

NEW RECORDS TO THE BRYOFLO RA OF THE E SLOPE OF MT. KENYA

***Itambo Malombe*¹, *Muiruri Patel*¹, *George K. Mugambi*³
& *Tamás Pócs*^{2*}**

¹*Cryptogamic Herbarium of the National Museum of Kenya, Nairobi, P.O. Box 45166 Nairobi-00100, Kenya;* ²*Institute of Biology, Eszterházy Károly Catholic University, Eger, Pf. 43, Hungary, H-3301;* ³*Department of Biological Sciences, Meru University of Science and Technology, P.O. Box 972-60200, Meru, Kenya;*
**E-mail: pocs.tamas33@gmail.com*

Abstract: The first author studied the bryophyte communities on the East slope of Mt. Kenya through the forest belt between 1600 and 3000 m elevations. Seven sampling plots were selected at each 200 m altitudinal interval. At each sampling plot microclimate data measurements were carried out for six months between July and December 2020 using dataloggers and the composition of epiphyllous communities was studied in details with special reference to the host plants. Tamás Pócs and his team (Bence Együd, Judit Havasi and Mária Szegedi) joined to this research during the August of 2021, to help in further collection and identification work. The collected specimens are deposited in the herbaria of EA and EGR. Majority of the collections have already been identified. The discovery of the only mainland African occurrences of the Lemurian *Microlejeunea inflata* and *Leptodon fuciformis* are outstanding results. Other species are new for Kenya: *Cololejeunea platyneura*, *Cyclodyction subbrevifolium*, *Diplasiolejeunea deslooveri*, *Fissidens intramarginatus* and *Telaranea coactilis*. The last author visited the same sites 2004 with his late wife, Sarolta Czimer, guided by Min S.Chuah-Petiot from Nairobi University and from their collection *Gemmabryum subapiculatum*, *Orthotrichum denticulatum*, *Lophocolea fragrans* and *Lophocolea muricata* proved to be new to Kenya.

Keywords: Africa, endemism, Kenya, Lemurian element

INTRODUCTION

Mount Kenya (Kirinyaga) is the highest mountain in Kenya and the second highest of Africa, with its 5199 m elevation. It lies just at the S side of Equator and was formed by tertiary volcanic activity. Protected as a national park, since 1949, spreading over 120 km



diameter, at 71500 ha area, quite isolated by the surrounding lowland (Bennun and Njoroge 2000).

Mount Kenya attracted many botanists but its bryological exploration started relatively late. The first bryophyte collectors were probably R. E. and Th. C. E. Fries in 1922 (Vanden Berghen 1951). Three later publications contained the majority of records. O. Hedberg's afroalpine collections (including many records from Mt. Kenya) were identified and published by Potier de la Varde (1955) and by S. Arnell (1956). M. S. Chuah-Petiot carried out intensive fieldwork in the mountains for several years. She reported 194 bryophyte species of which 38 species were new to Mt. Kenya and 30 others for the whole country (Chuah-Petiot 1995). Apart from these many publications contain scattered records from the mountains.

The first author made a comprehensive documentation of the epiphytic bryophyte communities along the Chogoria Trail, located SW of Meru town, on the East, windward slope of Mt. Kenya. The permanent sampling plots (PSPs) were spread through the whole forest belt between 1600 and 3000 m elevations, at each approximately 200 m altitudinal interval. Mugambi and Patel were instrumental in site selection and description.

The sampling plots are marked by the following abbreviations:

Nt: 1640 m. Degraded submontane rainforest dominated by *Anthocleista grandiflora*–*Diospyros abyssinica*, mixed with *Strombosia scheffleri*, *Agelaea pentagyna* and *Allophylus abyssinicus*.

Ch1: 1800 m. S 00°13.95', E 37°32.11'. Disturbed montane rainforest dominated by *Zanthoxylum gillettii* - *Harungana madagascariensis*, with *Tabernaemontana stapfiana*, *Elaeodendron buchananii*, *Xymalos monospora* and *Strombosia scheffleri*.

Ch2: 2000 m. S 00°14'.09", E 37°33'.05". Montane rainforest dominated by *Anthocleista grandiflora*, *Cassipourea malosana*, *Macaranga kilimandscharica*, intermixed with *Podocarpus latifolius* and *Xymalos monospora*.

Ch3: 2200 m. S 00°14'09", E 37°33'.05". Montane rainforest dominated by *Kuloa usambarensis*, *Afrocarpus falcatus*, *Cassipourea malosana*, mixed with *Galiniera saxifraga*, *Xymalos monospora* and *Podocarpus latifolius*.

Ch4: 2400 m. S 00°12'29", E 37°30'02". Upper montane rainforest dominated by *Afrocrania volkensii*, *Schefflera volkensii*, mixed with *Nuxia congesta*, *Cassipourea malosana* and *Podocarpus latifolius*.

Ch5: 2600 m. S 00°11'23", E 37°28'34". Bamboo (*Yushania alpina*) forest with scattered and emergent *Nuxia congesta* trees.

Ch6: 2800–2950 m. S 00°10'04", E 37°28'08". *Juniperus procera* forest intermixed with *Afrocarpus falcatus*, *Hagenia abyssinica* and *Yushania alpina*.

During our recent trip we collected only in the plots No. Ch2, Ch3, Ch4 and Ch6 and at 2100 m, between Ch2 and Ch3: **Ch2.2** and at 2300 m, between Ch3 and Ch4: **Ch3.2**. The spot numbers with boldface are used in the enumeration of records.

MATERIAL AND METHODS

Tamás Pócs and his team (Bence Együd, Judit Havasi and Maria Szegegi) joined to this research during the August of 2021, to help in the collection and identification work. Pócs visited the same route earlier, in February 2004 with his wife, Sarolta Czímer, guided by Min Chuah-Petiot from Nairobi University. The collected and already identified specimens from both collections are deposited in the herbaria of EA and EGR.

RESULTS

The records new to Kenya or the whole of continental Africa, according to Wigginton (2018) and to O'Shea (2006), are enumerated below:

Liverworts

Cololejeunea platyneura (Spruce) A.Evans occurs between 2000 and 3000 m in Guinea, Sierra Leone, Nigeria, DR Congo, Rwanda, Tanzania, Malawi and Madagascar (Fischer 2013, Wigginton 2018). Epiphyllous in montane forests. – *Malombe et al.*, at 2200 (**Ch3**) and 2900 m (**Ch6**).

Diplasiolejeunea deslooveri Vanden Berghen distributed in DR Congo, Rwanda, Kenya, Zimbabwe, Mozambique, South Africa. Epiphyllous or epiphytic in montane forest, 2500 m (2200 m in Mt Kenya, **Ch3**).

Lophocolea fragrans (Moris et De Not.) Gottsche, Lindenb. et Nees. is a species with very scattered (or unknown) distribution from the oceanic and Mediterranean parts of Europe, from Costa Rica, East China and from a few localities in Africa (Paton 1999, Wigginton 2018). Not yet known from Kenya. – *Pócs & Chuah-Petiot* 04003/A, at 2300 m, corticolous, the same locality, as **Ch3.2**.

Lophocolea muricata (Mitt.) Schiffn. is a Pantropical-oceanic temperate species widespread in Africa but hitherto was unpublished from Kenya (Grolle 1959, Wigginton 2018). *Pócs & Chuah-Petiot* 04010/F, at 2180 m, on decaying log, the same, as **Ch3**.

Microlejeunea inflata Steph. (*Figure 1*). KENYA: **Ch4**, Epiphyllous on *Podocarpus latifolius* leaves. The extension of its known

distribution to mainland Africa is remarkable. The species hitherto was known only from the Indian Ocean Islands (Grolle 1995). Good illustration of the species is done by Pócs (2002: 18, fig. 6). Type: from MADAGASCAR: without closer indication of locality: *Forsyth Major* 1000, in Stephani 1915), later published from the Antsiranana Prov., Réserve spéciale de Manongarivo (Pócs and Geissler 2002) furthermore there are three unpublished records from Madagascar: Toamasina Prov., Maromizaha forest S of Andasibe National Park at 1200 m, epiphyllous on *Pandanus* leaves, S. Pócs 9890/CL; Antsiranana Prov., Marojezy National Park, 780–1050 and 1830 m, epiphyllous, Pócs *et al.* 90113/EC and 90114/KA. From COMORO Islands: Ndzuani Island, first reported by Pócs (1993, confirmed by Grolle 1995), from Mayotte Island also became known (Chongui peak, 300-500 m, epiphyllous, Pócs & Magill 9287/AD, det. Grolle; Dapani, Réserve Forestière des Crêtes, 110-210 m, on roots, S. & T. Pócs 05080/G, NW du village Chembényoumba, 34 m, on roots, S. & T. Pócs 05090/G (all Mayotte records unpublished). It is known from many localities in RÉUNION Island (fully enumerated by Ah-Peng *et al.* 2010). New to the SEYCHELLES, Mahé Island, Morne Seychellois Nat. Park, summit ridge of Morne Blanc in mossy elfin forest dominated by *Northea seychellarum* and *Roscheria melanochaetes*. 600-667 m, epiphyllous. Pócs 00102/Q and 01539/R and Mahé Island, Grand Bois, on leaves of *Vateriopsis seychellarum*, J. Gerlach s.n. 2 Aug. 2002, det. Pócs.

Telaranea coactilis (Spruce) J.J.Engel & G.L.Merr. (*Figure 2*). Among other bryophytes. Earlier this species was treated as *Arachniopsis diacantha* (Mont.) Howe, with tropical African-American distribution (Gradstein *et al.* 1984). Engel & Smith Merrill (2004) in their revision of genus *Telaranea* distinguished two species formerly known as *Arachniopsis diacantha* under the binomials of *Telaranea diacantha* (Mont.) Engel & Merr. and *Telaranea coactilis* (Spruce) Engel & Merr., giving good distinguishing characters between the two in the shape and size and cell number leaf segments. Although both species were recorded from Africa, *T. coactilis* was not known from Kenya (Wigginton 2018). **Ch3**, on decaying log in the cushion of *Syrrhodon asper* Mitt.

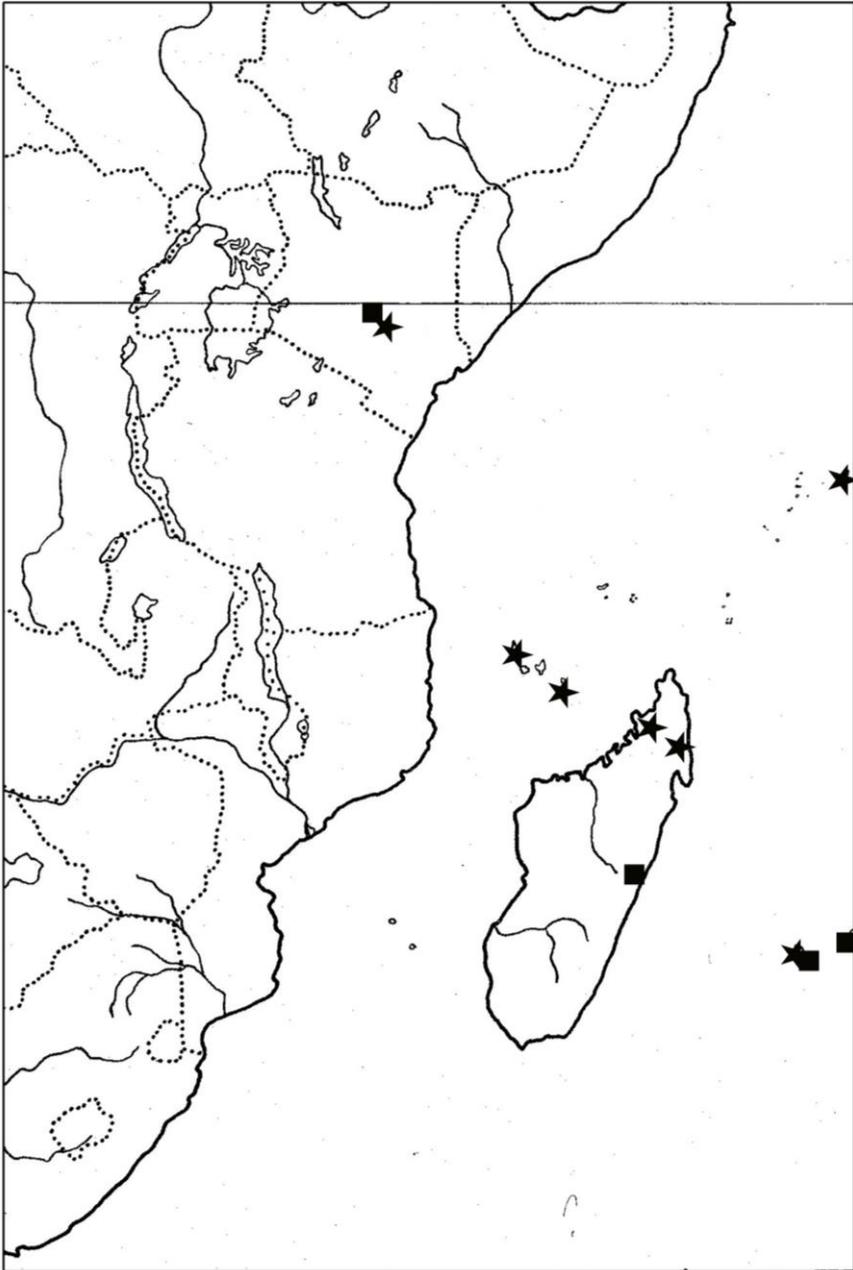


Figure 1. Distribution of *Microlejeunea inflata* Steph. (asterisk) and of *Leptodon fuciformis* (Brid.) Enroth.

Mosses

Cyclodictyon subbrevifolium Broth. (Figures 3–4). A species described and till now known only from Tanzania, Mt. Kilimanjaro along the Marangu Route at about 2800 m. New to Kenya: **Ch3**. Typical characters are the broad ovate leaves with acuminate apex and subentire or entire 2-seriate margin, with obsolete teeth (Demaret and Potier de la Varde 1951).

Fissidens intramarginatus (Hampe) A. Jaeger. An Afro-American disjunct widespread in tropical Africa, but new to Kenya: **Ch3**, on decaying log. The specific characters are the limbidia extending the whole length of vaginal laminae and the pluripapillose leaf cells with low and blunt papillae (Bruggeman-Nannenga 2006).

Gemmabryum subapiculatum (Hampe) J. R. Spence & H. P. Ramsay. Syn.: *Bryum subapiculatum* Hampe. A cosmopolitan species hitherto known in East Africa only from Tanzania (Bizot *et al.* 1979), new to Kenya. On shady rock in bamboo forest, Pócs & Chuah-Petiot 04008/P, same locality as **Ch5**.

Leptodon fuciformis (Brid.) Enroth (See figures 1 and 5–8). The species was hitherto considered to be an Indian Ocean Islands endemic known under the name of *Pinnatella fuciformis* (Brid.) Touw. and known only from Madagascar, Mauritius and Réunion. It is related to *Leptodon smithii* (Hedw.) F. Weber & D. Mohr, widespread also in the drier montane forests of continental Africa. But well differs by the hanging habit bipinnately branching at its lower and remotely and irregularly branched upper part with tapering branches which are not inrolled even in dry state (Enroth 1992). **Ch6**. Epiphyte hanging from *Juniperus procera* twigs.

Orthotrichum denticulatum Lewinsky. A rare East African montane epiphyte only known from Ethiopia, Rwanda and Tanzania occurring between 1700 and 2700 m. It is recognized by ovato-lanceolate leaves with broadly recurved margin and hyaline, denticulate apex, strongly 8-ribbed theca with cryptopore stomata. (Lewinsky 1978). New to Kenya: Pócs & Chuah-Petiot 04008/A (same as **Ch5**), on bamboo (*Yushania alpina*) twigs.

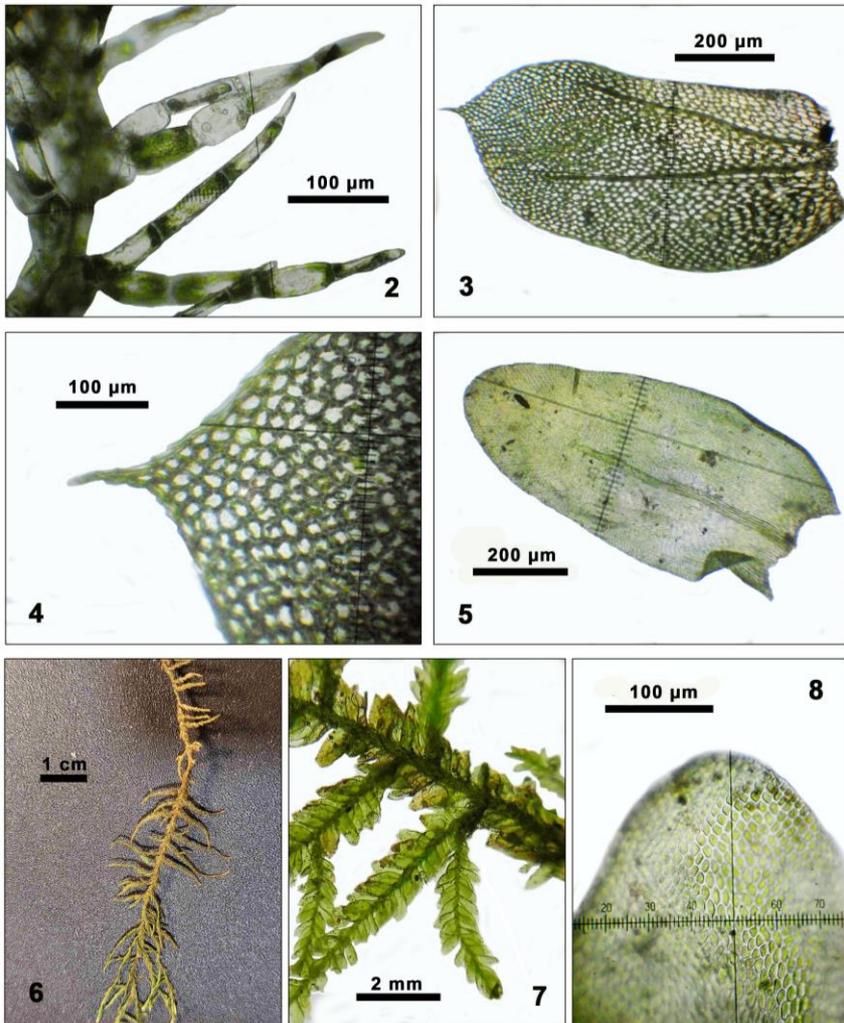


Figure 2. *Telaranea coactilis* (Spruce) J.J.Engel & G.L.Merr., part of shoot, dorsal, view (from *T. Pócs et al. Ch3.CA*). **Figures 3–4.** *Cyclodictyon subbrevifolium* Broth., leaf and leaf apex (from *Ch3.A*). **Figures 5–8.** *Leptodon fuciformis* (Brid.) Enroth, leaf, habit of hanging specimen, shoot with side branches and leaf apex (from *Ch.6A*).

DISCUSSION

As from the above examples can be seen, even the best investigated areas of Kenya can provide new records, what calls attention to the still inadequately searched Kenyan bryoflora, waiting for new

discoveries. The enumerated bryophytes are either widespread but overlooked taxa or rare species hitherto known only from their type locality or new to the continent. Also, some Lemurian (mostly on Indian Ocean islands distributed) species, although are concentrated in mainland Africa to the Eastern Crystalline Arc mountains, can occur also on some isolated volcanoes in Kenya, like *Microlejeunea inflata* and *Leptodon fuciformis*. In particular, the study and discovery of epiphyllous bryophytes from the entire range of afro-montane and montane forests in Mt Kenya lays a formidable baseline for monitoring biodiversity shifts underscored by the impacts of climate change.

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