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EAST AFRICAN BRYOPHYTES XIX
A CONTRIBUTION TO THE BRYOFLORA OF KENYA

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Ten taxa are recorded, as new to the bryoflora of Kenya: *Andrewsianthus bilobus, Cephaloziella kiaerii, C. transvaalensis*, *Chenia leptophylla*, *Cololejeunea minutissima, Colura kilimanjarica, Drepanolejeunea ternatensis, Kurzia irregularis, Lejeunea aloba* and *Syntrichia pagorum*. Further two proved to be new for the whole of Africa, as *Microlejeunea globosa* and *Hennediella stanfordensis.* These two were probably introduced into Nairobi township area, similarly to *Chenia leptophylla*.

Key words: Bryophyta, East Africa, *Hennediella*, Kenya, *Microlejeunea globosa*

INTRODUCTION

During the 4th Tropical African Bryology Training Course, organised by Min S. Chuah-Petiot at the Botanical Department of the University of Nairobi, between 10 and 24 March 2002, we made intensive bryophyte collections, both in Nairobi township area, especially in the Chirimo Campus of the University and during the field trips, mostly in Aberdare Mountains. The used locality and collecting numbers are those of T. Pócs, who identified the species. The collections resulted in numerous interesting records, of which two species, *Cololejeunea chauhiana* and *Microlejeunea nyandaruensis* proved to be new to science, both collected in the Aberdare Mountains (Pócs 2002). Further 2 are new for the whole Africa while 10 for the bryoflora of Kenya. In the following we discuss these records according to their habitats, giving an account also on their total distribution. The vaucher specimens are deposited in the Nairobi University Herbarium at the Department of Botany (NAI), Kenya and in the Herbarium of Eszterházy Károly College (EGR) in Eger, Hungary. All species written in boldface are new to the concerned area, those marked by an asterisk (*) are new to Kenya as well, while those with two asterisks (**) are new for the whole African continent with regard to the works of Kis (1984, 1985), Grolle (1995), Wigginton and Grolle (1996), O'Shea (1995, 1999), Chuah-Petiot (1997, 2001), Ros *et al.* (1999) and Wigginton (2002).

ENUMERATION ACCORDING TO THE LOCALITY AND HABITAT OF SPECIES

Nairobi township area (Loc. nos 02024, 02026)

Collections were made on the park and roadside trees, of which the most interesting result is the here widespread ***Microlejeunea globosa*** (Spruce) Steph.** (Fig. 1). It is quite common for example in the park of YMCA youth hostel, on planted trees, like *Terminalia* (Combretaceae) and *Croton* cf. *mantaly* (Euphorbiaceae), and in the Nairobi Arboretum, on the bark of 5 different tree species, among others the native *Teclea simplicifolia* (Rutaceae), no. 02026/A, both in the planted area and in the natural, but disturbed dry semi-evergreen forest (at 1,760–1,800 m altitude, 01° 16–17′ S, 36° 48–49′ E). *Microlejeunea globosa* was hitherto known only from the Americas: in the North (under the name of *M. cardotii* Steph.) from northern Mexico through coastal Louisiana to Florida while in the South from Paraguay and southern Brazil to Argentina (Misiones and Buenos Aires). Both Schuster (1980) and Reiner-Drehwald

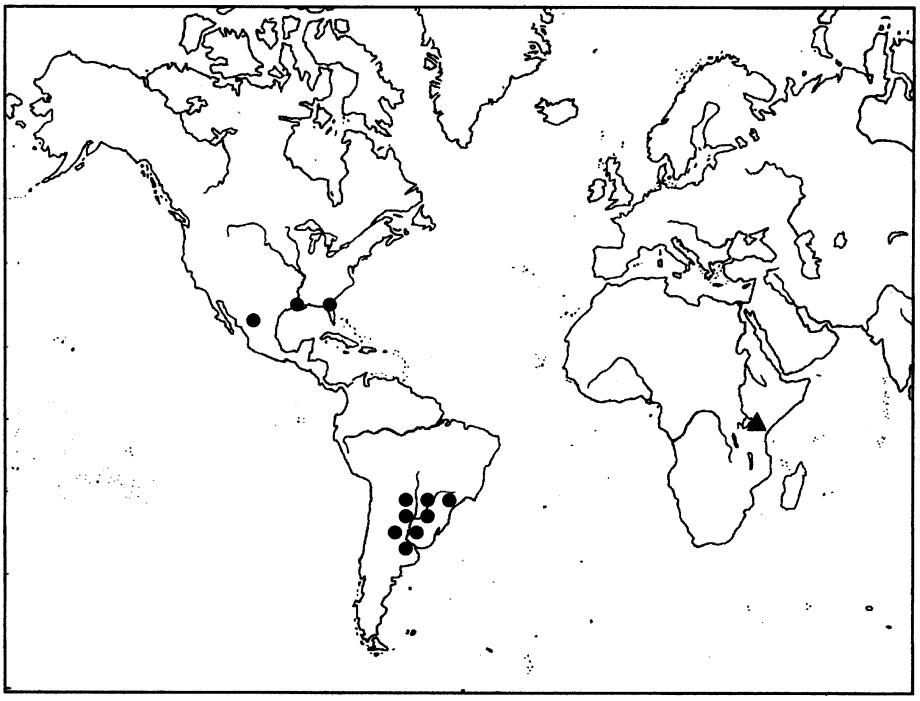
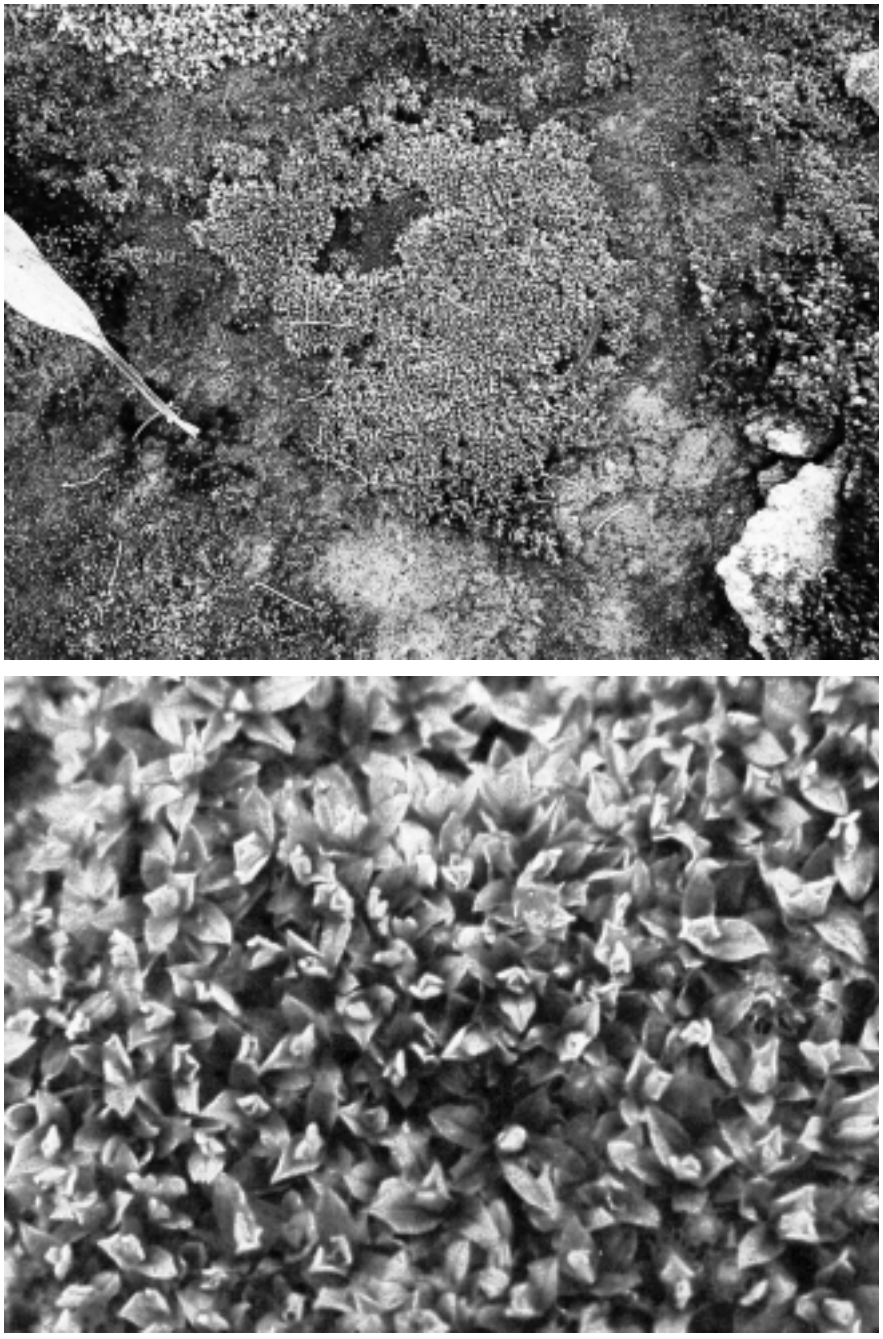


Fig. 1. The worldwide distribution of *Microlejeunea globosa* (Spruce) Steph. Based on Reiner-Drehwald (1994), new records marked by ▲

(1994), who deal with the species in details and synonymised it with *M. cardotii*, mention that apart from its natural habitat, the open, semidry forests, it often occurs under urban conditions, on the bark of roadside trees, being "able to survive in thoroughly disturbed or urbanizes sites" in New Orleans or in Buenos Aires. Its dispersal ability is enhanced by the different ways of vegetative propagation mentioned by Schuster and well illustrated by Reiner-Drehwald (*l. c.*), as by caducous branches (cladia), fragmentation of the stem by the formation of a detaching ring of small cells and by the production of marginal leaf gemmae otherwise unusual by other *Microlejeunea* species. It is easy to distinguish from all other African species also by its unusual shaped, often reduced, flat lobuli never reaching more than half length of the lobe. In the common, reduced form this is merely a narrow, elongated strip along the keel, tipped by an erect tooth or only by its hyaline papilla. Taking in account its known occurrence only from the township area of Nairobi, mostly from planted trees, it seems to us obvious that the species is a neophyte introduced probably by seeds or seedlings of exotic trees planted in parks and in the Arboretum. It is an interesting question, whether its bipolar pan-American distribution (see map in Reiner-Drehwald, 1994: 229) is not the result of an introduction from either side.

The main accompanying species, both in the seminatural dry forest and on the bark of roadside and park trees in Nairobi were *Frullania ericoides* (Nees) Mont., *Microlejeunea africana* Steph., *Brachymenium angolense* (Welw. et Dub.) Jaeg., *Erpodium beccarii* Müll. Hal. ex Venturi, *E. holstii* Broth., *Fabronia leikipiae* Müll. Hal., *Syntrichia fragilis* (Tayl.) Ochyra and (only on some planted trees of the University Campus) ***Syntrichia pagorum*** (Milde) Amann*, with its typical leaflike apical propagules. These species form a typical xerotolerant corticolous community in East Africa.

A tributary of Nairobi River, the Kirichwa streamlet flows through the Chirimo Campus of Nairobi University. Its bed is built of large stones and boulders, overflown during the major rains and partly shaded by planted and native trees and shrubs. On the temporarily wet boulders an interesting community developed, dominated by different Pottiaceae, each forming large patches on the stone surface: along the common *Barbula indica* (Hook.) Spreng. and *Hyophila involuta* (Hook.) Jaeg. large masses of ***Chenia leptophylla*** (C. Müll.) Zander* and ***Hennediella stanfordensis*** (Steere) Blockeel** occur. The patches of these three species well differ in this habitat by their shape, colour, lustre and their way of desiccation. *Barbula indica* forms light green, loose mats with narrow leaves which are crisped when dry. *Hyophila* forms very dark green, lustrous patches with a silky shine. The leaves roll in on both sides of the lamina parallel, towards the costa by drying. *Chenia* mats are light green, not lustrous, but the translucent leaves have a cell network visible even by



Figs 2–3. Chenia leptophylla (C. Müll.) Zander on the streambed stones of Kirichwa streamlet in the Chirimo Campus of Nairobi University. (All photos were taken by T. Pócs)

handlens. The leaves when drying, clasp or incurve, starting from the apex, forming then a triangular shape (Figs 2–3). *Hennediella* forms bright green mats with a reddish tint below. Its leaves are a bit Mniaceae like in appearance for naked eye or seen by handlens due to the 1–3 seriate, bistratose leaf margin when fresh, but curled when dry. *Chenia leptophylla* seems to spread recently in the warm belts of the World, including southern Europe (van Zanten 2000). It is already known from several countries in the southern half of Africa, like South Africa, Malawi, Botswana, Zimbabwe and Tanzania. It is obviously a neophyte in Kenya, and appeared in Nairobi too in a seminatural habitat. *Hennediella stanfordensis* seems to be also intruduced here and its presence even in Europe is an enigma. *H. stanfordensis* was first discovered in Britain under the name of *Tortula stanfordensis* Steere, where it is spreading along river valleys together with an other species, *H. brevis* (Whitehouse et Newton) Blockeel. It has sporadic occurrence also in France and widespread in California, among similar conditions, on riverbanks. Its homeland is, maybe, southern Australia, where it is widespread but there also occurs on riverbanks and in man influenced habitats (Whitehouse and Newton 1988, Blockeel 1990). There are other native *Hennediella* species in South and in East Africa (Zander 1993, O'Shea 1999), but these are quite distinct, not similar to *H. stanfordensis.* Anyway, the Nairobi record is the indication of its first appearance in Africa.

Aberdare (Nyandarua) Mountains, around Chania Falls (Loc. no. 02030)

Chuah-Petiot (1997) made an introductory account on the bryoflora of Aberdare Mountains with a long list of species discovered by her as new to these mountains. Anyway, the Aberdares are still not completely known from bryological point of view, as the new findings below indicate and further research is worthwile.

On the eastern edge of the plateau, at 3,040–3,080 m altitude, 00° 27.24′ S, 36° 42.39′ E, the closed, upper montane *Hageina abyssinica* (Rosaceae) – *Erica arborea* forest gives place to the ericaceous heathland. In this transitional zone, in the damp belt effected by the spray of the falls, already Afroalpine elements appear, like *Senecio johnstonii* subsp. *battiscombei.* In this transitional belt the giant (3–8 m tall) *Erica arborea* heath (Fig. 4) has very rich epiphytic vegetation on the stem and on the living and dead ericaceous twigs: ***Cheilolejeunea cordistipula*** (Steph.) Grolle, *C. pluriplicata* (Pears.) Schust., *C. pocsii* E. W. Jones, *Cololejeunea chuahiana* Pócs, ***Cololejeunea minutissima*** (Sm.) Schiffn.*, *Drepanolejeunea vesiculosa* (Mitt.) Steph., *Frullania arecae* (Spreng.) Gott., *F. depressa* Mitt., *F. ecklonii* Spreng.) Gott. et al., *F. obscurifolia* Mitt., *F. trinervis* (L. et L.) Gott. et al., *Microlejeunea africana* Steph., *M. nyandaruensis* Pócs, ***Plagiochila exigua*** (Tayl.) Tayl., *Radula quadrata* Gott. and others.

Fig. 4. Giant *Erica arborea* heath forest above Chania Falls, Aberdare Mts at 3,100 m alt.

Fig. 5. The Magura Valley area with the Fishing Camp on the undulating, 3,000–3,200 m high plateau of Aberdare Mts. In the background the Il Kinangop peak (3,905 m)

Cheilolejeunea cordistipula is an Afromontane species widespread from Cameroon to Madagascar (Jones 1985). In Kenya was known only from Mt Kenya (Chuah-Petiot 1995). ***Cololejeunea minutissima*** and ***Plagiochila exigua*** are oceanic subcosmopolitan species, often easily overlooked due to their small size. The first species was not yet recorded from Kenya although it is much more widespread than the second, a very disjunct and rare species, which was known from Kenya only at the Taita Hills (Pócs 1993) under the name of *Plagiochila corniculata* (Dum.) Dum. It is in East Africa the usual member of subalpine ericaceous heath.

Around the Chania Falls, on shady cliffs and boulders, there are other interesting bryophytes as: ***Cephaloziella kiaerii*** (Aust.) Douin*, ***Lejeunea aloba*** Sande-Lac.*, *L. hepaticola* (Steph.) Steph., *Plagiochila squamulosa*, ***Targionia hypophylla*** L., *Rhizofabronia perpilosa* (Broth.) Broth. and others, of which *Cephaloziella kiaerii* is a Palaeotropical montane species widely distributed from Africa to Southeast Asia, although not yet known from Kenya. *Targionia* is known only from 1–2 other localities in the country, while the Palaeotropical ***Lejeunea aloba*** is a real rarity. It is a rheophytic liverwort described from India

Fig. 6. Low ericaceous bushes alternating with tussock grassland along Magura brook, below the Fishing Camp, at 3,000 m alt.

and found in Africa before only in Zaire, Irangi Station (see Pócs 1993, Fig. 1). Near Chania fall it grows on the base of seeping rocks in contact with the streamlet (No. 02030/P). Apart from the very reduced lobule, the multicellular stem medulla and its cortex consisting of 8–12 cell rows, the gametangia developing on many short, lateral branches of amentulose character, are typical for this species, which belongs to Subgenus *Pleurolejeunea.* In the field the submerged, shiny, large and fleshy shoot is striking.

Aberdare (Nyandarua) Mountains, Magura River Fishing Camp
(Loc. no. 02031)
(Figs 5–6)

A few km south of the previous locality, in a depression of the plateau at 3,000–3,040 m, 00° 28.96′ S, 36° 43.85′ E. Bushy (2–3 m tall) *Erica arborea* heath alternating with tussock grassland, *Alchemilla argyrophylla* dwarf bush and in the valley bottom, along Magura streamlet, with *Carex monostachya* bogs (Fig. 6).

The subalpine ericaceous heath here is lower, but more rich in shrub species, like other *Erica* and *Blaeria* species, *Anthospermum usambarense* (Rubiaceae) and *Cliffortia nitidula* (Rosaceae). *Erica arborea* is as rich in epiphytes as in the previous locality. Interestingly, the bark and especially the twigs of *Cliffortia nitidula* (to some extent also that of *Anthospermum usambarense*), near the brook, are even more rich in tiny Lejeuneaceae.

The list below indicates also the hosts of the epiphytes:

	On Erica	*On Cliffortia*
Cheilolejeunea cordistipula (Steph.) Grolle	−	+
Cheilolejeunea krakakammae (Lindenb.) Schust.	−	+
Cheilolejeunea pocsii E. W. Jones	−	+
Cololejeunea minutissima (Sm.) Schiffn.*	−	+
Colura kilimanjarica Pócs et Ast*	−	+
Drepanolejeunea ternatensis (Gott.) Schiffn.**	−	+
Frullania caffraria Steph.	+	+
Frullania depressa Mitt.	−	+
Frullania obscurifolia Mitt.	+	+
Microlejeunea africana Steph.	+	+
Microlejeunea nyandaruensis Pócs	+	+
Radula quadrata Gott.	+	+

Cheilolejeunea cordistipula and ***Cololejeunea minutissima*** were discussed above. ***Colura kilimanjarica*** is a rare Afroalpine member of the Sectio

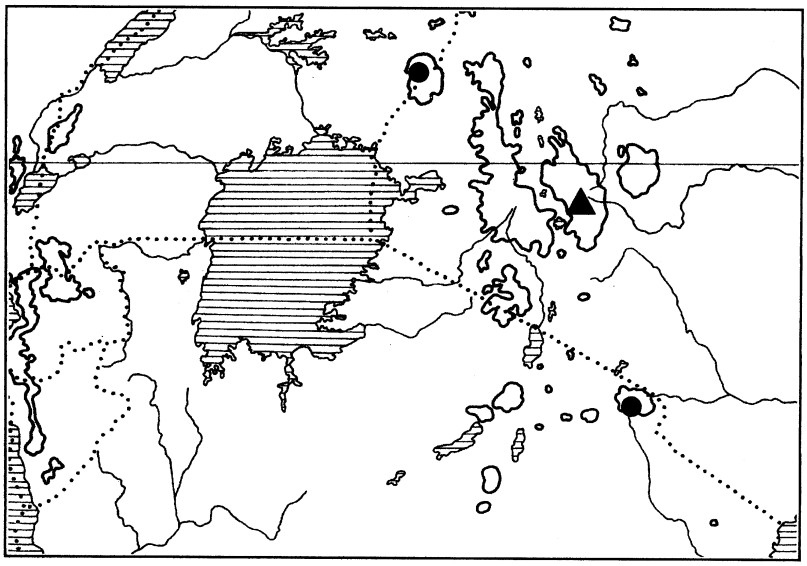


Fig. 7. The distribution of *Colura kilimanjarica* Pócs et Ast. The new record is marked by ▲

Fig. 8. Acanthaceae semidesert near Oltepesi in the Rift Valley, at 1,020 m alt.

Oidocorys Ast, previously known only from Mt Kilimanjaro and from the Ugandan side of Mt Elgon (Pócs in Jovet-Ast 1980, Pócs 1991, Pócs and Lye 1999), occurring among very similar conditions, at the same altitude (Fig. 7). Fischer (1999) described *Colura zoophaga*, from the Sectio *Macrorhamphus* Ast (= Sect. *Colura*), as new to science, exactly from this Aberdare locality. Although we were unable to locate the type of this species in Berlin Herbarium (B), seen from the description and the illustration published by Fischer (*l. c.*), *Colura zoophaga* Fischer seems to us to be a synonym of *Colura kilimanjarica* Pócs et Ast and instead of the Sectio *Colura*, it belongs to Sectio *Oidocorys*. Fischer himself indicates in his key that the "cylindrical prolongation of lobule indistinct, short or absent" and the perianth also exactly matches to the perianth shape and ornamentation of *Colura kilimanjarica*. In addition: we also have found many protozoa in the lobule sac of *Colura kilimanjarica* in this habitat. Finally ***Drepanolejeunea ternatensis*** (Gott.) Schiffn. is an interesting element here. It is Indomalayan-Oceanic in distribution and was known nearest only from the Seychelles Islands before (Grolle 1978, Pócs 1992). This is the first record from the African mainland. On the ground of heath, near the streamlet, large cushions of ***Breutelia stricticaulis*** Dix. occur.

On the southern side of the shallow Magura River, opposite of the Fishing Camp, on a 4 m high, north facing volcanic cliff rich hepatic vegetation developed, dominated by ***Andrewsianthus bilobus*** (Mitt.) Grolle* and by ***Kurzia irregularis*** (Steph.) Grolle*. Both species are Afroalpine in distribution and new to the flora of Kenya. In their thick, dark green and greyish mats *Jensenia spinosa* (Lehm et Lindenb.) Grolle and *Anastrophyllum auritum* (Lehm.) Steph. occur intermixed.

Rift Valley, SW of Nairobi, on the way to Lake Magadi
(Loc. no. 02036)
(Fig. 8)

Near Oltepesi, at 1,020 m alt., 01° 34.04′ S, 36° 26.36′ E. Acanthaceae (*Barleria eranthemoides, Blepharis hildebrandtii*) dwarf bush semidesert with scattered *Acacia* treelets and with large naked stony (chalk) earth surfaces on large patches covered by cryptobiotic crust formed mostly by lichens. A small amount of ***Pseudocrossidium porphyroneurum*** (C. Müll. ex Vent.) Zander was collected (No. 02038/A) by one of the student participants, F. Fernandez, in the shade of a dwarf shrub. This species is a real desert moss, occurring sporadically from Saudi Arabia to South Africa. In Kenya it was known from one locality: S. Turkana Distr., Lorio Plateau, lava boulder hillside at 1,364 m alt. in

small quantity, under the name of *Tortula porphyroneura* (C. Müll.) Townsend (Townsend 1987).

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