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East African Bryophytes, XVI. New taxa of Lejeuneoideae (Lejeuneaceae) collected in Manongarivo Special Reserve, NW Madagascar

TAMÁS PÓCS

In memoriam Patricia Geissler

ABSTRACT

PÓCS, T. (2001). East African Bryophytes, XVI. New taxa of Lejeuneoideae (Lejeuneaceae) collected in Manongarivo Special Reserve, NW Madagascar. *Candollea* 56: 69-78. In English, English and French abstracts.

From the rich collections made by Patricia Geissler in Madagascar, three taxa of *Lejeuneaceae* proved to be new to science: *Drepanolejeunea geisslerae* Pócs, *Diplasiolejeunea cobrensis* subsp. *antsirananae* Pócs and *Lejeunea alata* var. *patriciae* Pócs. *Drepanolejeunea geisslerae*, together with *Drepanolejeunea helenae* Pócs from Réunion Island and with *Drepanolejeunea ankasica* E.W. Jones from West Africa, Ghana, is included in a new section, *Drepanolejeunea* sect. *Africanae* Pócs.

RÉSUMÉ

PÓCS, T. (2001). Bryophytes Est-Africains, XVI. Nouveaux taxons des Lejeuneoideae (Lejeuneaceae) collectés dans la Réserve Spéciale de Manongarivo, Nord-Ouest de Madagascar. *Candollea* 56: 69-78. En anglais, résumés anglais et français.

Parmi les matériaux importants récoltés par Patricia Geissler à Madagascar, trois taxa de *Lejeuneaceae* se sont avérés nouveaux pour la science: *Drepanolejeunea geisslerae* Pócs, *Diplasiolejeunea cobrensis* subsp. *antsirananae* Pócs and *Lejeunea alata* var. *patriciae* Pócs. *Drepanolejeunea geisslerae*, avec *Drepanolejeunea helenae* Pócs de la Réunion et avec *Drepanolejeunea ankasica* E.W. Jones de l'Afrique de l'Ouest, est incluse dans une nouvelle section, *Drepanolejeunea* sect. *Africanae* Pócs.

KEY-WORDS: Bryophytes – Liverworts – *Lejeuneaceae* – Endemism – Madagascar – Manongarivo.

INTRODUCTION

Patricia Geissler took part, as a bryologist, during February-March 1999, in a joint expedition organised by the “Conservatoire et Jardin botaniques de la ville de Genève” in the Manongarivo Massif of Northwest Madagascar, from where no bryophytes were hitherto recorded. As a result, she collected more than 800 bryophyte specimens, and presented from the first results a poster at the XVI. International Botanical Congress in St. Louis (GEISLER, 1999), but her

unexpected death prevented her from further elaboration. The rich collection was sent to the author, who, with his contributors, identified 640 specimens of it, belonging to 167 taxa. Nineteen of them proved to be new to Madagascar and 4 for the whole of Africa, finally 7 to science (PÓCS & GEISSLER, *sub praelo*). One species, *Lopholejeunea leioptera* Gyarmati (*Lejeuneaceae*, subfam. *Ptychanthoideae*), is described by SASS-GYARMATI (2001), while further 3 new members of the same family (from subfam. *Lejeuneoideae*) are treated here.

***Drepanolejeunea geisslerae* Pócs, spec. nova** (Tab. 1-3, Fig. 1-20)

Planta autoica, corticola, lignicola vel epiphylla, sicca pallide virens, colonias diametro 3-5 cm dense caespitosas formans. Caules diametro 40-50 µm. Surculi cum foliis 450-680 µm lati, 1-3 cm longi, irregulariter ramuloses, ad substratum tantum laxe adhaerentes. Folia late falcato-spathulata, margine irregulariter dentato-lobata, apice frequenter incurvata. Ocelli 3 (2-4) suprabasali, moniliam formans. Cellulae laminae isodiametricae, diametro 12-15 µm, marginis 12-15 µm, parietibus non incrassatis, trigonibus subnullis. Lobulus ovatus, 100-150 µm longus, 70-100 µm latus. Margo libera quatuorcellularis dente primo unicellulari incurvo, dente secundo obtuso vel subnullo. Papilla hyalina in sinu interdenticulato unicellulario posita, plerumque ad dentem secundum affixa.

Androecia in spicis lateralibus ramulos vegetativos terminantes, 4-8 jugis antheridiis singulis evoluta, saepe prope gynoecia. Perianthia 400-700 µm longa, 230-450 µm lata, obovata, quiuecarinata, carinis obtuso-crenulatis. Rostrum breve (ad 25 µm altum). Seta articulata, capsula diametro 250 µm, elateris 100 µm longis, irregulariter unispiralis vel scalariformis.

Species nova in honorem Doctoris Patriciae Geisslerae, hepaticologicae illustrissimae beatae, collectoris hujus plantae dedicata.

Typus: MADAGASCAR, Prov. Antsiranana, “Réserve Spéciale de Manongarivo (13°59'N, 48°26'E), Prov. Antsiranana, Nord-Ouest de Madagascar”, abundant on palm stem, 950-1050 m, 5.III.1999, *Geissler 19559* (Holo-: G; iso-: EGR, TAN).

Paratypes: *Geissler 19421* (microslide, G, EGR); *Geissler 19423/1* (EGR, JE); *Geissler 19463* (G); *Geissler 19549/2* (microslide, G); *Geissler 19838/1* (microslide, G); *Geissler 19839/1* (G).

Autoicous, occurring in 3-5 cm large, pale green patches on bark, decaying wood or with solitary shoots intermixed among other liverworts also as epiphyll. The leafy shoots are 450-680 µm broad, forming a weft not or only loosely appressed to the substrate. Stems 40-50 µm diameter, formed by 3 medullary and by 7 cortical cell rows, of which two form the ventral merophyta (Fig. 3). Branching irregular, *Lejeunea* type, with collar.

Leaves (Fig. 4-9) erecto-patent, imbricate, falcato-spathulate, with a short, J shaped insertion line and narrow basal part and broad, irregularly dentate-lobate, slightly convex lamina. Antical base often extends across the stem. Keel and antical margin join at a right angle. 3 (rarely 2 or 4) suprabasal ocelli are arranged in a 90-120 µm long, moniliform vitta. They may have a bit thicker walls and are somewhat longer (up to 40 µm) than the isodiametric lamina cells of 12-25 µm diameter and have somewhat opaque content, probably being the remnant of one large oil body. No scattered ocelli occur in the lobe. Marginal lamina cells are a bit smaller, of 10-16 µm diameter. Leaf cell walls are even, relative thin, with no or with very small triangles. Lobules inflated, ovate, 100-150 µm long and 70-100 µm wide. Their free margin consist of 4 somewhat elongate cells. First tooth unicellular, hooked, second tooth obtuse or obsolete. The sinus between the two is one cell broad, with the hyaline papilla fixed usually to the distal side of the second tooth.

Amphigastria (Fig. 10-12) are distant, rhombic, bilobed behind their half length, 120-150 × 100-120 µm, base cuneate, insertion straight, 50 µm wide. Lobes 3-5 cells long and 2-4 cells broad, usually with an obtuse tooth on their outer side. Sinus irregular V shaped.

Androecia (Fig. 19-20) in a 4-8 paired spike on the tip of vegetative branches, develop usually near the gynoecia (Fig. 13). Male bracts with 1-1 antheridium. Bracteoles similar to amphigastria with a narrower sinus, disappearing towards the apex of the male spike.

Gynoecia on shoot apex or on short side branches, each with one pycnolejeuneoid innovation (Fig. 1). Female bracts and bracteoles (Fig. 14) bilobed, short, not reaching the half length of the stalked, emergent perianthium (Fig. 15-17), which is 400-700 µm long and 230-450 µm broad, obovate, with five obtuse, by protruding cells slightly crenulate keels. Beak short (up to 25 µm), formed by only one row of elongate cells.

Seta strongly articulate, capsule of 250 µm diameter, elaters at the valve tips 100 µm long with irregularly unispiral or with scalariform thickenings (Fig. 18).

The new species is dedicated to its collector, the late Dr. Patricia Geissler, renowned hepatologist.

Specimens examined.- All known specimens were collected by Patricia Geissler in the Réserve Spéciale de Manongarivo (13°59'N, 48°26'E), Prov. Antsiranana, NW Madagascar, on the rain forest covered north ridge leading to the 1869 m high summit of Manongarivo Massif, some of them in large amount, some others just as tiny shoots intermixed among other epiphyllous bryophytes: *Geissler 19421*, 1200 m, epiphyte; *Geissler 19423/1*, 800-900 m, sur tronc d'env. 10 cm de diamètre + liane; *Geissler 19463*, 850-950 m, on decaying wood; *Geissler 19549/2*, 850-950 m, epiphyll; *Geissler 19559*, 950-1050 m, abundant on palm stem, Holotype; *Geissler 19838/1* & *Geissler 19839/1*, 1200 m, epiphyte.

The generic concept of *Drepanolejeunea* (Spruce) Schiffn. was established and developed by SPRUCE (1884), STEPHANI (1889) and BISCHLER & al. (1966).

The history of intergeneric subdivision of *Drepanolejeunea* is discussed in details by BISCHLER (1964), who created 6 groups for the neotropical species, as could not be properly used the sections and subsections defined by HERZOG (1930) and by ZWICKEL (1933) for the Asian taxa. GROLLE (1976) was the first to establish three subgenera: *Drepanolejeunea* subg. *Drepanolejeunea*, *Drepanolejeunea* subg. *Pristolejeunea* Grolle and *Drepanolejeunea* subg. *Kolpolejeunea* Grolle, based on the characters of lobule teeth, the ocelli and the position of gynoecia. These subdivisions were accepted by JONES & HARRINGTON (1983) and by SCHUSTER (1996). Recently GROLLE & ZHU (2000) modified this generic concept, including the former genus *Rhaphidolejeunea* Herzog at the subgeneric level (*Drepanolejeunea* subg. *Rhaphidolejeunea* (Herzog) Grolle & R. L. Zhu). *Drepanolejeunea* accordingly has now four well distinguishable subgenera.

The new taxon obviously belongs to *Drepanolejeunea* subg. *Drepanolejeunea* and is related to two recently described African species, *D. ankasica* E. W. Jones from West Africa, Ghana (JONES & HARRINGTON, 1983) and *D. helenae* Pócs from Réunion Island. The relationship between these two last species was discussed in details by PÓCS (1997). The common characters of the now three related species are the falcato-spathulate, irregularly sinuose or lobulato-dentate leaves with acute, often incurved apex and with moniliform, suprabasal ocelli and the relatively large amphigastria, which have broad lobes directed forwards to sideway, diverging never more than 60° from the stem. This combination of characters seems to be unique within *Drepanolejeunea* subg. *Drepanolejeunea* and serves to distinguish a new section for this natural group of species:

***Drepanolejeunea* sect. *Africanae* Pócs, sect. nova**

Folia falcato-spathulata margine irregulariter sinuosa vel dentato-lobata ocellis 2-4 suprabasibus moniliformibus. Amphigastria magna cauli triplo latiora lobulis convergentibus vel diagonaliter divergentibus.

Typus sectionis: *Drepanolejeunea helenae* Pócs in Cryptog. Bryol. Lichénol. 18: 198. 1997.

There are further characters, which interconnect by pairs the species of the section, like the sinuose leaf margin and obconical perianth with a very long beak (*D. ankasica* and *D. helenae*), and the lack of scattered laminar ocelli (*D. ankasica* and *D. geisslerae*). The distribution of *Drepanolejeunea* subg. *Drepanolejeunea* seems to be restricted to Tropical Africa, from Ghana to the Indian Ocean Islands.

***Diplasiolejeunea cobrensis* subsp. *antsirananae* Pócs, subsp. nova** (Tab. 4, Fig. 29-32)

A typo differt foliis et cellulis multo angustioribus et lobulis amphigastriorum cellulibus uniseriatis compositis, amphigastris saepe unilobulatis.

Typus: MADAGASCAR, Prov. Antsiranana, “Réserve Spéciale de Manongarivo (13°59'N, 48°26'E), on the rain forest covered north ridge leading to the 1869 m high summit of Manongarivo Massif, epiphyllous”, 850-950 m, III.1999, *Geissler 19549/8* (Holo-: G; iso-: EGR, in form of microslide) [This is the only specimen examined].

Diplasiolejeunea cobrensis Steph. is a pantropical species with a very scattered distribution in all tropical continents. The Manongarivo plant differs so much from its normal appearance (see Fig. 26-28), that, without the presence of characteristic basal and scattered laminar ocelli and inrolled lobulus, it would be very difficult to recognise. Its leaves are much narrower in shape (only up to 200 µm instead of 400 µm), which is caused mostly by the narrower lamina cells (15 µm instead of 20 µm) of an almost equal number, arranged in longitudinally parallel rows. But the most peculiar feature is the shape of amphigastria, consisting often only in one unicellular lobe (see Fig. 31-32). The new subspecies is known only from the type locality in NW Madagascar.

***Lejeunea alata* var. *patriciae* Pócs, var. nova** (Tab. 4, Fig. 21-25)

A typo differt alii perianthii longissime auriculato-corniculatis (latitudo apicis cum cornibus longitudinis perianthiae aequans) et statura maiori (latitudo surculae ad 1.7 mm).

Typus: MADAGASCAR, Prov. Antsiranana, “Réserve Spéciale de Manongarivo (13°59'N, 48°26'E), on the rain forest covered north ridge leading to the 1869 m high summit of Manongarivo Massif, epiphyllous”, 12.III.1999, *Geissler 19856/1* (Holo-: G; iso-: EGR, JE, TAN).

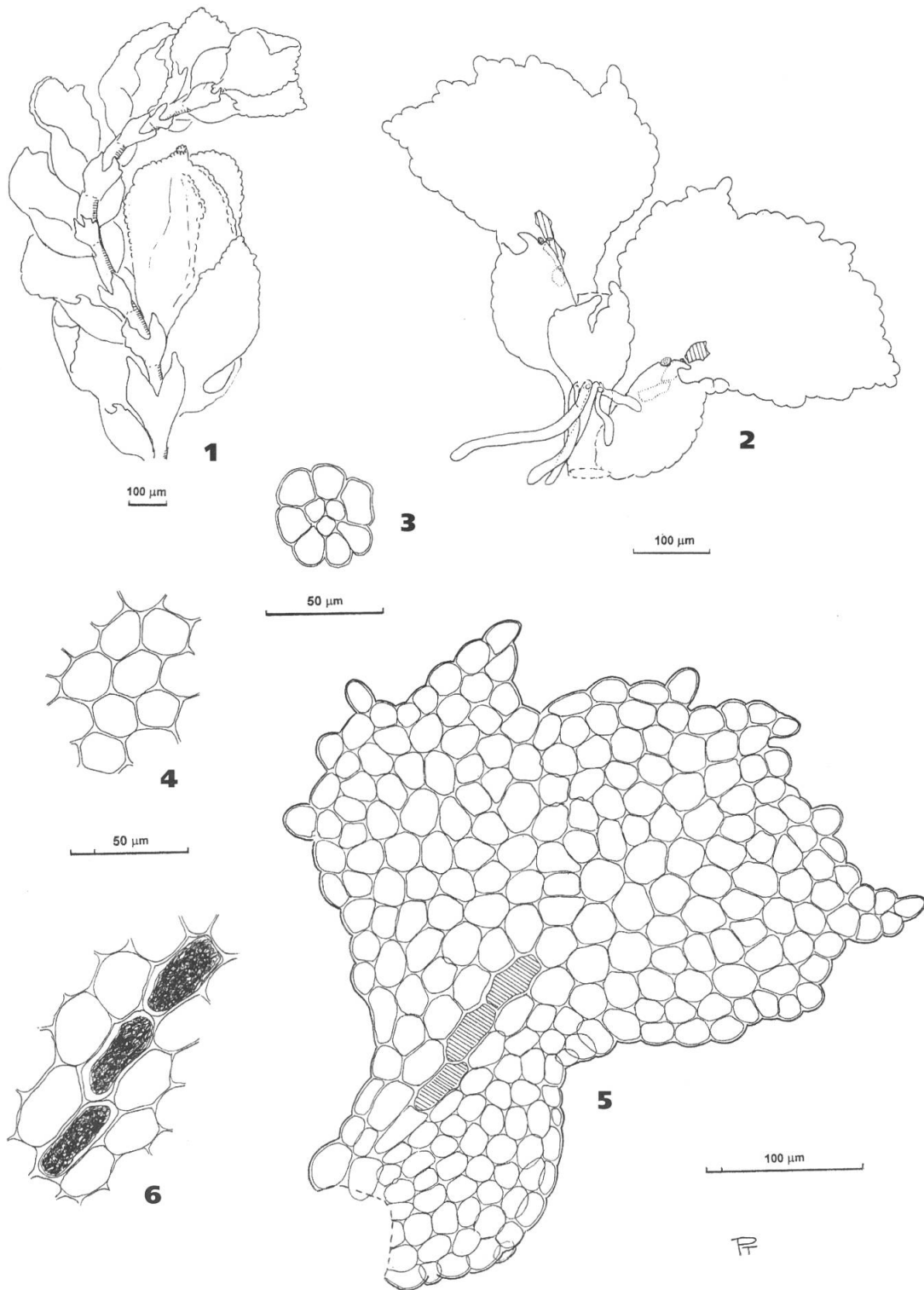
Paratypes: *Geissler 19852/2* (G); *Geissler 19855/1* (G); *Geissler 19857/2* (G, microslide); 19858/15 (G).

Differs from the type, *Lejeunea alata* Gott., by its very long, auriculate horns of perianth wings (see Fig. 21-22) making the width equal to the perianth length (by the type the width of mitrate apex is only 2/5-2/3 of the perianth length) and by its larger stature (shoot width up to 1.7 µm, by the type up to 1.2 mm).

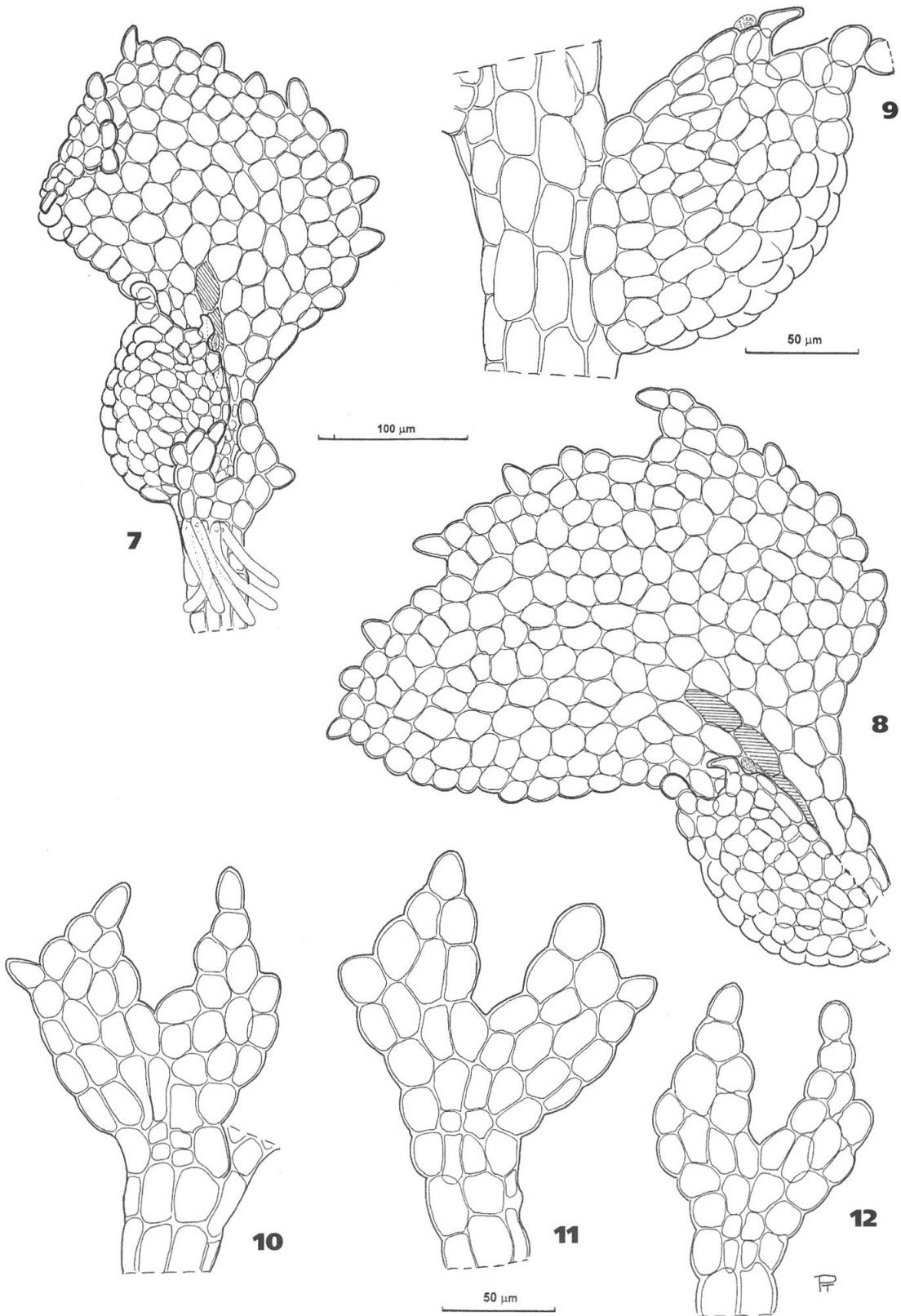
As GROLLE (1977) pointed out, the closest relative of *Lejeunea acuta* Gott. is the African *L. eckloniana* Lindenb. Both have, as the other members of the “*L. eckloniana* complex” of JONES (1974), *Massula*-type oil bodies (GROLLE, 1977; KIS & PÓCS, 1997), “which disintegrate into minute ochre coloured bodies visible in the herbarium specimens, giving often the dry plants a “brassy” tinge” (JONES, 1974). Other mutual characters are the thin cell walls with small triangular and intermediate thickenings, the very broad amphigastria and the usually broad perianth wings often bearing appendices. The mean difference between *L. eckloniana* and *L. alata* is in the shape of perianth wings, being more or less evenly tapering at both ends in *L. eckloniana*, while auriculately inflated at their upper end, giving the perianth a mitrate shape in *L. alata* (GROLLE, 1977). Anyhow, the width of these wings can vary also in *L. eckloniana* (see

Fig. 1 in JONES, 1974), as the size of ears can be different in *L. alata*. The specimens from Manongarivo have especially large auriculate horns, while the Asian type of *Taxilejeunea mitracalyx* Eifrig, synonym of *L. alata* (see Fig. VIII of EIFRIG, 1937; Fig. XIII of MIZUTANI, 1970), and most specimens of *L. alata* from continental Africa have small ears. The type of *L. renauldii* Steph., an other synonym from Réunion Island, (see Fig. in STEPHANI, 1985) is intermediate in this respect. This high variability of perianth shape seems not to be related to environmental (humidity or light) conditions, as both *L. alata* var. *alata* and *L. alata* var. *patriciae* occur in Manongarivo reserve.

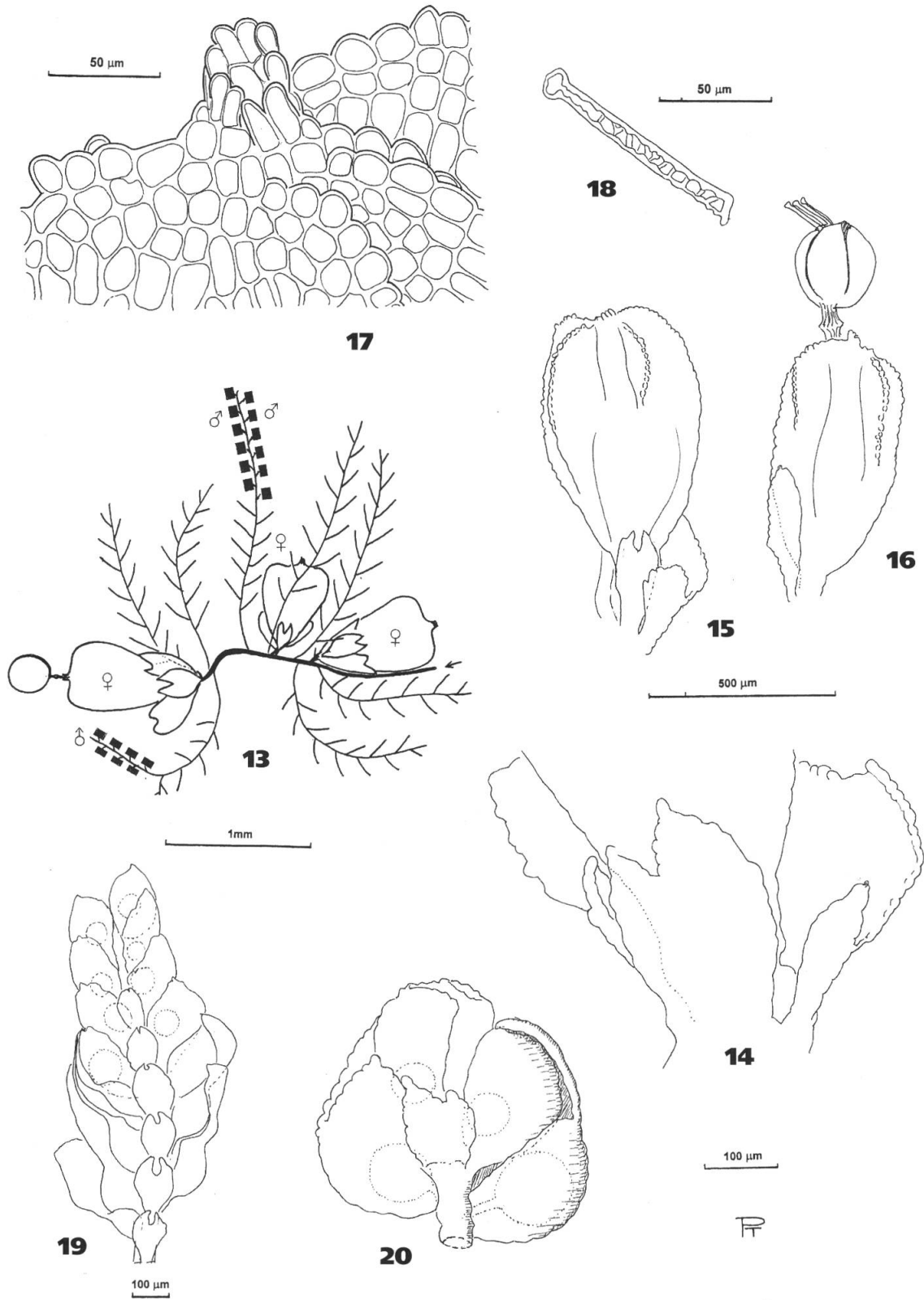
Specimens examined.- All known specimens were collected by Patricia Geissler in the Réserve Spéciale de Manongarivo (13°59'N, 48°26'E), Prov. Antsiranana, NW Madagascar, at 1200 m altitude in the rain forest covered north ridge leading to the 1869 m high summit of Manongarivo Massif, on 12 March 1999, as epiphylls: *Geissler 19852/2*, *Geissler 19855/1*, *Geissler 19856/1* (Holotype), *Geissler 19858/15*.



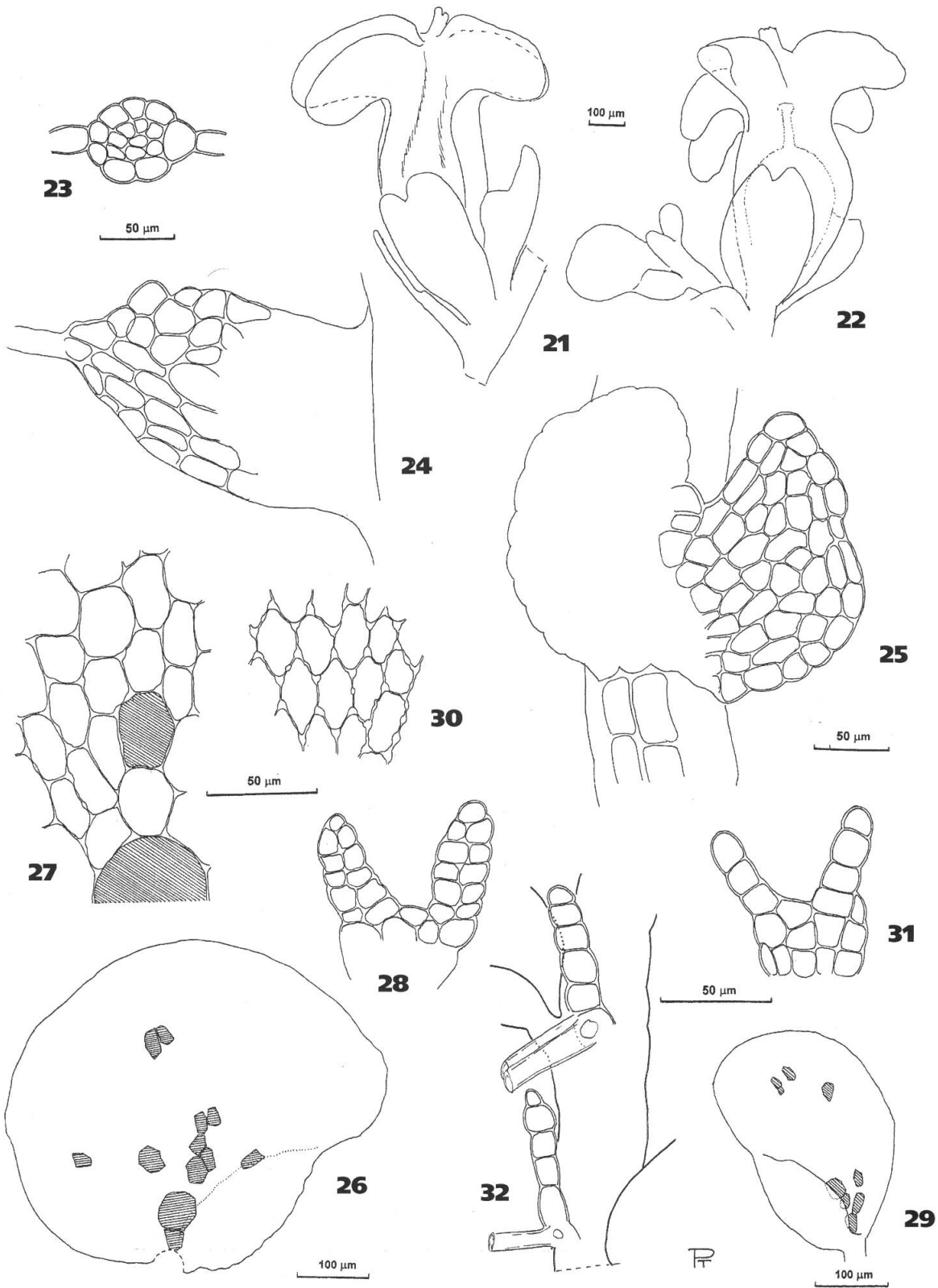
Tab. 1. – *Drepanolejeunea geisslerae* Pócs. **1:** Gynoecium with a *Pycnolejeunea* type innovation. **2:** Part of shoot, ventral view. **3:** Stem section. **4:** Median lobe cells. **5:** Leaf, dorsal view. **6:** Ocelli. [Geissler 19559, holotype G].



Tab. 2. – *Drepanolejeunea geisslerae* Pócs. 7-8: Leaves, ventral view. 9: Lobule. 10-12: Amphigastria. [Geissler 19559, holotype G].



Tab. 3. – *Drepanolejeunea geisslerae* Pócs. **13**: The position of gametangia. **14**: Perichaetium. **15-16**: Perianths. **17**: Perianth mouth. **18**: Elater. **19-20**: Androecia. [Geissler 19559, holotype G].



Tab. 4. – *Lejeunea alata* var. *patriciae* Pócs. 21-22: Perianths. 23: Stem section. 24: Lobule. 25: Amphigastrium. [Geissler 19856/1, holotype G]. – *Diplasiolejeunea cobrensis* Steph. subsp. *cobrensis* 26: Leaf. 27: Median cells of lobe. 28: Amphigastrium. [Pócs 89214/C, Tanzania, Mafia Island, EGR]. – *Diplasiolejeunea cobrensis* subsp. *antsirananae* Pócs. 29: Leaf. 30: Median cells of lobe. 31-32: Amphigastria. [Geissler 19549/8, holotype G].

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