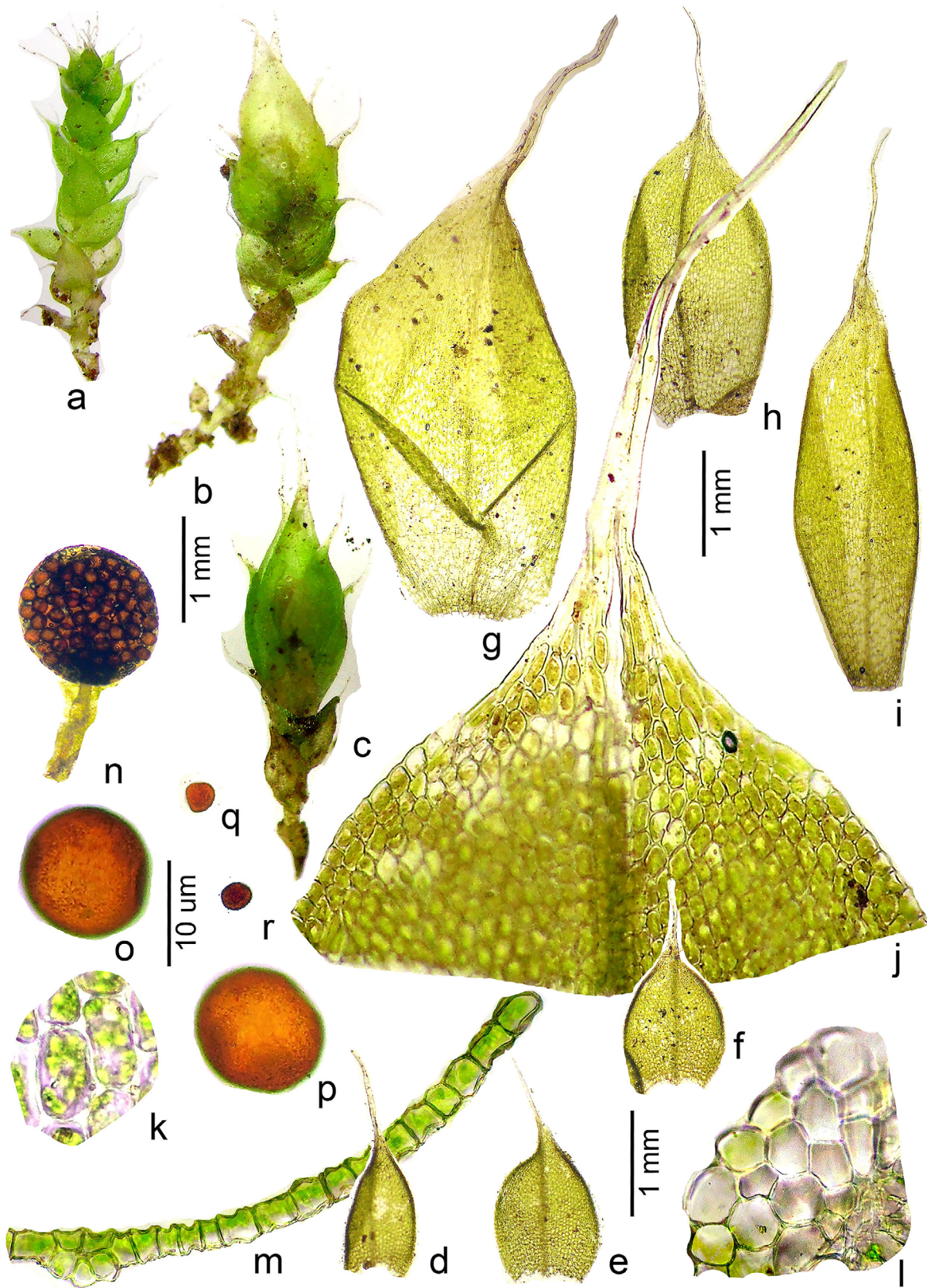


Figure 2. *Lorentziella imbricata* (Mitt.) Broth. a. Gametophyte with sporophytes. b-c. Gametophyte with perichaetial leaves. c-f. Stem leaves. g-i. Perichaetial leaves. j. Apical cells of the leaf. k. Laminal cells of the leaf. l. Stem in cross-section. m. Leaf in cross-section at the median region. n. Capsule with a seta. o-p. Spores. q-r. Abortive spores.

Gametophytes were found on the soil between rocky outcrops, grasses, *Selaginella*, and other cleistocarpic capsulate bryophytes (*Archidium* Brid., *Leptophascum* (Müll. Hal.) J. Guerra & M.J. Cano) and *Riccia* L., with altitudes ranging from 150-200m.

Larrain *et al.* (2107) presented nomenclatural updates and disjoint phytogeographic characterization of *Lorentziella imbricata* between the two subtropical portions of North and South America. Larrain *et al.* (2017) did not cite Brazilian samples and thus the occurrence of this genus remained unknown for Brazil.

Gigaspermaceae was not yet worldwide reviewed. The species currently recorded was firstly identified as *Lorentziella* because its cleistocarpic capsule differentiates from the nearest genus, *Gigaspermum*, which has a 'gymnostoma' capsule as described by Larrain *et al.* (2017) and Seppelt *et al.* (2012).

Lorentziella's distribution includes Uruguay, Paraguay, Argentina (Lawton 1953, Fife 1980), Bolivia (Fuentes & Muñoz 2002, Churchill & Fuentes 2005), Chile, Central Mexico (Cardenas & Delgadillo 1994) and Texas (Lawton 1953, Rushing & Snider 1980, Rushing 2007). The new record shows its importance by increasing the knowledge about the bryoflora of the Pampa biome, which is one of the less floristically studied in Brazil. It increases the knowledge of the Brazilian biodiversity as well.

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