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Families and genera of mosses no longer believed to occur in sub-Saharan Africa

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Abstract: Twelve genera are excluded from the sub-Saharan Africa checklist based on evidence from literature or re-identification. *Atractylocarpus*, *Chorisodontium*, *Ctenidium*, *Dicranodontium*, *Homalia*, *Isothecium*, *Lasiodontium*, *Meesia* and *Potamium* are excluded as the collections belong to other genera, and *Camptochaete*, *Phylloprepanium* and *Ptychomnion* are excluded because of evidence of mistaken (or no longer existing) localities. As a consequence, the following families no longer are known from Africa: Echinodiaceae, Lembophyllaceae, Phylloprepaniaceae and Ptychomniaceae. *Ectropothecium nishimurii* O'Shea & Ochyra, *nom. nov.* replaces *Ectropothecium mauritanum* (Broth.) Nishimura, *hom. illeg.*, and *Kindbergia kenyae* (Dixon ex Tosco & Piovano) O'Shea & Ochyra, *comb. nov.* replaces *Isothecium kenyae* Dixon ex Tosco & Piovano. *Lasiodontium mieheanum* Ochyra in S. Miehe & G. Miehe, *nom. nud.*, is a synonym of *Daltonia angustifolia* Dozy & Molk. and accordingly *Lasiodontium* Ochyra in S. Miehe & G. Miehe, *nom. nud.*, must be placed in synonymy with *Daltonia* Hook. & Taylor.

Introduction

The African moss checklist (O'Shea 1995) was built from checklists already produced by other authors, which in turn were mainly based on earlier literature. It will be some time before all the resulting ca. 3000 taxa can be critically examined, but in the subsequent two editions of the checklist (O'Shea 1997, 1999), attempts were made to correct some of the mistakes made in accumulating this

large quantity of data. The project to create a *Guide to the bryophytes of sub-Saharan Africa* has required all the families and genera to be reviewed, which provides a further opportunity to review the quality of this data, and to align the families and genera used in the checklist with those to be used in the *Guide*. In cases where there are very few taxa or few records, it has been possible to take a critical view about their presence in Africa, and this paper reviews the evidence for

twelve genera that are to be excluded from the *Guide*. In some cases evidence excluding them from Africa has already been published but overlooked in O'Shea (1999), in other cases there is no definite evidence because the necessary collections are missing, but nevertheless there is a strong balance of probabilities that the taxa do not occur in Africa; all twelve taxa will be represented by just a comment in future checklists. Any reference in this document to the 'checklist' refers to O'Shea (1999) unless stated otherwise.

Genera to be excluded

Atractylocarpus (Dicranaceae)

The African species of *Atractylocarpus* have been transferred to *Metzleria*. See Frahm (2000).

Camptochaete (Lembophyllaceae)

Prior to version 3 of the checklist (O'Shea 1999), there were two species of *Camptochaete* on the list: *C. fallax* (Renauld & Cardot) Renauld and *C. ramulosa* (Mitt.) A. Jaeger. The latter was removed in version 3 because of an error that occurred in Born *et al.*'s (1993) checklist for Central Africa, where records from Demaret (1940) and Demaret & Leroy (1949) for *Porotrichum ramulosum* (Mitt.) Dusen were mistaken for *P. ramulosum* (Mitt.) Mitt. The confusion is easy to understand, as the combination *P. ramulosum* has been made on three different occasions, twice by Mitten:

Porotrichum ramulosum (Mitt.) Mitt., Trans R. Soc. Victoria 19: 84. 1882 (*Isothecium ramulosum* Mitt., Kew. J. Bot. 8: 263. 1856 (= *Camptochaete ramulosa* (Mitt.) A. Jaeger, Ber. S. Gall. Naturw. Ges. 1875-76: 309. 1877 (Ad. 2: 213))

Porotrichum ramulosum (Mitt.) Mitt., J. Linn Soc. Bot. 33: 315. 1886 (*Neckera ramulosa* Mitt., J. Linn. Soc. Bot. 7: 160. 1863 (= *Porotrichum cameruniae* Dixon, *vide* Dixon, J. Bot. 75: 123. 1937))

Porotrichum ramulosum (Mitt.) Dusen, Kongl. Svenska Vetensk. Acad. Handl. 28(2): 42. 1895 (*Neckera ramulosa* Mitt.)

Born *et al.* (1993) should have referred to the taxon

based on *Neckera ramulosa*, not *Isothecium ramulosum*, and so *Camptochaete ramulosa* (now a synonym of *C. deflexa* (Wils.) A. Jaeger) can be excluded from the African list. The full synonymy for *C. deflexa* can be seen in Tangney (1997). *Porotrichum ramulosum* and *P. cameruniae* are now synonyms of *P. quintasii* (De Sloover 1983).

In his revision of *Camptochaete*, Tangney (1997) called *C. fallax*, recorded only for Madagascar, an 'uncertain species' and stated that: "Not having seen any material of this species, I have no knowledge of its relation to *Camptochaete*", and in addition, Madagascar falls outside the geographic range of the genus as he understood it. The Madagascar record was from Diego Suarez, near the north tip of the island, (now called Antserañana, 12°19'S 49°17'E), collected by Chenagon in 1890, and was published first in Renauld & Cardot (1897) and the same information was then repeated in Renauld (1898) and Renauld & Cardot (1915); in addition, the latter reference also has an illustration of the taxon. Although the illustration looks quite like *Camptochaete*, the authors comment on the relatively long and narrow leaf cells, and the denticulate leaf margins, which would probably discount *Camptochaete*. Tangney (1997) applied to 23 herbaria for loans, but no collections of this taxa were provided. PC holds the herbaria of both Renauld and Cardot, and were amongst the herbaria contacted by Tangney (1997). As no specimen is available, and as there might be doubt as to the correct assignation to genus, and as Madagascar would be significantly outside the taxon's present range, the taxon is excluded until further evidence is available.

Chorisodontium (Dicranaceae)

Chorisodontium is an austral pan-temperate genus distributed mainly in South America from Tierra del Fuego to the northern Andes and extending to the Subantarctic and the northern maritime Antarctic. One species, *Chorisodontium falcatum* Magill, was described from the Cape area of South Africa and Îles Kerguelen (Magill 1981), but this species is regarded by Frahm (1989) as identical with *Platyneurum laticostatum* (Cardot) Broth., now treated as *P. praealtum* (Ochyra & Bednarek-Ochyra 1997). Examination of the

original material of *Ch. falcatum* confirmed that this name must go into synonymy with *P. praealtum*. Accordingly, in the moss flora of Africa the genus *Chorisodontium* is replaced by the predominantly southern South American genus *Platyneurum*.

***Ctenidium* (Hypnaceae)**

Three species of *Ctenidium* have been reported for tropical Africa, and included in all three versions of the checklist. However, *C. mauritianum* Broth. and *C. squarriifolium* (Broth.) Broth. were transferred to *Ectropothecium* by Nishimura (1985) in his revision of *Ctenidium*, and non-type material of both species present in BM also belongs to *Ectropothecium*. The third species, *C. floribundoides* Dixon ex Tosco & Piovano, was not mentioned by Nishimura, presumably because Tosco and Piovano's (1956) paper was overlooked by Wijk et al. (1959-1969) when compiling *Index Muscorum*. Dixon's herbarium is held in BM, but *C. floribundoides* is not present in it, and loans are not made from TOR (where Tosco & Piovano's collections are held). Nishimura (1985) does not consider *Ctenidium* to occur in Africa, although phytogeographically there is no reason why it should not be present. However, the description and illustration in Tosco & Piovano (1956) suggest that *C. floribundoides* may not be a *Ctenidium*, particularly the lack of any leaf decurrency. Until a specimen is located or expert attention is given to Tosco & Piovano's paper, it seems wise to exclude *Ctenidium* from the African flora.

As one of Nishimura's new names in *Ectropothecium* was invalid, the taxon is renamed here:

Ectropothecium nishimurii O'Shea & Ochyra, **nom. nov. pro *Ectropothecium mauritianum*** (Broth.) N. Nishim., J. Hattori Bot. Lab. 58: 75. 1985, *hom. illeg.* [*non E. mauritianum* Renaud & Cardot in Paris, Ind. Bryol. Suppl. 137. 1900.] based on *Ctenidium mauritianum* Broth. in Voeltzkow, Reise Ost Afr. 3: 62, t. 9, f. 12, 1908. Type: Mauritius (Mascarene Isles), 1904, Voeltzkow *s.n.* (holotype and isotype, H-BR), *fide* Nishimura 1985: p. 75.

***Dicranodontium* (Dicranaceae)**

Dicranodontium is mainly holarctic. Three species were described from Central and East Africa and Madagascar (Potier de la Varde 1950, 1954; Taylor & Potier de la Varde 1954), of which *D. interruptum* proved to be synonymous with *Bryohumbertia filifolia*, *D. tanganyikae* was identical with *Campylopus flexuosus* and *D. humilis* was regarded as a species of *Blindia* (Frahm 1997).

***Homalia* (Neckeraceae)**

After the transfer of *Homalia pygmaea* Broth. to *Symphodon* (as *S. pygmaeus* (Broth.) S. He & Snider) by He & Snider (1992, 2000), *H. subexigua* Müll. Hal. in Geh. was the only member of this genus on the checklist. Presumably because it was a *nomen nudum*, it was not mentioned in He's (1997) revision of *Homalia*, but a specimen with this name was found in BM, filed under *Homalioidendron exiguum* (Bosch & Sande Lac.) M. Fleisch. The original collection in Mauritius was made by Robillard in 1876, and was published by Geheeb (1878) with Müller's manuscript name, but no description. The BM collection details are as follows: MAURITIUS. Pouce Mts., 1878, *Balfour s.n.* ex herb Mitten (BM). H. N. Dixon makes the following comments on the sheet: "This [*Homalia subexigua*] appears to be unpublished. No doubt it is *H[omalia] Valentini*, which appears to be scarcely separable from *H. exigua*." *H. valentini* Besch., *fide* Fleischer (1908), is now a synonym of *Homalioidendron exiguum*: the Balfour specimen is identical to *H. exiguum*. *H. exiguum* is already known in Africa from Mauritius, as well as Réunion, Madagascar, Comores and Tanzania, and is widespread in tropical and sub-tropical Asia, Oceania and Australasia. As no description has ever been published of *H. subexigua*, it is likely that this collection has been named with reference to the original collection; however, without seeing the original collection it is not possible to suggest synonymisation, but serious doubt is certainly cast on the status of the taxon, and it should be excluded from the African list.

***Isothecium* (Echinodiaceae)**

The genus *Isothecium* Brid. is represented in sub-Saharan Africa only by a single species, *I. kenya* Tosco & Piovano. This name was proposed by

H. N. Dixon for the plant collected in 1914 by G. Balbo in Central Kenya, but it remained unpublished as a typical herbarium name until Tosco & Piovano (1956) validated it after examination of the specimen preserved in the African Bryological Herbarium of the Consolata Society for Foreign Missions in Turin. A duplicate of this collection is preserved in the Dixon herbarium (now in BM) and it has been available for investigation.

In a brief taxonomic discussion Tosco & Piovano (1956) stated that although Dixon admittedly attributed this moss to *Isothecium*, it shows closer alliance with *Brachythecium* Bruch, Schimp. & W.Gümbel or *Homalothecium sericeum* (Hedw.) Bruch, Schimp & W.Gümbel in its leaf areolation and overall aspect. Examination of the type material indeed confirms this observation. The leaf areolation of *Isothecium kenyae* is totally unlike that of other species of *Isothecium* in which the distinct alar groups consist of small, opaque, densely chlorophyllose cells with strongly incrassate walls forming yellowing to brownish auricles. In addition, the upper cells in *Isothecium* are rhomboidal to narrowly rhomboidal, thick-walled, becoming shorter at the margins and towards the apex. In contrast, in *I. kenyae* the basal cells are quadrate to short-rectangular, pellucid, with moderately thick to incrassate and porose, yellow-coloured walls, especially well seen on branch leaves (Fig. 1.6-7). They form a distinct band sharply set off from the adjacent laminal cells. The upper cells are thin-walled, long rhomboidal to oblong-linear, with shortly fusiformly narrowed ends. This leaf areolation indicates close alliance of *I. kenyae* with the brachythecioid mosses rather than with *Isothecium*.

When describing *Isothecium kenyae*, Tosco & Piovano (1956) overlooked one important detail of this new species, namely a marked leaf dimorphism (Fig. 1.1-5). The stem leaves are abruptly long acuminate from a triangular to ovate-cordate base. They are erect-spreading with often spreading apices and are long decurrent (Fig. 1.6). The costa ends about mid-leaf and does not project dorsally as a spine. The branch leaves are oblong-ovate, gradually tapering into the long acumen and are not decurrent (Fig. 1.7).

The only genus of the Brachytheciaceae

which has markedly differentiated leaves is *Kindbergia* Ochyra. Because *Isothecium kenyae* fits well the concept of this genus, the following transfer is necessary:

Kindbergia kenyae (Dixon ex Tosco & Piovano) O'Shea & Ochyra, *comb. nov.*

Basionym: *Isothecium kenyae* Dixon ex Tosco & Piovano, *Allionia* 3(1): 142, f. 21. 1956. Type: Kenya (Central Prov.), Isanguni: foresta a 2000 m. s.l.m., su rocce (leg. G. Balbo, 1 ott. 1914) [Holotype: TOM (not seen); isotype: "Herb. H. N. Dixon. Ref. No. 341 *Isothecium Kenyae* Dix. sp. nov. Rocks, Isanguni, Kenya Colony; 2000 m. Coll. G. Balbo 1 Oct. 1914, comm. P. G. Piovano type" (BM!)].

In sub-Saharan Africa the genus *Kindbergia* is represented by a single species, *K. africana* (Herz.) Ochyra which is widely distributed in the Central and East African volcanic area. It is a montane species occurring at an elevation of 1900-4000 m (Kis 1985; O'Shea 1999; Ochyra 1997b). It differs from *K. kenyae* in several characters including the smaller size of the plants and the shorter, erect-spreading and sharply and coarsely serrulate branch leaves, up to 1.0 mm long, with thin-walled basal cells. In contrast, the branch leaves in *K. kenyae* are up to 1.8 mm long, closely appressed and finely serrulate at margins and have basal cells mostly with incrassate yellow walls.

This taxonomic conclusion results in the exclusion of the genus *Isothecium* from the moss flora of sub-Saharan Africa. Nonetheless, this genus is present on mainland Africa and three species have been recorded from the area north of the Sahara, namely *I. alopecuroides* (Dubois) Isov. and *I. myosuroides* Brid. from Algeria and Morocco and *I. maroccanum* Thér. & Meyl. from Morocco (Ros *et al.* 1999).

The familial placement of *Isothecium* has been unstable and the genus was shifted from family to family of pleurocarpous mosses including the Lembophyllaceae and Brachytheciaceae. We follow here the suggestion of Hedenäs (1992) who placed *Isothecium* in the Echinodiaceae, unfortunately without giving the reasons for this transfer.

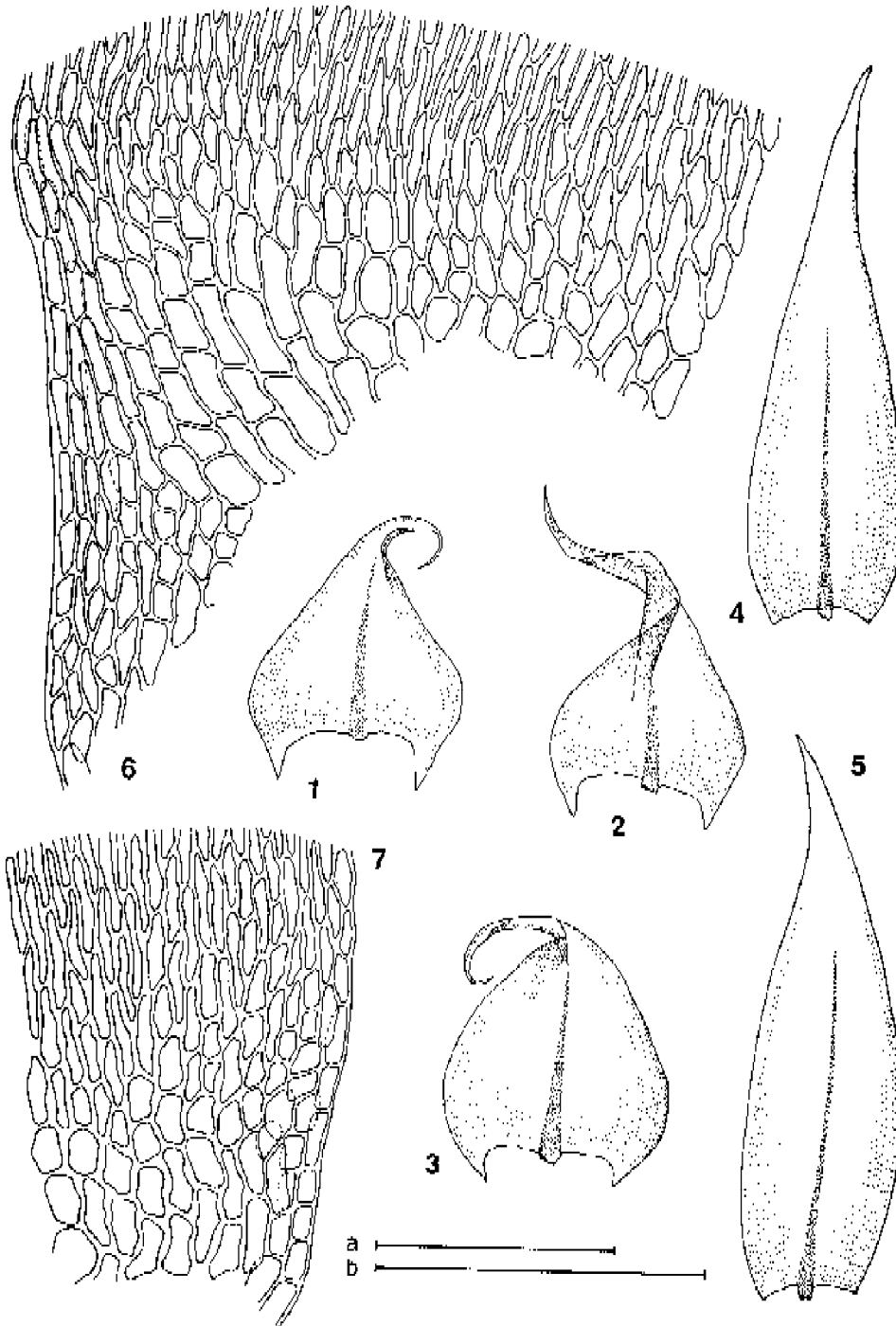


Fig. 1: *Kindbergia kenya* (Dixon ex Tosco & Piovano) O'Shea & Ochyra. **1-3:** stem leaves; **4-5:** branch leaves; **6:** basal and alar cells of stem leaf; **7:** basal cells of branch leaf. (All drawn from *Balbo s.n.*, 1 Oct 1914, isotype of *Isothecium kenya*, BM). Scale bars: a: 1 mm (1-5); b: 100 μ m (6-7).

***Lasiodontium* (Bryaceae)**

In the list of mosses collected in the Bale Mountains in Ethiopia Miehe & Miehe (1994) published the name *Lasiodontium mieheanum* Ochyra. This provisional name of a new species and genus of the Bryaceae has never been validly published and the subsequent reexamination of the material revealed that it represented *Daltonia angustifolia* Dozy & Molk., a species and genus which had not hitherto been recorded from Ethiopia. Accordingly, the invalidly published generic name *Lasiodontium* Ochyra must go into synonymy with *Daltonia* Hook. & Taylor and *L. mieheanum* becomes a synonym of *D. angustifolia*.

Daltonia angustifolia Dozy & Molk.
= *Lasiodontium mieheanum* Ochyra in Miehe & Miehe, Eric. For. Heathl. Bale Mts S Ethiopia: 168. 1994. Original material: ETHIOPIA. Bale Mts., above Goba, 6°54'N, 39°56'E, alt. 3450-3500 m; upper montane *Philippia-Hagenia* forest on 30-40° steep rocky upper slope with relatively little human disturbance; accompanying ground moss; 4 Mar 1990, S. & G. Miehe 3290a (KRAM), *syn. nov.*

***Meesia* (Meesiaceae)**

The only species recorded for the area is *Meesia kenyae* P.de la Varde. Ochyra (2000) considered it to be conspecific with *Ceratodon purpureus* (Hedw.) Brid.

***Phyllo drepanium* (Phyllo drepaniaceae)**

Schwaegrichen (1816) first mentioned *Phyllo drepanium falcifolium* (Schwägr.) Crosby (the only species in the family) as a plant of Réunion, although Bescherele (1878) expressed serious doubts about this, and Crosby (1970) gave additional reasons why it should be excluded from Africa. Nevertheless, Crosby *et al.* (1983) included it in their list of mosses of the East African islands, and it subsequently appeared in the African moss checklist (O'Shea 1995, 1997, 1999). Crosby's (1970) argument is fully endorsed here, and the moss is thus excluded from the African moss checklist.

***Potamium* (Sematophyllaceae)**

Bryophytes that occur in areas subject to inundation are notable for their high degree of

variation, and this is also true in Sematophyllaceae. *Potamium sanctae-mariae* (Besch.) Broth., Nat. Pfl. 1(3): 1107. 1908 (Basionym: *Pterogoniella sanctae-mariae* Besch., Ann. Sci. Nat. Bot., sér 6 10: 260. 1880.) was described from the island of Sainte-Marie (now Nosy Boraha) off the E coast of Madagascar from a Boivin collection of 1850, 'sur les racines de Manguieres'. Renault & Cardot (1890) discussed the two specimens of this taxon loaned to them by Bescherele, pointing out that the two collections represented two different species: Boivin's collection that agreed with the description of *Pterogoniella* (= *Potamium*) *sanctae-mariae*, and a Marie collection that was *Pterogoniella diversifolia* (= *Meiothecium diversifolium*). Buck (1990) found that Bescherele's herbarium (in BM) now contained only Marie's *M. diversifolium*. However, Buck (1990) repeats Renault & Cardot's (1890) assertion that *P. sanctae-mariae* had only a single peristome, which would exclude it from *Potamium/Sematophyllum* and probably place it in *Meiothecium*. It should be noted that Bescherele (1880) described an external peristome and then added 'interni fugaces?', giving some possibility of doubt about placement in *Potamium*, and the balance of possibilities is, as Buck states, that the collection was a *Meiothecium*. Buck (1990) therefore ignored it in his analysis of *Potamium* (which he reduced to one species). The genus *Potamium* was revised by Florschütz-de Waard (1992), and treated as a genus of two species, restricted to tropical South America. Florschütz-de Waard (1992) rejected Buck's (1990) analysis of the genus, but accepted his statement concerning *P. sanctae-mariae*. It seems likely that if the original specimen is ever found that it will prove to be something other than a *Potamium*, and the genus can thus be removed from the list.

***Ptychomnion* (Ptychomniaceae)**

This genus has been reported twice from Africa and its adjacent Indian Ocean islands. Bridel (1827) mentioned *Ptychomnion aciculare* (Brid.) Mitt. (as *Hypnum aciculare* Brid.) from Mauritius on the basis of the specimen collected by Bory de St. Vincent during his year-long stay in Mauritius and Réunion from May 1801. According to Dorr (1997) he did not collect

elsewhere during this period, and returned directly to France at the end of his visit. The taxon thus seems to be a correctly assigned collection for the island, but the species has not been rediscovered there since. No voucher collection which could confirm this record is present in the Bridel herbarium at B. *Ptychomnion aciculare* is a large and distinctive plant, and Mauritius has been explored in some detail by bryologists in the last two centuries, during which period there have been significant changes in the island's vegetation, so there must be a strong suspicion that the plant does not now occur in Mauritius.

Shaw (1878) recorded *Ptychomnion aciculare* from mainland Africa on the basis of the collection he had made in 1869 on the Katberg in the Cape Colony. Sim (1926) discredited this report (although he did not indicate the correct identification of the collection) and excluded this species from the bryophyte flora of Southern Africa, as also did Magill & Schelpe (1979) in their checklist of the bryophytes of this region. Also, no specimens of this species from Africa have been located by Hattaway (1984) in his unpublished revision of the Ptychomniaceae.

Ptychomnion is an oligotypic austral genus with a wide pan-temperate distribution and only rarely deeply penetrating into the tropics. *P. aciculare* is an Australasian species widespread in eastern Australia, New Zealand and Tasmania and extending to North Borneo and the Society Islands in the Pacific and its occurrence in mainland Africa is rather improbable. Nonetheless, the discovery of this genus, for example on Réunion, is quite possible since another species of this genus, *P. densifolium* (Brid.) A. Jaeger is very common on the subantarctic islands, namely Marion and Prince Edward Islands and Îles Crozet, as well as on Tristan da Cunha, and sometimes austral cool-adapted mosses penetrate into this island, for example *Racomitrium membranaceum* (Mitt.) Paris, but for now *Ptychomnion* should be best removed from the list of African moss genera.

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