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## *Felipponea* (Leucodontaceae, Musci), a new genus for Africa, to include '*Leucodon maritimus*' and *L. assimilis*

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**Abstract:** *Felipponea assimilis* (Müll.Hal.) O'Shea is the correct name to be used for all African collections of *Felipponea*, a species found in Uruguay, Brazil, Bolivia, southern and eastern Africa and the East African islands. *Hypnum maritimum* Müll.Hal. and *Cladomnion montevidensis* Müll.Hal. are new synonyms. Lectotypes are selected for *Neckera assimilis* Müll.Hal., *Cladomnion montevidensis* Müll.Hal. and *Braunia peristomata* Dixon in Sim & Dixon.

The name *Leucodon maritimus* has been used widely in southern and eastern Africa and the East African islands during the last 30 years for the taxon previously known as *L. assimilis*, as a consequence of the incorrect synonymisation of *L. assimilis* with *L. maritimus* in *Index Muscorum* (van der Wijk, Margadant & Florschütz 1959-1969). Unfortunately, the type specimen of *Leskea maritima* Hook. (the basionym of *Leucodon maritimus* (Hook.) Wijk. & Margad.) is not a *Leucodon*, but a subspecies of *Catagonium nitens* (Lin 1984), and the plant that has been called *Leucodon maritimus* or *L. assimilis* (Müll.Hal.) A.Jaeger in Africa appears to be the same as *Felipponea montevidensis* (Akiyama 1988), from Uruguay (Müller 1897), Bolivia (Herzog 1910) and Brazil (Yano 1981). However, because of long-standing misunder-

standings, there are a number of systematic and nomenclatural problems that need clarification before deciding on the correct name for this moss.

Hooker (1819) described *Leskea maritima* (= *Catagonium nitens* ssp. *maritimum*) from collection 5323 of William Burchell. According to McKay (1943), this collection was made on 14 April 1814 at "Plettenberg Bay near the landing place on the Sand Hills", which is near Knysna on the south coast of South Africa. Apparently the same collection (or part of it) was used later (1851) by Müller to describe *Hypnum maritimum*, citing Hooker's *Leskea maritima* as a homotypic synonym (i.e. based on Burchell 5323). However, from his description the plant seems to differ from Hooker's, and to be the same as what is now known as *Leucodon assimilis*.

Burchell collected extensively all over Cape province, and the collections were despatched periodically to Hooker during his collecting trip. Both BM and PRE hold several collections of *Leucodon assimilis* from Hb. Hooker collected during the period February to September 1814, mainly in the Port Elizabeth to George area, all within about 100 km of Knysna. However, none can be identified as the type of *Hypnum maritimum*, as they were all labelled as *Pterogonium julaceum*, which at the time was the name by which the taxon was known, although (as *Leucodon julaceus*) this name now belongs to a taxon occurring only in North America. The name *Pterogonium julaceum* was used between the years 1811 and 1846 (at which time the taxon was transferred to *Leucodon*), so would have been used for the many South African collection made during the period before the taxon was given the local name of *L. assimilis* in 1850. [*Leucodon julaceus* is remarkably similar to *L. assimilis*, and from my own collections of the two taxa *L. julaceus* appears to differ most obviously only in its ovoid capsule and the stronger, more toothed leaf apiculus. The species would also seem to fall within the scope of *Felipponea*; compare for instance the illustrations and descriptions of Magill and van Rooy (1998) and Buck (1998).] All the Burchell collections are consistently similar, and all are *L. assimilis*. However, there is nothing to link any of these collections specifically to the type, so it is unfortunate firstly that Hooker did not recognise this taxon as distinct from *Pterogonium julaceum*, and secondly that Müller chose to describe *Hypnum maritimum* from Burchell 5323 (when, earlier in the same document, he has also described the same taxon as *L. assimilis*, from a different collection!).

The confused origin of *Leucodon maritimum* in Africa is made worse by the lack of a type specimen for *L. assimilis* (as with many of Müller's taxa, following the destruction of his herbarium in Berlin) and also by ambiguous collection details in South Africa. The type for *L. assimilis* is supposedly a 1826 Pappé collection, but Gunn & Codd (1981) say that Pappé, who took over Zeyher's collections, rewrote the original specimen labels, "...so that a

casual observer might easily suppose that the plants are to be referred to Pappé's and not to Zeyher's labours" and they also state that "...it may be difficult to determine whether a given specimen is collected by Ecklon, Zeyher, or both, or whether it is part of a type gathering or not." In addition, it should be noted that Pappé only moved from Germany to South Africa in 1835 (Stafleu & Cowan 1983), so could not have been the collector. However, vouchers from South Africa (PRE) and from Brotherus' herbarium in Helsinki (H-BR) provide possible candidates for a type specimen. There were two syntypes mentioned: a 'Pappé' collection from Grootvaterbosch, Swellendam (now Grootvadesbosch Natural Reserve, about 25 km NE of Swellendam), and an Ecklon collection from 'Adoi' (probably Addo, about 30 km north of Port Elizabeth). There are two collections purporting to come from Swellendam: Zeyher 9398 from Swellendam (PRE) and a H-BR collection labelled in Brotherus' writing: "C.B.Sp., distr. Zwellendam, Grootvatersbosch, 18/10/1826 leg. Ecklon Pappé". The latter is selected as the lectotype for this taxon as the locality is more specific, the change in collector by Brotherus is supported by the Gunn & Codd (1981) quotation already mentioned, and the specimen is more likely to be contemporary (the Zeyher collection from PRE was identified by Dixon, so is clearly not the original collection, although the collection could well have been contemporary). Both collections are the identical taxon.

Sim (1926) almost got to the heart of the problem of *Leskea maritima* and *Hypnum maritimum*, but as he had only seen the two descriptions, and not the types, he failed to draw the correct conclusion. He pointed out that the two descriptions appear to be of different plants. One is:

"an erect, slightly branched or simple plant 1.5 inch high, with imbricate, appressed, concave, ovate-acuminate, nerveless leaves, forming a julaceous stem (evidently *Leucodon assimilis*), with erect lateral seta 1 inch long, suberect cylindrical capsule with sixteen free lanceolate teeth, and an inner peristome having deep basal membrane and short triangular processes without

cilia...Perichaetial leaves ... minute and perichaetium ... hairy (which is also illustrated)."

Sim also quotes Hooker: "The very erect and thickly tufted growth of this moss is very remarkable....The whole plant is very brittle, but particularly the fruit stalk." This is all a clear description of the type specimen of *Leskea maritima* held at BM!, with duplicates in NY!, which is now known as *Catagonium nitens* var. *maritimum* (Hook.) S.-H.Lin. Sim continues:

"Müller, on the contrary, describes it as *widely prostrate*; leaves densely imbricate, *somewhat secund*; margin *reflexed*; nerve *subdistinct, double*; cells large, elliptical; perichaetial leaves *ovate, long-acuminate*..... Probably the specimens contained two different julaceous plants and each dealt with a different one of these, but Hooker's figure is *Leucodon*."

Despite Sim's comments that Hooker's description is 'evidently *Leucodon assimilis*' and 'Hooker's figure is *Leucodon*', it is Müller's description that is exactly that of the plant that Sim knew as *Leucodon assimilis* (and which is described by him (Sim 1928: 358) in his South African flora), whilst Hooker's plant is a *Catagonium*. Unfortunately, van der Wijk and Margadant (1960) took Sim's words to mean that *Leucodon assimilis* was a synonym of Hooker's *Leskea maritima*, and so made *Leucodon assimilis* a synonym of *Leucodon maritimum* (Hook.) Wijk & Margad. *Hypnum maritimum* Müll.Hal. is not mentioned in *Index Muscorum* (van der Wijk *et al.*, 1959-69), only the earlier homonym *Hypnum maritimum* (Hook.) Arnott, which was based on *Leskea maritima*, and this may be the main reason why it has taken so long for this anomaly to be recognised. It is not clear whether or not Müller (1851) had seen Hooker's plant, or whether he was just treating *Leskea maritima* Hook. as a synonym of his new name, but the confusion does not appear to have been resolved until Lin (1984) demonstrated that the type of *L. maritimum* belonged to *Catagonium*, and Akiyama (1988) recognised the connection between the collections known as *Leucodon assimilis*, *L. maritimum* and the Uruguayan *Felipponea montevidensis*. Although the name

of *Leucodon maritimum* appeared in Magill & Schelpe's (1979) checklist for southern Africa, in parallel with *L. assimilis*, it was not mentioned even as a synonym in Perold and van Rooy's (1993) checklist, nor in the coverage of *Leucodon* in Magill and van Rooy's (1998) flora. As *Leskea maritima* Hook. does not belong to *Leucodon*, and as *Neckera assimilis* Müll.Hal. (1850) predates the invalid *Hypnum maritimum* Müll.Hal. (1851), it was quite correct of these authors to abandon the name *Leucodon maritimum* in favour of *L. assimilis*.

*Cladomnion montevidense* Müll.Hal. was collected from tree bark in Uruguay in 1877 (later found in Brazil and in Bolivia), and was described by Müller (1897) as having leaves of the structure of *Leucodon* but the sulcate capsule of *Cladomnion*. Subsequently Brotherus (1912) transferred this taxon to a new genus, *Felipponea*, and Manuel (1974) in his review of Leucodontaceae compared this genus with *Leucodon*, describing a number of characters justifying their status as separate genera in his quite broad view of the scope of the family. Akiyama (1988) re-evaluated *Felipponea* and did not entirely agree with Manuel (1974), but stated that the constant differentiating characters of *Felipponea* were leaves without plication, the weak differentiation between laminal and alar cells, and the horizontally spreading exostome teeth in moist conditions. He disagreed with a further character highlighted by Manuel (the lack of a central strand in the stem), because he (Akiyama) had just added a new species to the genus which contained a central strand in its stem. However, so far as African material and *Felipponea montevidensis* are concerned, this latter character is a significant distinction from other African *Leucodon*. For these reasons, the genus *Felipponea* is considered a useful and valid split from *Leucodon*. Species of *Felipponea* have also been described from Chile (Thériot 1936) and China and Japan (Akiyama 1988).

Akiyama (1988) also stated that all the South African specimens he had seen named *Leucodon assimilis* and *L. capensis* also belonged to *Felipponea montevidensis*. He was unable to locate type specimens of these two South African

species so was unable to say whether they were synonymous with *F. montevidensis* or not. There are slight differences between the South American and African collections, mainly in the size of the leaves: the leaves of the American plants tend to be rather shorter, averaging about 1.1 mm in length, whereas the African plants tend to have leaves of around 1.4 mm long, but the leaf width varies between 0.7 and 0.9 mm in all plants. This results in the leaves of the American plants often looking shorter and wider, but variation in both leaf length and width, length of apiculus and sharpness of transition to the apiculus is common to all the plants, and they clearly belong to the same taxon. It should be noted that the longer the apiculus, the longer the cells within it. As *Neckera assimilis* is an earlier name than *Cladomnion montevidense*, then *assimilis* is the correct specific epithet.

*Felipponea assimilis* is reasonably widespread in South America and Africa, but the distribution is patchy. Whether this is due to being under-collected is not known, but where it is found, it often appears in some quantity, as witnessed by our Malawi and Uganda collections and its occurrence in South Africa and southern Brazil. Several collections are from fallen branches, and one from high up a tree, which might suggest it may be growing out of reach of collectors. It appears to produce sporophytes throughout its range, so fertility does not appear to be an issue. A map of the distribution has the look of a Cretaceous distribution split by the opening Atlantic, but there are areas of central west Africa, for instance Angola, where it 'ought' to occur but where so far there have been no collections. This may be caused by more recent climatic changes that have driven it to higher altitudes with cooler and moister climates, whilst still existing at lower altitudes in the moist areas of the eastern Cape of South Africa.

As type specimens have not been selected for several of the synonyms of *F. assimilis*, an attempt is made to do that here.

*Cladomnion montevidense* Müll.Hal. The type specimen of this taxon has not been found, and presumably was destroyed with Müller's herbarium. However, Brotherus had duplicates

of many of Müller's types, and although they were not always labelled as such, some are identifiable as being taken from the type. In this case, Brotherus only has one collection labelled (in his own handwriting) "*Cladomnion montevidense* C.Müll." and it has to be assumed that this was the specimen he used when transferring the taxon to *Felipponea*. In addition, the specimen agrees well not only with Müller's illustration of *C. montevidense* (Müller 1897), but also with other South American specimens listed below. The H-BR specimen is annotated "Presumably a fragment extracted from the type specimen det. Pekka Isoviita 1986 University of Helsinki, Finland". I thus select this specimen (H-BR 1596002) as the lectotype for *Cladomnion montevidense*.

*Leucodon assimilis* var. *gracilis* Rehm., *nom. nud.* An original specimen of this in BM, distributed as part of Rehm's 'Musci austro-africani (1875-77)', has a rather longer apiculus than normal, but this is well within the degree of variation seen, and Sim's synonymisation is supported.

*Braunia elliottii* Broth. was based on a single collection from Malawi made in December 1893 by G.F. Scott Elliot. Presumably the holotype is in H-BR, but the isotype in BM is very typical *F. assimilis*. *Index Muscorum* follows Brotherus in spelling the specific name 'elliotti', and although Nineteenth Century spellings are not always consistent, the spelling used elsewhere (e.g. in bibliographies and lists of collectors and herbaria) is almost universally 'Elliot' with one 't'. However, the rules are not absolutely clear on this, and so Brotherus' spelling is maintained.

*Leucodon capensis* Schimp. in Renaud. Presumably the name is a Schimper herbarium name for a South African plant, but Renaud (1898) in using the name quotes only collections from Réunion (Cilaos, *Eudel* (Hb. Viaud Grand Marais) alt. 1550 m) and Madagascar (zone supérieure des forêts, Ambatomanga, *Rev. Talazac*, 1894). At the time of writing loans are not available from PC, but hopefully a type can be selected from there. Both syntypes were seen by Magill & van Rooy (1998). However, Paris (1894-8) attributes the name to "W.P. Schimp. in Breutel's M. Capens.", and there are a number

of Breutel collections from BM (from both Hb. Schimper and Hb. Hampe), from Uitenhage and 'Enon, White River', and also a Leibold collection from Grootvaderbosch. All are *F. assimilis*, although the 'Enon' collection mentioned below has leaves with particularly long apiculi, up to one third of the leaf length.

*Braunia peristomata* Dixon was published with five syntypes, but it is clear from Dixon's herbarium sheet for this species in BM (including manuscript annotations by Dixon) that *Sim 8750* is the prime specimen used to define the taxon, and it is here selected as the lectotype.

*Leucodon assimilis* var. *humilis* Sim is treated by Magill and van Rooy (1998) as a synonym of *L. assimilis*, and I agree with this. The plant (which I have also collected in Uganda) is unusual but is morphologically indistinguishable from the type.

The nomenclatural position thus appears to be as follows:

*Catagonium nitens* ssp. *maritimum* (Hook.) S.-H. Lin. J. Hattori Bot. Lab. 55: 298. 1984.

Basionym: *Leskea maritima* Hook., Musci Exot. 2: 18. 166. 1819 (≡ *Hypnum maritimum* (Hook.) Arnott, Mem. Soc. Linn. Paris 5: 303. 1827; *Rhaphidostegium maritimum* (Hook.) A. Jaeger, Ber. S. Gall. Naturw. Ges. 1876-77: 358. 1878 (Ad. 2: 454); *Leucodon maritimus* (Hook.) Wijk & Margad., Taxon 9: 190. 1960.).

Type: *Leskea maritima* Hook., SOUTH AFRICA: sandy scrub at shore of Plettenberg bay, *Burchell 5323* (BM BM000672521! - holotype; NY 0032414!, 0032415! - isotypes)

*Felipponea assimilis* (Müll.Hal.) O'Shea, **comb. nov.**

Basionym: *Neckera assimilis* Müll.Hal., Syn. 2: 92. 1850 (≡ *Leucodon assimilis* (Müll.Hal.) A. Jaeger, Ber. S. Gall. Naturw. Ges. 1875-76: 217. 1877 (Ad. 2: 121)).

Syntypes: SOUTH AFRICA. Grootvaterbosch prope Zwellendam, *Pappe*; in truncis *Eucleae undulatae* sylvarum prope Adoi

(District. Uitenhagen), in edito tertio, Augusto: *Ecklon*.

**Lect. nov.:** SOUTH AFRICA. 'C. B. Sp., distr. Zwellendam, Grootvatersbosch, 18/10/1826, leg. ~~Ecklon~~ Pappe.' (H-BR 2422008!) (see narrative above)

= *Hypnum maritimum* Müll.Hal., Syn. 2: 328. 1851 *nom. inval.*, **syn. nov.**

Type: SOUTH AFRICA: Prom. b. spei, in fruticetis arenosis sinus Plattenberg: *Burchell* [?5323 p.p.] (Type not seen)

= *Cladomnion montevidense* Müll.Hal., Hedwigia 36: 108. 1897, **syn. nov.** (≡ *Felipponea montevidensis* (Müll.Hal.) Broth. in Felipp., Contr. Fl. Bryol. Uruguay 2: 15. 1912).

Type: URUGUAY. Montevideo, in cortice arborum: Prof. Arechavaleta Novbr. 1877 cum fructibus immaturus legit. Hb. Lund, 1886.

**Lect. nov.:** H-BR 1596002! (see narrative above)

= *Leucodon assimilis* var. *gracilis* Müll. Hal. in Paris, Ind. Bryol. 754. 1897 *nom. nud.*, *fide* Sim (1926).

Original specimens: SOUTH AFRICA: In sylvis Knysna, Musci austro-africani (1875-77), *Rehmann 320*. (BM BM000672524!, BM000672525!).

= *Braunia elliottii* Broth., Bot. Jahrb. 24: 253. 1897, *fide* Sim (1926).

Type: MALAWI. Shire Highlands, Sotchi [Soche], Dec. 1893, *G.F. Scott Elliot* (BM BM000672523! - isotype)

= *Leucodon capensis* Schimp. in Renaud, Prodr. Fl. Bryol. Madag. 184. 1898, *fide* Magill & van Rooy (1998); Sim (1926). Syntypes: RÉUNION. Cilaos, *Eudel*; MADAGASCAR. Ambatomanga, *Talazac*, 1894 (PC)

= *Entodon araucariae* Broth., Bih. K. Svensk. Vet. Ak. Handl. 26 Afd. 3(7): 49. 1900 *nom. nud.* (≡ *Pterigynandrum araucariae* Müll.Hal. in Broth., Denkschr. Ak. Wiss. Wien, Math. Nat. Kl. 83: 320. 1926 *nom. nud. in synon.*), *fide* Brotherus (1926).

Original specimens: BRAZIL: Rio Grande do Sul: Excolonia Santo Angelo, ad ramulos demortuos silvae primaevae (*Regnellschen Expedition 170* [S]);

- Silveira Martins, ad ramos arborum silvae primaevae (*Regnellischen Expedition 208* [S]).
- = *Leucodon squarrosus* Herz., Beih. Bot. Centralbl. 26(2): 76. 1910, *fide* Brotherus (1925).  
Type: BOLIVIA. An einem Baum in Bergwald des Cerro Amboró, ca. 900 m, Oktober [19]07, *Th. Herzog s.n.* (H-BR 1596001! - possible isotype). Presumably the holotype is in JE: not seen.
- = *Braunia peristomata* Dixon in Sim & Dixon, S. Afr. J. Sc. 18: 324. 1922, *fide* Magill & van Rooy (1998); E. De Luna, type specimen annotation, BM!; H.N. Dixon, type specimen annotation, BM!  
**Lect. nov.:** ZIMBABWE: Great Zimbabwe Temple ruins, on tree, 3000', July 1920, *T.R. Sim, 8750* (BM BM000672522!)
- = *Leucodon assimilis* var. *humilis* Sim, Bryo. S. Afr. 358. 1926, *fide* Magill & van Rooy (1988).  
Type: SOUTH AFRICA. Transvaal, Houtbosch, *Rehmann 605* (PRE - holotype; BM BM000661468! - isotype)

#### Selected specimens examined:

- BOLIVIA: An einem Baum in Bergwald des Cerro Amboró, ca. 900 m, Oktober [19]07, *Th. Herzog s.n.* (H-BR 1596001) (possible isotype of *Leucodon squarrosus* Herz.).
- BRAZIL: Prov. S. Paulo, Caxacica (?), Aug 1882, *F.F. Puiggari 2034* (H-BR 1596005) (as *Entodon araucariae* Broth., *nom. nud.*); Prov. S. Catharina, Serra Geral (?), an *Araucariastammen*, May 1890, *E. Ule 848* (H-BR 1596003) (as *Pterigynadrum araucaria* Müll.Hal. in Broth., *nom. nud. in synonym.*); Minas Gerais, Serra dos Orgãos, an Felsen, Dec. 1891, *E. Ule 1252*. (H-BR 1596004) (as *Felipponea montevidensis* (Müll.Hal.) Broth.).
- URUGUAY: (no collection details) H-BR 1596002 (lectotype of *Cladomnion montevidensis* Müll.Hal.)
- MALAWI: Mulanje, Chisongoli, on large Kampon tree by path in degraded forest, 16°1'S 35°43'E, 1200 m, 17 June 1991, *R.D. Porley 60a* (E); Zomba, on Cycad in grounds of government hostel, 15°55'S 35°38'E, 14 June 1991, *O'Shea 7601a* (E); Shire Highlands, Soche, December 1893, *G.F. Scott Elliot* (BM BM000672523) (lectotype of *Braunia elliotii*).
- SOUTH AFRICA: Foot of Postberg, N side of George, 8

- September 1814 [details from McKay, 1943], *Burchell 5872* (BM BM000661469) (as *Pterogonium julaceum*); C.B.Sp., distr. Zwellendam, Grootvadersbosch, 18/10/1826 leg. ~~Eeklon~~ *Pappe* (H-BR 2422008) (lectotype of *Leucodon assimilis*); Swellendam, *C. Zeyher 9398*, det. H.N. Dixon, stamped 'Royal Gardens Kew 60' (PRE) (as *Leucodon assimilis*); Cap. B. Sp., Enon, White River, 1901 (BM BM000661473) (as *Leucodon capensis*).
- UGANDA: Rukungiri, Ishasha Gorge, fallen branch, 0°53'S 29°40'E, 8 June 1952, *E.M. Lind 25* (BM BM000661474); Kumi, Mukura, growing 40 feet high in the bole of *Canarum schweinfurthii*, in recently cleared forest, 1150 m, 18 April 1953, *G.H.S. Wood 1737* (BM BM000661475); Masindi, Budongo Forest Reserve, Nyakafunju Nature Reserve, rotten log across path, 1°42'N 31°31'E, 1060 m, 24 January 1997, *O'Shea 2645a* (E); Kabarole, Fort Portal, bark of tree at S end of main street, 0°39'N 30°16'E, 28 January 1997, *O'Shea 2757a* (E).

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