

***Acanthocoleus elgonensis* Gyarmati et Pócs, sp. nov. from Mount Elgon (Uganda)**

Andrea SASS-GYARMATI & Tamás PÓCS

Botany Department of Eszterházy College, Eger, PB. 43, H-3301, Hungary

Abstract – A new *Acanthocoleus* R.M. Schust. species is described from the afroalpine belt of Mount Elgon, Uganda. *Acanthocoleus elgonensis* Gyarmati et Pócs is distinguished from the related *A. madagascariensis* (Steph.) Kruijt by stem, leaf lobule and underleaf structure, pigmentation of cell walls and finally by the shape of female bracts.

***Acanthocoleus* / Africa / Lejeuneaceae / Mt. Elgon / Uganda**

Resumé – Une nouvelle espèce de l'*Acanthocoleus* R.M. Schust. est décrit de la région afroalpine du Mont Elgon, Uganda. *Acanthocoleus elgonensis* Gyarmati et Pócs se distingue de l'espèce voisine *A. madagascariensis* (Steph.) Kruijt par le structure de tiges, lobules des feuilles, amphigastres, coloration de parois des cellules foliaires et finalement par la forme de la bractée femelle.

INTRODUCTION

The genus *Acanthocoleus* R.M. Schust. was described by Schuster (1970), and subsequently it was treated by Kruijt (1985) as a subgenus of *Dicranolejeunea* (Spruce) Schiff. Later the same author (Kruijt, 1988) recognised *Acanthocoleus* at genus level, differentiating it from *Dicranolejeunea* by its smooth stem epidermis without bulging cells and by its entire female bracteoles. Van Slageren & Berendsen (1985) established the tribe Brachiolejeuneae for several genera. Gradstein (2013) in his classification of Lejeuneaceae based on molecular and morphological evidence recognized Brachiolejeuneae tribe with eight genera in the subfamily Lejeuneoideae C. Massal., with the subtribes Stictolejeuninae and Brachiolejeuninae. The latter contains the genera *Acanthocoleus*, *Blepharolejeunea* S.W. Arnell, *Brachiolejeunea* (Spruce) Schiff., *Dicranolejeunea*, *Lindigianthus* Kruijt et Gradst., and *Odontolejeunea* (Spruce) Schiff., of which *Acanthocoleus*, *Dicranolejeunea* and *Odontolejeunea* are represented in Africa. Three species of the genus *Acanthocoleus* were recognised from the continent, namely *A. aberrans* (Lindenb. et Gottsche) Kruijt, *A. chrysophyllus* (Lehm.) Kruijt and *A. madagascariensis* (Steph.) Kruijt. (Kruijt, 1988). However, according to Wigginton (2004), referring to Jones (1970) there is no morphological difference between the African materials of *A. aberrans* and *A. madagascariensis*, hence only

two species are accepted in Africa. However, according to the latest checklist of African liverworts (Wigginton 2009) three species are enumerated: *Acanthocoleus aberrans*, *A. chrysophyllus* and *A. madagascariensis*. As *A. aberrans* and *A. madagascariensis* are neighbours in the same clade (Wilson *et al.*, 2007), we think that this problem can only be solved by further, more detailed molecular investigations.

In September 1997 the second author took part in the Norwegian sponsored NUFU “Ecology and Sustainable Natural Resource Management in Uganda” Project at the Makerere University of Uganda, Kampala, together with prof. Kåre Arnstein Lye (Agricultural University of Norway, Ås) collecting in several bryologically less known parts of the country. The majority of their results were already published (Pócs & Lye, 1999) but some critical species remained unnamed. Among them was a holostipous Lejeuneaceae collected in Afroalpine environment, which is herein described as a new species.

DESCRIPTION

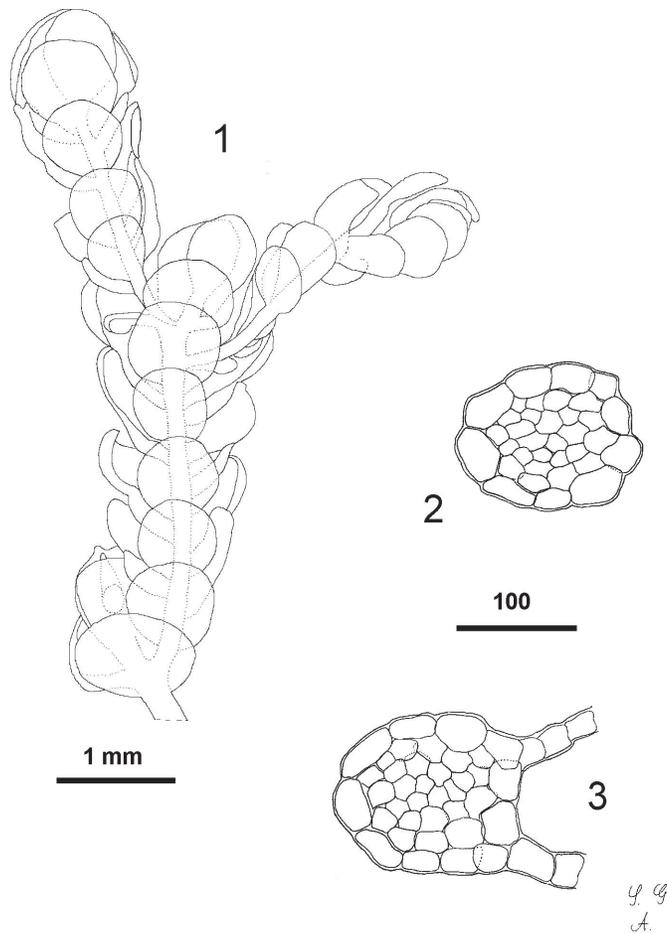
Acanthocoleus elgonensis Gyarmati *et* Pócs, *sp. nov.*

Figs 1-12

Diagnosis – *Acanthocoleus elgonensis* differs from *A. madagascariensis* and from *Acanthocoleus chrysophyllus* by its greater size (especially of its underleaf) and the stem structure composed by much more medulla cells. Also differs by the *Massula*-type oil-bodies and by the shape of the female bracts with a lobule stretching up to almost half of the lobe size. The greater plant size, stem structure, the yellowish brown to reddish brown pigmentation of cell walls, the 3-4-toothed lobules, and especially the very broad underleaves well distinguish the new species from other African members of the genus.

Typus – UGANDA, Mbale District, Mount Elgon, along Sasa Trail, 3750 meters, below Jackson Pool. 1°9.6 N, 34°30.7'E. On half shady, dripping volcanic cliffs surrounded by *Senecio elgonensis* moorland and *Helichrysum* – *Pentaschistis* tussock. *Coll.* T. Pócs 97145/AA, 23 Sept. 1997 (Holotype: EGR; isotypes: GOET, MHU, MLH).

Description – **Plants** dark brown to olive both in fresh and in dried conditions, forming 2-5 mm thick mats of up to 10 cm in diameter. **Shoots** 1-2 cm long and 1.0-1.5 mm wide. **Stem** 120-125 µm in diameter, in cross section composed of 40-45 medullary and 14 cortical cells, of which 4 are on the ventral side; cortical cells much larger than the thin-walled medullary cells; ventral merophyte 2(-4) cells wide. **Branching** mostly of *Frullania*-type, few of the *Lejeunea*-type. **Leaf lobes** imbricate, 750-1150 × 1000-1125 µm, ovate, margins entire, revolute towards the apex; leaf apex acute, slightly denticulate; leaf cells isodiametric, irregularly oriented, trigones small, median cells 20 × 25 µm, cell walls yellowish to reddish brown coloured, with not-cordate trigones, intermediate thickenings 0-1 per cell wall. **Oil bodies** *Massula*-type, homogeneous, minute, 8-35 per cell. **Lobules** rounded, not saccate, 0.45(-0.55) mm long, 0.35(-0.45) mm wide, with 3-4 equal, one-celled teeth, first tooth incurved, the other teeth hardly or not incurved; hyaline papilla 2 cell rows below the proximal base of the first tooth. **Underleaves** distant to contiguous, not or hardly imbricate, 4.5-6.0 times as wide as the stem, broadly (sub)orbicular with sinuate insertion line; length: from upper insertion to apex 0.65-0.75 mm, from lower insertion to tip 0.7-0.8 mm, greatest width

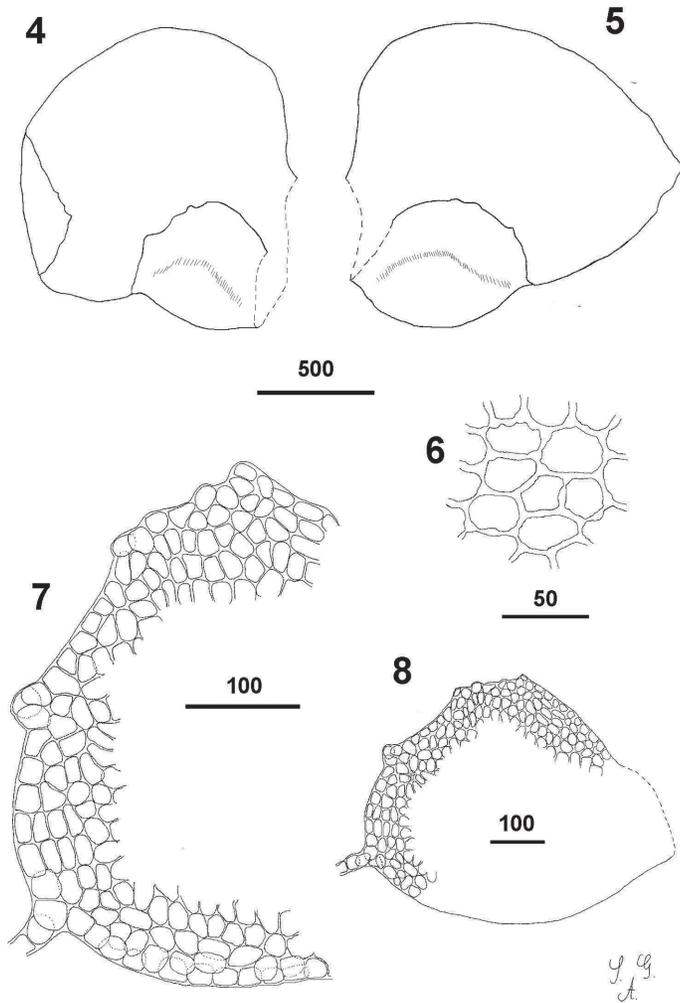


Figs 1-3. *Acanthocoleus elgonensis* Gyarmati et Pócs. **1.** Habit, ventral view, with female branch. **2-3.** Transverse section of stem. (All from holotype).

0.75-0.87 mm, apex plane, bases narrowly decurrent. **Androecia** not seen but male bracts possibly present and similar leaves. **Gynoecea** terminal on the stem, with (1-)2 pycnolejeuneoid innovations. **Bracts** 0.85(-1.2) mm × 0.55(-0.7) mm, lobule large, 0.4 mm × 0.25 mm; **female bracteole** with entire margin, 0.85 mm long, 0.9 mm wide. **Perianth** immersed, obovate, somewhat stalked, smooth, without ciliae, 3-keeled, ± dorsiventrally compressed with 1 broad ventral keel, 0.75 mm × 0.6 mm, stalk 0.2 mm; beak 5 cells high. **Sporophyte** unknown.

Etymology – The species epithet *elgonensis* is named after the collection place.

Distribution and ecology – The species was accompanied by *Bartramia* sp., *Leptodon smithii* (Hedw.) F. Weber et D. Mohr., *Bryum alpinum* With., *Bryum laevigatum* Hook.f. et Wilson, *Distichium capillaceum* (Hedw.) Bruch et Schimp., *Hedwigia* sp., *Hymenostylium recurvirostrum* (Hedw.) Dixon, *Palamocladium leskeoides* (Hook.) E. Britton, *Tayloria kilimandscharica* Broth., *Radula voluta* Taylor and the lichen *Solorina simensis* Flot.

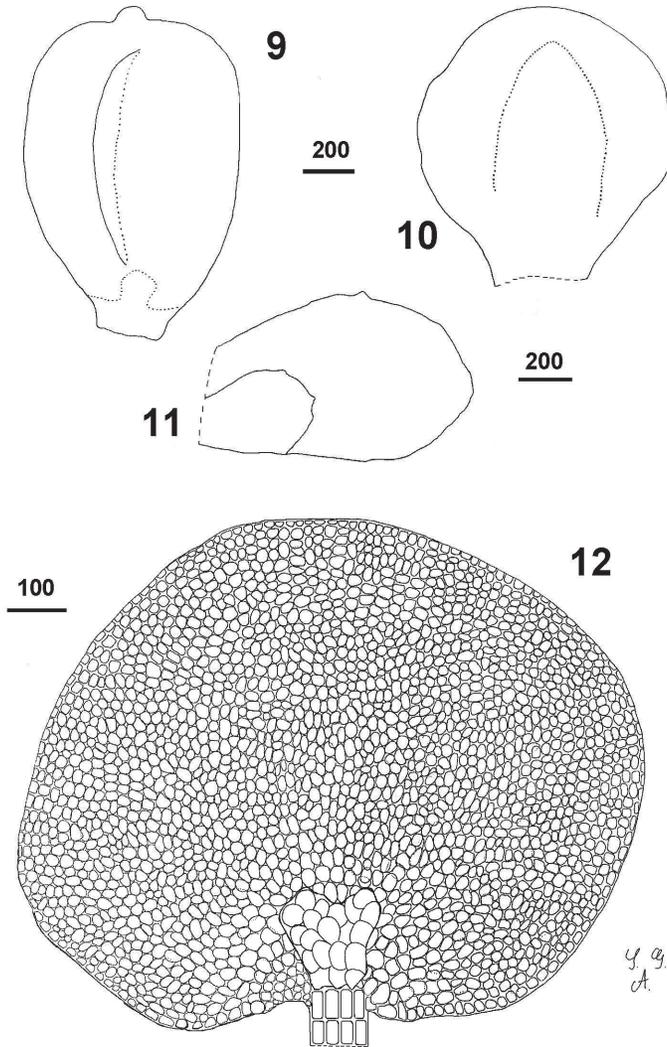


Figs 4-8. *Acanthocoleus elgonensis* Gyarmati et Pócs. 4-5. Leaves, ventral view. 6. Median cells. 7-8. Leaf lobules (All from holotype).

DISCUSSION

With the new species described in this paper, the known number of *Acanthocoleus* species in Africa increased to four. They are recognised in the following key:

- 1. Keel of the lobules straight to slightly arched, cell walls yellow to reddish brown pigmented 2
- 1. Keel of the lobule strongly arched, cell walls colourless 3



Figs 9-12. *Acanthocoleus elgonensis* Gyarmati et Pócs. **9.** Perianth, ventral view. **10.** Bracteole. **11.** Gynoecial bract. **12.** Amphigastrium, with the indication of insertion line. (All from holotype).

- 2. Cell walls yellow coloured, female bract lobule very small (or absent). Number of lobule teeth 2. Underleaf 1.5-3 times as wide as the stem, reaching 260-610 μm width *A. chrysophyllus*
- 2. Cell walls yellowish to reddish brown pigmented, female bract lobule almost half length and width of the lobe. Lobule teeth 3-4(-5), of which the first one triangular, consisting of 3 cells, the others unicellular, blunt. Underleaf 4.5-6.0 times as wide as the stem, reaching 700-850 μm width *A. elgonensis*
- 3. Perianth with 5 keels, male bracts under perianth *A. aberrans*
- 3. Perianth with 3 keels, male bracts on specialized *Lejeunea*-type branches *A. madagascariensis*

The habit, colour and the much greater size of the plant already at the first glance differentiates *Acanthocoleus elgonensis* from the other African species, which are restricted to the forest belts and never occur in a typical afroalpine habitat of that altitude (3750 meters), well above the forest line. On Mt. Kilimanjaro *Acanthocoleus madagascariensis* thrives at 1850-2200 m (Pócs, 1994), while in other East African mountains is recorded from 900 to 2260 m (Jones, 1970). *Acanthocoleus chrysophyllus* occurs on Mt. Kilimanjaro up to 2800-2900 m altitude (Bizot *et al.*, 1979). The yellowish to reddish brown pigmentation of cell walls, the 3-4-toothed lobules, the very broad (to 870 µm) underleaves and, especially, the female bracts with a lobule stretching up to almost half of the lobe size, well distinguish the new species from other members of the genus *Acanthocoleus*. Although the oil bodies of *A. elgonensis* were observed just a few days after collection, it might be that they were already disintegrating, resulting in their homogeneous, *Massula*-type appearance. Although homogeneous oil bodies have been reported previously in some palaeotropical species of *Acanthocoleus*, according to Gradstein (1994) they are finely segmented in fresh material of the genus and turn homogeneous upon age.

Mount Elgon, being the oldest among the East African giant volcanoes, is rich also in vascular plant endemics (Hedberg, 1957) and this richness is also reflected in the bryoflora. There are many afroalpine endemics of bryophytes in this massif, including *Colura hedbergiana* Pócs, *C. kilimanjarica* Pócs *et al.* (= *C. ornithocephala* S.W. Arnell, *vide* Gradstein, 2013), *Fossombronia grandis* Steph., *Gongylanthus richardsii* E.W. Jones, *Harpalejeunea fischeri* Tixier, *Tetralophozia cavallii* (Gola) Vána, *Torrentaria hedbergii* (P. de la Varde) Ochyra, and *Zygodon fragilifolius* Malta and others.

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