

Additions to the bryophyte flora of Réunion (East African Islands)

Frank Müller

Institut für Botanik, Technische Universität Dresden, Mommsenstr. 13, D-01062 Dresden, Germany

Abstract: Nineteen species of bryophytes are reported for the first time for Réunion. Especially remarkable are the first African record of *Anastrophyllum leucocephalum* (Tayl.) Steph. and the first records for the East African Islands of *Cephaloziella* cf. *vaginans* Steph., *Fossombronina foveolata* Lindb., *Riccia huebeneriana* Lindenb., *Barbula unguiculata* Hedw., *Bryum pseudotriquetrum* (Hedw.) Schwägr., *Chenia leptophylla* (Müll.Hal.) R.H.Zander, *Dicranella subsubulata* (Hampe ex Müll.Hal.) A.Jaeger, *Ditrichum punctulatum* Mitt., *Physcomitrium spathulatum* (Hornsch.) Müll.Hal. var. *spathulatum* and *Trichostomum crispulum* Bruch var. *crispulum*. *Brachymenium gemmiferum* A.J.Shaw & W.R.Buck is regarded as synonymous with *Brachymenium exile* (Dozy & Molk.) Bosch & Sande Lac.

Introduction

In September and October 1998 the author collected bryophytes on the island of Réunion, a French overseas department situated in the Indian Ocean 700 km east of Madagascar. In comparison with other regions of Africa, Réunion belongs to the bryologically better investigated areas. An overview of the bryophytes known from the island is provided by the checklists of Grolle (1995) and O'Shea (1999). There are 484 mosses and about 220 liverworts listed for the island. For the small size of the island (2510 km²) this is a remarkable species richness. The cause of the bryophyte richness is not only the extensive investigation in the past but also the very high diversity of landscape, vegetation and geology and the tropical, wet climate. Among the bryophytes discovered by the author there are a lot new for the island. Most of

the new species were found in habitats which in the past were obviously investigated less intensively: walls and open soil in urban areas, shores of lakes and alpine vegetation around the highest mountain of the island, the Piton des Neiges (3069 m). The records of some additional mosses of the Réunion trip are already published in Müller & Schäfer-Verwimp (1999).

Annotated list of species

The nomenclature and systematic arrangement of the species follows mainly O'Shea (1999) for the mosses and Wigginton & Grolle (1996) for the liverworts. Voucher specimens are in my personal herbarium. For specimens sent to specialists for determination or confirmation, duplicates exist in their personal herbaria. All species are reported for the first time for Réunion.

Hepaticae

Anastrophyllum leucocephalum (Taylor) Steph. (= *A. crebrifolium* (Hook.f. & Taylor) Steph.)

Hell-Bourg SW: near the Gite de la Caverne Dufour below Piton des Neiges, c. 2450 m; rocky, boulder rich area with fragmentary *Philippia* bushes, on a rocky embankment; 22.9.1998; herb. *F. Müller R 556*, det. J. Vána

Hell-Bourg SSW: between Gite de la Caverne Defour and Cap Anglais, low *Philippia* forest, on forest ground, c. 2300 m; 23.9.1998; herb. *F. Müller R 618*, conf. J. Vána

This taxa is reported for the first time for Africa. Up to now it was only known from Latin America, where it shows a montane-subantarctic distribution. In the Americas the species is known from Tierra del Fuego, Cape Horn, Patagonian Channels, Juan Fernandez and the higher reaches of the Andes of Colombia, Bolivia, Peru and Ecuador (Engel 1978, Vána 1984).

The genus *Anastrophyllum* contains worldwide about 35-40 species and represents a genus with Gondwanalandic origin and speciation: the majority of the taxa are known from tropical mountains in South America and Australasia (Vána 1999). In Africa four additional taxa are known, *A. auritum* (Lehm.) Steph., *A. minutum* (Schreb. ex Cranz) Schuster, *A. piligerum* (Nees) Steph. and *A. subcomplicatum* (Lehm. & Lindenb.) Steph. Distribution centres of the genus in Africa are the East African mountains, South Africa and the Mt. Cameroon. From the East African Islands hitherto only *A. piligerum* was known, which occurs occasionally on Madagascar, Mauritius, Réunion and Seychelles. *A. leucocephalum* represents an additional American-African geoelement.

Bryophytes of southern hemispheric or subantarctic distribution occur on Réunion mainly around Piton des Neiges, the highest mountain of the island. In addition on this mountain the mosses *Amphidium tortuosum* (Hornsch.) Cufod., *Philonotis scabrifolia* (Hook.f. & Wilson) Braithw. (see Müller & Schäfer-Verwimp 1999) and *Ditrichum punctulatum* (see below) were found.

Cephaloziella cf. *vaginans* Steph.

Piton des Neiges: on the way to the top on the SE side; c. 2750 m; subalpine, fragmented vegetation-covered scree; 23.9.1998; herb. *F. Müller R 549*, det. J. Vána

New for the East African Islands. The species was hitherto known only from several countries of continental Africa (e.g. Cameroon, Rwanda, Tanzania, Zaire and probably Sierra Leone and if *C. umtaliensis* Arn. is really a synonym of this taxa, as suggested in Wigginton & Grolle [1996], also from Mozambique and Zimbabwe).

Fossombronia foveolata Lindb.

Hell-Bourg SE: section of Forêt de Belouve eastern and southeastern of the Gite de Belouve; c. 1500 m; mountain rainforest, wet embankment on the lake le Grande Mare; 20.9.1998; leg. *F. Müller R 5*, det. S. Perold

Grand Ilet NE: shores of the lake Mare a Martin, 1100 m; muddy soil along the lake shores; 24.9.1998; leg. *F. Müller R 338*, det. S. Perold
New for the East African Islands. In sub-Saharan Africa additional records exist only for South Africa, but the genus is being revised (S. Perold, R.E. Stotler & B. Crandall-Stotler), so that the future should provide more information about the African distribution of this taxon.

Odontoschisma africanum (Pears.) Sim

Hell-Bourg SSW: between Gite de la Caverne Defour and Cap Anglais; low *Philippia* forest, on dead wood, c. 2300 m; 23.9.1998; herb. *F. Müller R 590*, conf. J. Vána

A rare African element, which was known hitherto in the East African Islands only from Mauritius; in continental Africa is it known from a few sites in South Africa, from where the species was described, and Tanzania.

Riccia huebeneriana Lindenb.

La Plaine-des-Palmistes N: shores of the lake le Grand Etang; c. 500 m; on lake mud; 30.9.1998; herb. *F. Müller R 158, R 159, R 201*, conf. S. Perold

In sub-Saharan Africa hitherto known only from one record in Ethiopia. The new record on

Réunion represent the first collection for the East African Islands and probably for the whole southern hemisphere. *R. huebeneriana* is a temperate species of the northern hemisphere, which is known from scattered localities in Europe, northwards to Scandinavia and North Russia, northern Africa (probably Algeria), India and Japan. The material from Réunion agree well with Central European material from Germany. Among the holarctic phanerogams of the dwarf rush communities (phytosociological unit Nanocyperion) many species have disjunct single occurrences in tropical and southern Africa, e.g. *Dichostylis micheliana* (L.) Nees, *Cyperus flavescens* L., *Juncus bufonius* L., *Isolepis setacea* (L.) R. Br., *Juncus capitatus* Weigel (see distribution maps by Lampe 1996), which originate from the transport of diaspores by waterbirds (ornithochore diaspore dispersion). Probably also *R. huebeneriana* belongs with this group of ornithochore aquatic plants.

Musci

Anomodon pseudotrictis (Müll.Hal.) Kindb.

La Plaine-des-Cafres NW: on the way from Bois Court to Grand Bassin, c. 800 m, on a rockface fully exposed to the light and as epiphyte on trees; 25.9.1998; herb. *F. Müller R 383, R 411*

The material was determined with help of the keys in the revision of the genus by Granzow-de la Cerda (1997). *Haplohymenium tenuissimum* (Besch.) Broth. was the only species mentioned from Réunion by Broth. (1925), but this may have been an error, as the original description (Bescherelle 1880) quoted this species only from Mauritius. This taxon is not treated in the monographic treatment of *Anomodon* and *Haplohymenium* (Granzow-de la Cerda 1997), but O'Shea (in press) synonymised *H. tenuissimum* with *Anomodon pseudotrictis* and saw only Mauritius collections.

Barbula unguiculata Hedw.

Hell-Bourg SE: section of Forêt de Belouve eastern and southeastern of the Gîte de Belouve, c. 1500 m, mountain rainforest, on a wall; 20.9.1998; herb. *F. Müller R 612*

A species with a more or less subcosmopolitan world distribution. The occurrence on the island

rests most likely on introduction. In sub-Saharan Africa the species is known from South Africa, Angola, Cape Verde and Sudan. First record for the East African Islands.

Brachymenium exile (Dozy & Molk.) Bosch & Sande Lac., *Bryologia javanica* 1: 139. 1860. Basionym: *Bryum exile* Dozy & Molk., *Ann. Sci. Nat. Bot.*, III, 2: 300. 1844.

(**Syn. nov.:** *Brachymenium gemmiferum* A.J.Shaw & W.R.Buck, *Bryologist* 101: 601. 1998. Typus: Réunion, *Lorence 7512*, NY)

Grand Ilet N: climb to the Roche Ecrite, along the hiking trail to the top, c. 1500 m, embankment in rainforest along the way, associated with *Anomobryum laceratum* (Besch.) Broth. and *Philonotis* spec.; 24.9.1998; herb. *F. Müller R 433*

A pantropical element, widely distributed in tropical Africa.

Brachymenium gemmiferum A.J.Shaw & W.R.Buck was described based on material from Réunion as new for science (Shaw, Allen & Buck 1998). A special characteristic of this species is the presence of axillary gemmae; it should be „the only species of *Brachymenium* known to form gemmae“. This observation is incorrect. The presence of axillary gemmae is already well documented in the literature for another *Brachymenium* species, *B. exile* (see Ochi 1972 & 1994; Eddy 1996). *Brachymenium gemmiferum* is well described and illustrated in Shaw, Allen & Buck (1998) and there is no doubt that it is identical with *B. exile*. Therefore it is treated here as synonymous with this taxa.

Brachymenium longicolle Thér.

Forêt de Bebour: Sentier de la Rivière in the valley Rivière des Marsouins, c. 1350 m, epiphytic in mountain rainforest; 2.10.1998; herb. *F. Müller R 387*

A rare afro-montane element, which is known from higher mountains of West Africa (Cameroon, Bioko), Tanzania, Malawi and Mauritius and occurs elsewhere also in the E. Himalayas. Our material agrees well with the description and figures in Ochi (1972) (leaves with long acuminate apex, operculum short-conic with a pointed apex, spores over 40 µm in

diameter) and are clearly distinct from the Mascarene endemic *B. eurychelium* Besch.

Bryum pseudotriquetrum (Hedw.) Schwägr.

La Plaine-des-Palmistes: in the village in the area of the hotel „Les Azalees“, c. 900 m; in lawn; 2.10.1998; herb. *F. Müller R 30*

Subcosmopolitan species which is known in sub-Saharan Africa from many countries. First record for the East African Islands. The occurrence on Réunion rests most likely on introduction, because the species was collected in a man-made habitat together with *Pseudoscleropodium purum* (Hedw.) M. Fleisch, another introduced species of the island.

Calymperes palisotii Schwägr. ssp. *palisotii*

St-Philippe W: not much north of the village Le Baril, c. 100 m, epiphytic on a roadside tree; 27.9.1998; herb. *F. Müller R 674*, conf. S. Orban
Pantropical species which is widely distributed in sub-Saharan Africa.

Chenia leptophylla (Müll.Hal.) R.H.Zander

Le Plaine-des-Cafres NW: along the way from Bois Court to Grand Bassin, c. 600 m, on soil by the wayside in the village Grand Bassin; 25.9.1998; herb. *F. Müller R 443*

Subcosmopolitan species, easily overlooked, which is known in sub-Saharan Africa especially from the southern part. First record for the East African Islands.

Dicranella subsubulata (Müll.Hal.) A.Jaeger

La Plaine-des-Palmistes: in the village, c. 900 m, rocky embankment of a road; 1.10.1998; herb. *F. Müller R 47*

Hell-Bourg SE: section of the Forêt de Belouve eastern and southeastern of the Gîte de Belouve, c. 1500 m, mountain rainforest, wet embankment on the lake le Grande Mare; 20.9.1998; herb. *F. Müller R 249*

The species is known from many countries of tropical and southern Africa. The material from Réunion agrees well with the description and figures in Magill (1981). First record for the East African Islands.

Ditrichum punctulatum Mitt.

Piton des Neiges: climb to the top on the

southeastern side, c. 2750 m; subalpine, fragmented vegetation-covered scree; 23.9.1998; herb. *F. Müller R 576, R 577*

Primarily a southern hemisphere species, which is known from Australia, New Zealand, Ecuador and from the higher mountains around Drakensberg and Gaika's Kop in South Africa and Lesotho. First record for the East African Islands. Like the South African material (Magill 1981) the Réunion collections are also only in sterile condition.

Erythrodontium spec.

Hell-Bourg: on the western edge of the village by the thermal springs, 900 m, epiphytic in a park-like area; 21.9.1998; herb. *F. Müller R 356*
In the literature there is no information about the occurrence of *Erythrodontium* species on Réunion. Our material cannot be determined to species level because of its sterile condition and the lack of a taxonomic treatment of the African species of the genus.

Leucomium strumosum (Hornsch.) Mitt.

St-Philippe NW: Réserve Naturelle de Mare Longue, along the Sentier botanique, c. 250 m, lowland rainforest, on dead wood; 29.9.1998; herb. *F. Müller R 164*

Pantropical element, widely distributed in tropical Africa.

Physcomitrium spathulatum (Hornsch.) Müll.Hal. var. *spathulatum*

La Plaine-des-Palmistes N: shores of the lake le Grand Etang; c. 500 m; on lake mud; 30.9.1998; herb. *F. Müller R 205*

The material was compared with an isotype of *P. spathulatum* in BM (herbarium Schimper, Cape) and with the description and figures in Magill (1987) and agree well. In Africa the species was hitherto known from the southern and eastern part. First record for the East African Islands.

Pseudephemerum nitidum (Hedw.) Loeske

La Plaine-des-Palmistes N: shores of the lake le Grand Etang; c. 500 m; on lake mud; 30.9.1998; herb. *F. Müller R 115*

Grand Ilet NE: shores of the lake Mare a Martin, 1100 m, on lake mud; 24.9.1998; herb. *F. Müller*

R 332

A species of Europe and North America which is also known from few, scattered localities in northern, central and eastern Africa and probably also occur in eastern Asia. Like *Riccia huebeneriana* (see above) this species belongs to a group of water plants with ornithochore diaspore dispersion.

Trichostomum crispulum Bruch var. *crispulum*
Hell-Bourg NW: mountain Piton d'Enchaing, along the hiking trail to the top, 900 m , on boulders in cultivated area; 21.9.1998; herb. *F. Müller R 450*

Hell-Bourg: on the western edge of the village along the track to the thermal springs, 900 m , on a wall; 21.9.1998; leg. *F. Müller R 329*

Subcosmopolitan species, which is known in sub-Saharan Africa from South Africa, Djibouti, Chad, Tanzania and the islands of Cape Verde and St. Helena. First record for the East African Islands.

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