



A new species of the genus *Lejeunea* Lib. (Marchantiophyta, Lejeuneaceae) from Brazil

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Abstract

The new species *Lejeunea flagellifera* from Brazil is described and illustrated. This species is characterized by its large size, the large, inflated and rectangular leaf lobule and by flagelliform branches with caducous leaves. The specimens were found in montane ombrophilous forests, growing on bark and living leaves of trees.

Key words: Hepatics, taxonomy, tropical America

Introduction

Lejeunea Libert (1820: 373) is a large pantropical genus with more than three hundred accepted species (Reiner-Drehwald 1999, Lee 2013, Söderström *et al.* 2016). The precise number of taxa is still unclear due to the limited availability of revisionary studies (Heinrichs *et al.* 2013).

According to Heinrichs *et al.* (2013), the genus has its centre of diversity in the humid tropics, with a Neotropical origin. In Brazil, the genus has not yet been revised, but a few provisional or regional papers dealing with *Lejeunea* have been published lately. A preliminary key to selected species from Brazil was published by Reiner-Drehwald (2003), including 28 taxa. Bastos & Yano (2009) reported 21 species for the State of Bahia, Northeastern Brazil and a new species from Pará, Northern Brazil, *Lejeunea combuensis* Moura, Ilkiu-Borges & Reiner-Drehwald (2012: 198) was published by Moura *et al.* (2012). In a study on bryophyte diversity, Costa & Peralta (2015) reported 40 species of *Lejeunea* in Brazil.

During the revision of Brazilian species of *Lejeunea* in the framework of the “Flora do Brasil” 2020 Project, an unusual species from Bahia, which appeared to be undescribed was identified by the first author. The same taxon had also been collected by the third author in Espírito Santo and São Paulo states and included in an online preliminary key to the genus *Lejeunea* in Brazil, as “*Lejeunea* sp. A” (Reiner-Drehwald 2007, online). Based on all these collections, we present a description with illustrations and a plate with photographs of this new taxon, including a discussion of similar species in *Lejeunea*.

Taxonomy

Lejeunea flagellifera C.J. Bastos, M.E. Reiner & Schäf.-Verw., **sp. nov.** Fig. 1, Plate 1.

Diagnosis: Plants large, up to 2.5 mm wide, leaf lobule rectangular, apical margin 6-8 cells long, flagelliform branches with caducous leaves frequent, caducous leaves with marginal rhizoids.

Typus:—BRAZIL: Bahia, Miguel Calmon, Parque Estadual das Sete Passagens, 11°39'S, 40°53'W, elev. 1000-1200 m, Capão da Trilha da Cachoeira da Garganta, em floresta montana, growing on tree trunk, 13 Oct. 2007, *J. Ballejos 2203* (holotype ALCB).

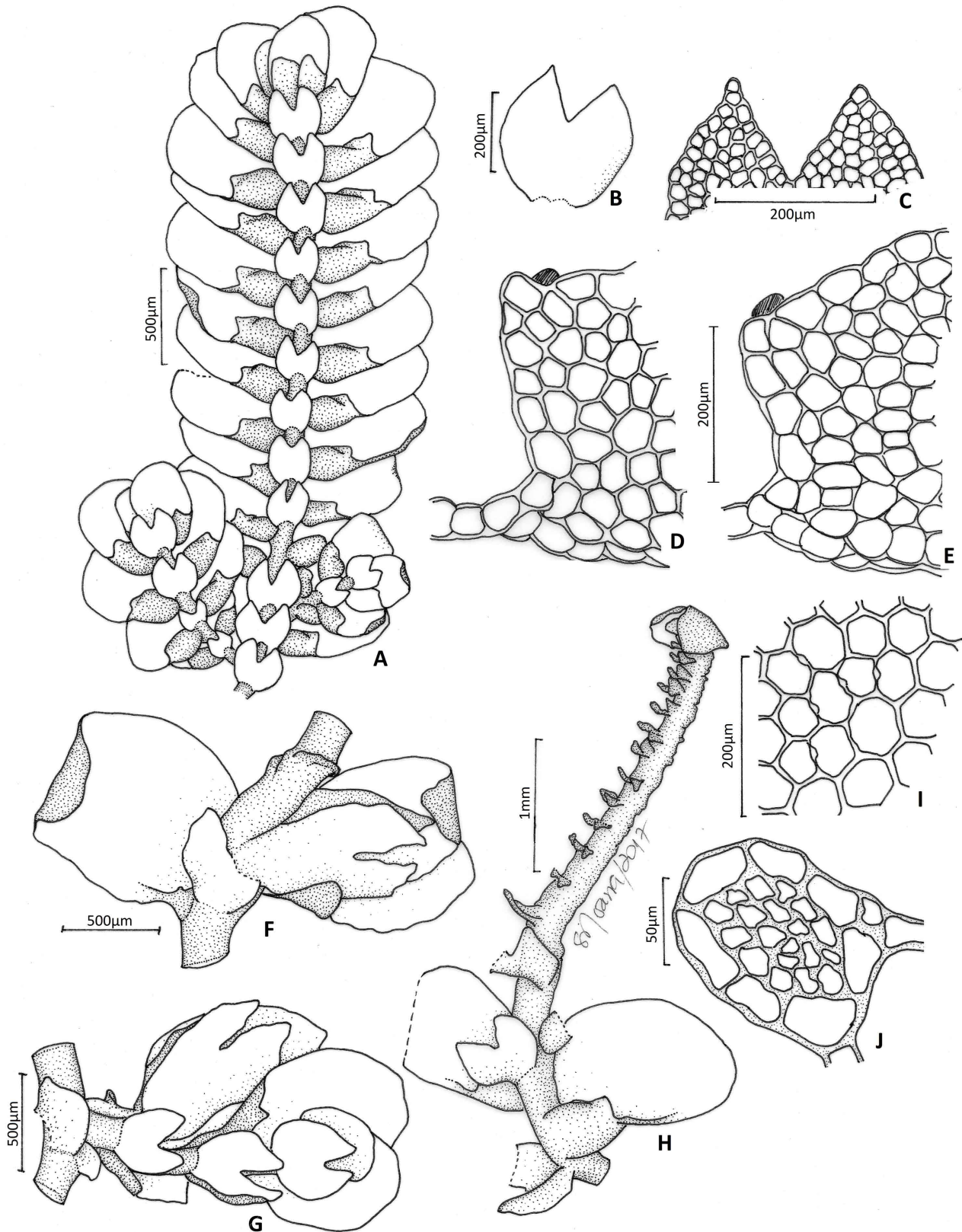


FIGURE 1. *Lejeunea flagellifera* C.J. Bastos, M.E. Reiner & Schäf.-Verw. A: gametophyte, ventral view. B: underleaf. C: underleaf apex, detail. D, E: lobule apices. F, G: gynoeclial branches, ventral view. H: shoot sector with flagelliform branch. I: central cells of leaf lobe. J: cross section of stem (all figures from holotype; drawing by Silvana B. Vilas Bôas-Bastos).

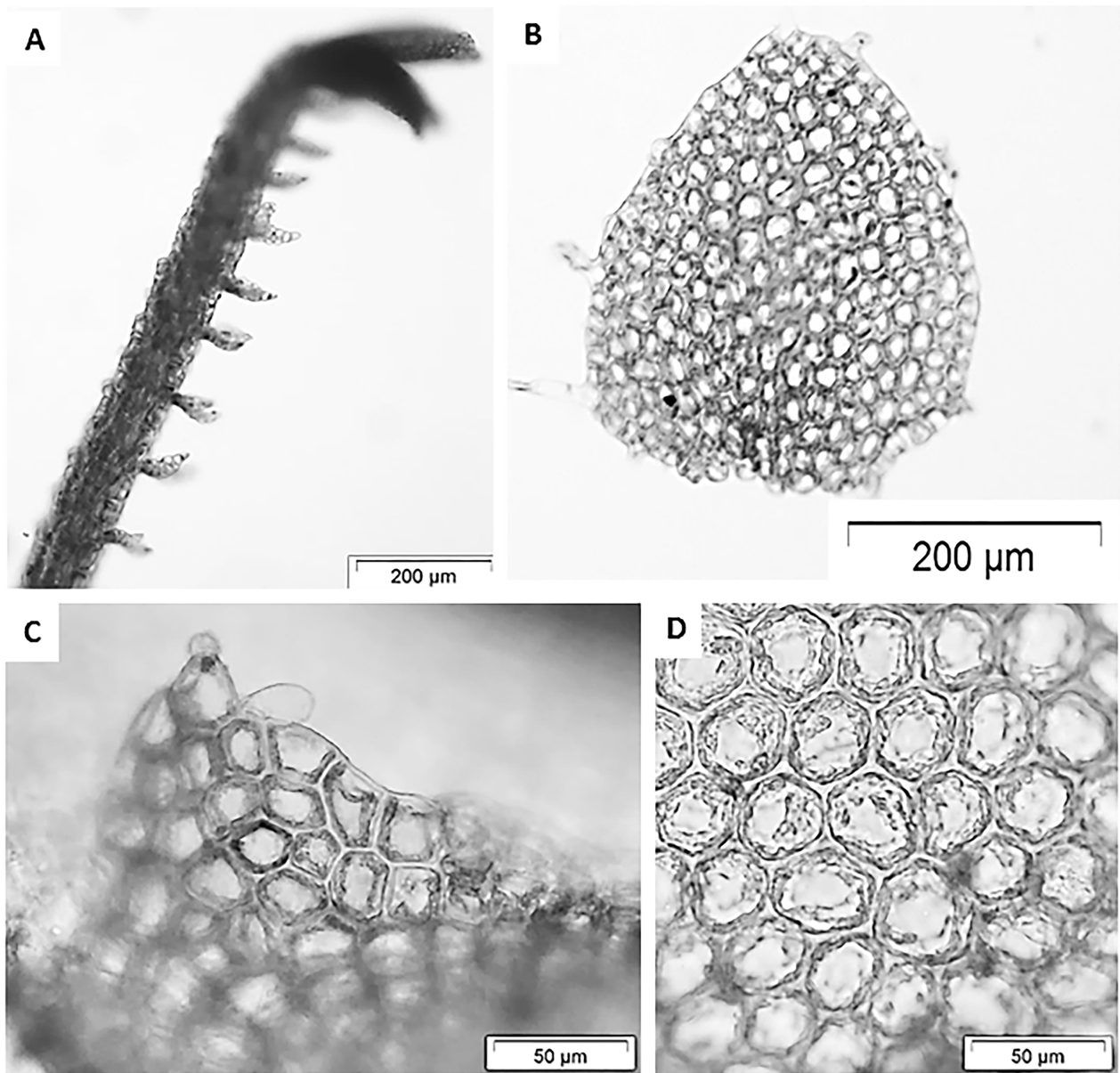


PLATE 1. *Lejeunea flagellifera* C.J. Bastos, M.E. Reiner & Schäf.-Verw. A: flagelliform branch. B: modified caducous leaf with marginal rhizoids. C: leaf lobule apex showing hyaline papilla. D: central cells of leaf lobe (all photos from holotype, by Cid J.P. Bastos).

Plants robust, 1.2–2.5 mm wide, pale-green, creeping, vegetative branches *Lejeunea*-type, terminal flagelliform branches with caducous leaves frequent. Stem 130 µm in diameter, in cross-section with 7–8 cortical cells and 18–19 medullary cells, thick-walled; cortical cells 35–58 µm long × 15–20 µm wide, medullary cells smaller, 12–20 × 10–12 µm; ventral merophytes two cells wide. Leaves imbricate, spreading; lobe ovate to oblong-ovate, 0.5–1.0 mm long × 0.4–0.7 mm wide, dorsal margin slightly arched, entire, ventral margin straight, entire, apex rounded; basal cells oblong, 35–38 × 20–27 µm, median cells oblong to hexagonal, 28–35 × 20–28 µm, thin-walled, trigones small, walls with 0–1 rounded to elongate intermediate thickenings; oil bodies not seen; ocelli absent. Leaf lobule large, inflated rectangular, 380–460 µm long × 220–270 µm wide, free margin slightly involute, plane at the apex, apical tooth small, ovate to oval, hyaline papilla at the proximal base of apical tooth, apical margin slightly curved to straight, 6–8 cells long, keel straight to weakly arched. Underleaves contiguous to distant, bifid to ½ its length, ovate to suborbicular, 310–420 µm long × 300–430 µm wide, sinus acute, base cuneate, insertion line arched. Dioicous (?). Androecia not seen. Gynoecia on short lateral branches, innovation lejeuneoid. Bract lobe obovate, 600–770 µm long × 310–390 µm wide, margin entire, apex rounded to obtuse; bract lobule obovate, 230–320 µm long × 120–150 µm wide, apex acute; bracteole obovate, bifid, 410–480 µm long × 230–250 µm wide; perianth not seen. Vegetative reproduction by modified caducous leaves born on flagelliform branches; flagelliform branches are usually upright prolongations of

prostrate shoots, terminal on branches or innovations; usually without leaves and with reduced, persistent and upright underleaves, caducous leaves suborbicular to ovate, 360–600 µm long × 300–560 µm wide, mostly smaller than normal and persistent leaves, without lobule, with marginal rhizoids and regenerants.

Additional specimens examined: BRAZIL. Bahia, Miguel Calmon, Parque Estadual das Sete Passagens, 11°39'S, 40°53'W, elev. 1000–1200 m, Capão da Trilha do Alto de Sete Passagens, growing on living leaf, 9 Sep. 2007, *J. Ballejos 1938* (ALCB). Espírito Santo, Domingos Martins, feuchter Sekundärwald SE Venda Nova, epiphyll; mit *Drepanolejeunea mosenii* (Stephani 1913: 372) Bischler (1967[1968]: 118), 1060 m alt., 20°27'S, 41°02'W, 10 Oct. 1988, *Schäfer-Verwimp & Verwimp 10180* (JE); Sekundärwald an der BR 262, Km 134 (1,5 km westlich der Abzweigung nach Brejetuba), epiphytisch, 1050 m alt., 1 Jul. 1990, *Schäfer-Verwimp & Verwimp 12852* (ALCB, JE, SP). São Paulo, Serra da Paranapiacaba, Fazenda Intervalles südlich Capão Bonito, Caminho dos Lagos, epiphytisch in feuchtem Sekundärwald beim “Castello”; 800 m alt., 21 Apr. 1990, *Schäfer-Verwimp & Verwimp 12610* (ALCB, GOET, JE, SP).

Etymology: In reference to the characteristic flagelliform branches.

Distribution and ecology: Known from Brazil (Bahia, Espírito Santo and São Paulo states). The specimens were found in montane ombrophilous forests, at 800–1200 m altitude, growing on bark and living leaves of trees.

Comments: *Lejeunea flagellifera* is characterized by its large size (up to 2.5 mm wide), the large, inflated and rectangular leaf lobule with an inconspicuous apical tooth and 6–8 cells long apical margin, and by flagelliform branches with caducous leaves. Vegetative reproduction via caducous leaves is common in the genus *Lejeunea* and has been observed in many species, for example in *L. tapajosensis* Spruce (1884: 223), *L. deplanata* Nees in Gottsche *et al.* (1845: 368), *L. phyllobola* Nees & Montagne in Montagne (1842: 471), *L. ptosimophylla* Massalongo (1881: 123) and *L. rionegrensis* Spruce (1885: 579). But in all these taxa, caducous leaves are borne in normal vegetative shoots, not in flagelliform branches. Other differences from *L. flagellifera* include: 1) *L. tapajosensis*: the leaf lobule is smaller (up to 170 µm long) and median leaf cells in well-developed shoots possess triradiate trigones and 1–2 intermediate thickenings; 2) *L. deplanata*: the plants are smaller (0.8–1.7 mm wide), leaves and underleaves are caducous (no reduced and persistent underleaves in shoots with caducous leaves were observed); 3) *L. phyllobola*: the plants are smaller (0.6–1.1 mm wide), apical margin in the lobule only few (2–3) cells long; 4) *L. ptosimophylla*: underleaves bifid up to ¾ its length, lobules smaller with a long tooth (up to 1–4 cells wide, 5–7 cells long); 5) *L. rionegrensis*: lobule smaller (up to 130 µm long), underleaves are reniform to suborbicular (up to 630 µm wide) (Reiner-Drehwald 2000, 2010, Reiner-Drehwald & Schäfer-Verwimp 2008). *Lejeunea concava* Lindenbergl & Gottsche in Gottsche *et al.* (1847: 759) is a poorly known species from Mexico (Reiner-Drehwald & Grolle 2012). It resembles *Lejeunea flagellifera* by the general aspects of the plant and the large, ± rectangular leaf lobules (Stephani 1985, Icones N° 8877), but differs by the angle at the union of the keel and the ventral margin of the lobe (keel and ventral margin of the leaf lobe ± straight, without angle at the union in *L. flagellifera*) and the absence of caducous leaves and flagelliform branches. The Asian *Lejeunea planiloba* Evans (1906: 147) also presents a large, rectangular leaf lobule, however, it differs from *L. flagellifera* in the following characteristics: (a) smaller size, with 0.6–0.8 mm wide (*L. flagellifera*: 1.2–2.5 mm wide); (2) stem in cross section with 4–5 medullary cells (*L. flagellifera*: 18–19 medullary cells); (c) autoicous plant (*L. flagellifera*: possibly dioicous); (d) asexual reproduction by caducous leaves absent (*L. flagellifera*: asexual reproduction by caducous leaves frequent). The African *Lejeunea aethiopica* Jones (1985: 387) also has a rectangular leaf lobule, however it differs from *L. flagellifera* by presenting the first and second distinct teeth, separated by 2–3 cells, and caducous leaves are not known. The Neotropical *Lejeunea sessiliflora* (Stephani, 1914: 512) Grolle (1988: 171) also has a relatively large, rectangular leaf lobule, but it differs by the papillose cuticle, the larger underleaves (4–5× the stem width), gynoecea without innovations, and asexual reproduction by caducous leaves is not known.

The genus *Lejeunea* in Brazil is still poorly known, and the description of this new species, as well as the recently described *Lejeunea combuensis* from state of Pará and *Lejeunea perpapillosa* Reiner-Drehwald & Pôrto (2007: 542) from Pernambuco and Bahia, reinforce the need to increase not only collecting activities, but also studies of Brazilian species of *Lejeunea*.

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