

NOTES ON MALESIAN FERNS—I  
On the genus *Lemmaphyllum* Presl

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## SUMMARY

1. The genera *Lepidogrammitis* Ching and *Weatherbya* Copel. are merged in *Lemmaphyllum* Presl. The inconstancy of the characters on which these genera have been separated in discussed,

2. The following new combinations are proposed: *Lemmaphyllum. accedens* (Bl.) Donk (basinym, *Pnlypodiwm uccedens* Bl.) and *Lemmaphylhim* sect. *Phlebodiupsin* (Moore) Donk (basinym, *Phapeltis* sect. *Phlebodiopsis* Moore).

**HISTORICAL.**—*Lemmaphyllum* was introduced by Presl (1849: 157) as a segregate from his previously published genus *Drymoglossum* Presl (1836: 277 pi. 10 fs. 5, 6). The latter group is based on two species of which the second, "*D. spatulatum* Presl in Meyen herb.," represents the *Lemmaphyllum* element, the first being *Pteris piloselloides* L., the unavoidable type species (selected) of the name *Drymoglossum*. The original species of *Lemmaphyllum* are two, (i) *Lemmaphyllum spatulatum* Presl (*Drymoglossum spatulatum* Presl nom. nud.), the one species previously included in *Drymoglossum*, and (ii) *Drymoglossum carnosum* (Wall.) ex Hook.

The main character for separating the two genera Presl found in the position of the coenosori, halfway between the midrib and the margin of the blade in *Lemmaphyllum* rather than close to the margin as in *Drymoglossum*. This looks very much like a flimsy pretext for excessive splitting, but with our present knowledge it may now be stated that it is an example of Presl's acuteness in setting apart unrelated groups that look superficially strongly alike.

*Lemmaphyllum* was neither accepted as a genus by Feë (1850-52: 94) nor, of course, appreciated by Hooker (1864: 189); both authors merged it again in *Drymoglossum*. Mettenius (1856: 28; "*Lemaphyttum*") regarded *L. carnosum* as part of *Taenitis* Sw. As usual, Hooker's example remained dominant for a long time and, for instance, Diels (1899: 302) and Christensen (1906: xlvi) accepted his treatment.

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However, after Goebel (1926: 140-148 *pi. 11 fs. 75-78*) had already concluded that the two genera should be kept apart, Christensen (1929: 44) re-established *Lemmaphyllum* and his well documented opinion has hardly been questioned afterwards. As to the differentiating characters, the lack of stellate hairs suffices to differentiate *Lemmaphyllum* from *Drymoglossum* with similar coenosori; and the presence of peltate scales in the young sori will serve to distinguish it from most other genera of Polypodiaceae *se-nsu stricto* with coenosori, except *Hymenolepis* Kaulf. (= *Belvisia* Mirbel) and *Drymotaenhtm* Makino, the former with a fertile, strongly contracted, apical portion of the frond ('spike'), the latter with uniform, linear fronds and immersed coenosori; in both the coenosori are covered by the strongly revolute edges of the frond at least when immature, *Drymoglossum* belongs to a quite different set of genera to which *Pyrrhosia* Mirbel also belongs, and Christensen's renewed separation of *Lemmaphyllum* from *Drymoglossum* is certainly well-founded.

When re-establishing the genus, Christensen at the same time broadened its limits by including a small group of species of which *Drymoglossum abbreviatum* Fée and *Neurodium sinense* Christ were the principal representatives. This made necessary the subdivision of the genus into two sections, section *Eulemmaphyllum* C. Chr. and section *Pseudovittaria* C. Chr., both with uniform fronds. This treatment, excellent as it was, has been improved by Ching (1933: 58), who transferred the second section to *Lepisorus* (J. Sm.) Ching. Section *Pseudovittaria* is intermediate between *Hymenolepis* and *Lepisorus* rather than between *Lemmaphyllum* and *Hymenolepis* and its inclusion in *Lepisorus* is perhaps the best disposition of it when one retains the first pair of genera as distinct. On the other hand, Ching proceeded to include a small number of species, like *Polypodium drymoglossoides* Baker, with rather uniform fronds and distinct, round (Polypodioid<sup>1</sup>) sori. For this new element the new section *Pseudolepisorus* Ching was established. The incorporation of this group weakens two of the leading characters of *Lemmaphyllum*, viz., the dimorphous fronds and the linear coenosori, but all the same the transfer is an improvement, in my opinion.

Afterwards Ching was not satisfied with his own disposition of these species with round sori and introduced for them a special genus *Lepidogrammitis* Ching:

"*Lepidogrammitis* Ching (*Lemmaphyllum* § *Pseudolepisorus* Ching). [Type species:] *L. drymoglossoides* (Bak.) Ching (*Polypodium* Bak.). . . . *Lepidogrammitis* inter *Lepiaorem* et *Lemmaphyllem* medium tenens, soris prioris, habitu, venatio, et textura foliis dimorphis vel subdimorphis potius *Lftmmupkyi*U."<sup>2</sup> Ching (1940: 258).

Copeland does not commit himself as to *Lepidogrammitis*, which, except for fleetingly mentioning it under *Lemmaphyllum*, he does not place definitely anywhere. Ching's species occur in south-eastern Asia rather than in Malesia, and when Copeland had to deal with two Malesian representatives of *Lepidogrammitis*, he promptly established for them the new genus *Weatherbya* Copel. These two species are *Poly-podium accedens* Bl. (type species by original designation) and *Polypodium damuense* Rosenst. ("a very small, not very distinct New Guinea derivative"):

"*Weatherbya* is clearly related to *Pleopeltis*, as shown by the paraphyses. . . . It is distinguished from *Pleopeltis* by habit, the peculiar dimorphism, position of the sorus on its vein, and the spores. The two genera have no area in common, not quite meeting in Luzon."—Copeland (1948: 191 pi. 5).

It will be noticed that Copeland compared his genus with *Pleopeltis* Humb. & Bonpl. ex Willd. This genus, as emended by him, contains (incorrectly, I believe) also *Lepisorus* which is the group he had in mind in connection with *Weatherbya*. What the differences in habit are is not stated. The peculiar dimorphism he described as follows: "the sterile ovate or lanceolate [fronds], obtuse, the fertile contracted about the middle and thence attenuate" (no dimorphism mentioned for *Lepisorus*). The spores are "minutely reticulate-roughened" as against "smooth or nearly so" in *Lepisorus*. The sori are said to be situated on veinlets excurrent from the lowest cross-veinlets (at the union of several veinlets in *Lepisorus*); this statement is contradicted for *Weatherbya* by the accompanying plate, where the sori are correctly depicted on the lowest cross-veinlets themselves.

There is no doubt that *Weatherbya* is congeneric with *Polypodium drymoglossoides* and related species (*Lepidogrammitis*). Taxonomically there is nothing really significant to separate the two and I do not hesitate to assign *Lepidogrammitis*, and consequently also *Weatherbya*, to *Lemmaphyllum*. Dr. R. E. Holttum (in litt.) has agreed with this conclusion which was already summarily stated in a book-review (Donk, 1948: 282).

**TYPIFICATION.**—The type species of *Lemmaphyllum*, should be *L. spatulatum* rather than the other original species, *L. carnosum*. *Lemmaphyllum spatulatum* was the first element known to Presl and, moreover, it was the only species he knew through specimens! At the end of the description of *L. carnosum* he indicated "ex icone," which clearly shows that he did not see specimens of it. I agree, therefore, with Copeland (1948: 189) who selected *L. spatulatum* ("*spathulatum*") as the type species.

These reasons will make it also clear why I reject Christensen's earlier selection (1006: xlvi) of *Drymoglossum carnosum* as the type species.

Later he himself left the question unsolved by indicating: "Type-species: *L. spatulatum* Pr. and *L. carnosum* (Wall.) Pr." (Christensen, 1929: 45). Ching (1940: 259) followed Christensen's selection of 1906.

VENATION.—One of the most telling characters of *Lemmaphyllum* as here understood (inclusive of *Lepidogrammitis* and *Weatherbya*) is in the venation which represents a much more simple type than in the genera *Lepisorus* and *Hymenolepis* with which it is now usually compared and with which it appears closely related.

The costa of the simple, entire blade is percurrent, almost reaching the apex. The main veins are pinnately arranged and send off their first veinlet rather far away from the costa while dividing more or less typically dichotomously. The two opposite veinlets from two neighbouring main veins unite into an arch setting off a rather large costal areole which nearly always contains a free, recurrent veinlet: the latter is simple (generally bending towards the basis of the frond) or once branched and arising from the arch. Following the costal areoles are one to three more rows of areoles. Each of these rows consists of distinctly smaller and more numerous areoles than the preceding one; mostly their areoles also include a single recurrent veinlet (sometimes arising from the lateral sides rather than from the outer side of the areole) or are devoid of such veinlets, while the outer areoles may be incomplete or often lack a recurrent veinlet. The veins and veinlets are conform. Excellent drawings of this type of venation are to be found in publications by Wu, Wong, & Pong (1932: *textpl.* 120, *Drymoglossum microphyllum*), Ogata (1981: *pi.* 163, *Drymoglossum carnosum*, *pi.* 164, *D. microphyllum*, *pi.* 165, *D. nobukoanum*, *pi.* 166, *D. obovatum*), and Copeland (1948: *pi.* 6, *Weatherbya accedens*). This peculiar type of venation is rare among the Polypodiaceae *sensu stricto* with clathrate scales and occurs in this series in its most typical form only, as far I have noticed, in *Colysis* Presl and closely related groups: it is especially to be encountered in the small members (with simple fronds) of *Dendroglossa* Presl emend. Copel. (inclusive of *Myuropteris* C. Chr.)<sup>1</sup> and in some of those that have larger and pinnatifid fronds, for instance, *Campium laciniatum* Copel. (1928: 354 / 10) and certain forms with narrow segments of the complex of *Colysis ellipticum* (Thunb.) Ching. If one compares the venation of *Lemmaphyllum* with Christensen's figure (1929: *j*), 10 *f.* 3) of *Myuropteris cordata* (Christ) C. Chr. and of *Leptochilus minutulum* Fee (Copeland, 1928: *f.* 3, *Campium minutulum*), two of the above mentioned small, entire-bladed species of

<sup>1</sup> This genus should rather be fused with *Colysis*,

*Dendroglossa*, with *Leptochilus*-like fertile fronds, the striking resemblance will at once be noticed.

I am inclined to consider this resemblance as a case of 'convergence.' The venation of *Dendroglossa* (inclusive of *Myuropteris*) is readily understandable as derived from the normal *Colysis* type of venation. *Colysis* and *Dendroglossa* differ, for instance, by the lack of peltate scales in the young sori and in being terrestrial, and in a general way appear not closely related to *Lemmaphyllum*. Outside Polypodiaceae with clathrate scales, the same kind of venation is found in some of the species of *Drymoglossum*.

The type of venation in *Lemmaphyllum* is perhaps the one really important character to separate it from *Lepisorus*. On the whole the differences in this respect are very evident, but the situation becomes less clear in some members of *Lepisorus* with strongly simplified venation. Typically the type of venation in the latter genus is more complicated than in *Lemmaphyllum*. The basic pattern in *Lepisorus* is the same as in such species of *Goniophlebium* Presl sensu Copel. (*Schellolepis* J. Sm.) in which only the costal areoles are well developed, but the areoles, especially the costal ones, are strongly subdivided into subareoles by accessory veinlets forming a network and among which are free veinlets variously directed (as is also the case in *Phymatodes* Presl); the meeting point of the 'axillary,' (first, acroscopic) veinlet (so notable in *Goniophlebium*) with a number of accessory veinlets in the costal main areole is the seat of the pleiosorus in *Lepisorus*: thus a quite different situation from that found in *Lemmaphyllum*.

SORI.—One of the main features of the original species of *Lemmaphyllum* is the one linear and longitudinal coenosorus on each side of the midrib. This character is not quite stable: almost every plentiful collection may prove this. Christensen (1920: 49) mentioned a collection of *Lemmaphyllum carnosum* with "fertile leaves about as broad as the sterile ones and the sori much interrupted, almost polypodioid, thus very much resembling *Polypodium subrostratum*." Some of the specimens referred to *L. mierophyllum* "approach *Polypodium drymoglossoides* Bak. . . so much that they can only be distinguished from it with difficulty. The leaves of these specimens . . . are partly subdimorphous; besides the typical spathulate fronds some others are found that are similar to the sterile ones, though larger and ovate-oblong . . ., but fertile, the sori often interrupted, sometimes fully polypodioid." (Christensen 1929: 47). Of *L. mierophyllum* var. *obovatum* (Harr.) C. Chr. a frond was depicted in every respect quite typical of '*Lepidogrammitis*' (Christensen 1929: 47

pi. 5 f. 3c). Wu, Wong, & Pong (1932: *textpl.* 120A) gave a drawing of a plant of this species in which all of the fertile fronds except one out of ten show a more or less pronounced tendency to polypodioid sori. Ching may also be quoted on this matter:

"The sori in *L. microphyllum* and *Polypodium drymoglossoides* are perhaps the best illustration of unstability of [the eoenosori], for on a single frond are often found completely fused sori on the top, half-fused ones in the middle and entirely distinct ones at the base. Although the two species above referred to are placed by modern authors in two distinct genera, nevertheless the identity of species is not without difficulty, particularly, in the presence of ample material"—Ching (1933: 95).

I have seen ample collections of nearly all the species involved and share this view unconditionally.

**DIMORPHISM.**—The dimorphism of the fronds in the original species of *Lemmaphyllum* is quite pronounced and expresses itself by the longer stipes and the narrower blades in fertile fronds. It is worthy of note that where a tendency to breaking up of the eoenosori may be noticed the dimorphism becomes simultaneously effaced: the more truly polypodioid and the farther apart they are, the shorter the stalks and the broader the blades, the extremes at the other end of the series showing hardly any dimorphism at all, at least not more than is usual in the truly polypodioid series of species added by Ching (section *Pseudolepisor* VrS = genus *Lepidogrammitis*).

In the species of section *Pseudolepisoms* dimorphism is not wholly absent. As a rule the sori are restricted to the apical half (or a still smaller portion) of the blade and this fertile portion often shows a tendency to elongate and contract. In this respect there is really no essential difference between *Polypodium subrostratum* and *Polypodium accedens*, the type species of *Weatherbya*, for which the partial dimorphism was especially emphasized by Copeland ("the fertile [fronds] contracted about the middle and thence attenuate").

**CONCLUSION.**—The extremely closely-knit relations of the species with eoenosori with those with round sori in rows was already duly recognized by Christensen. Without perhaps agreeing as to the theoretical (phylogenetic) basis underlying his conclusions, one may well share his conclusion that the species involved are intimately related indeed:

"As often mentioned above several of the species [of *Lemmaphyllum*], dealt with show so close a resemblance to certain species of *Polypodium* sect. *Lepisoms* [= *Lemmaphyllum* sect. *Pseudolepisonis*] that it seems probable, that each is a recent derivative from its polypodioid mother-species or rather from an older form which during the course of evolution has been split up into one polypodioid and one "drymoglossoid" daughter-species. Pairs of such sister-species are f. inst.;

*Polypodium drymoglo&soides* — *Lemmaphyllm microphyllon* "  
*P. sibrostratum* — *L. carnosum*  
 . . . — . . . ."—Christensen (1929: 71).

The main point at issue in this note is not whether *Lepidogrammitis* and *Weatherbya* are congeneric—this is hardly doubtful—, but whether these two supposed genera may be fused with *Lemmaphyllum*. In this connection two pairs of characters were considered above: (i) more or less uniform (or not too strongly dimorphous), almost sessile fronds against clearly dimorphous fronds with slender stipes, and (ii) rows of distinct, round sori against coenosori. In both cases the conclusion has been that neither of the two can possibly serve as a generic basis for separation. Therefore, *Lemmaphyllum*, *Lepidogrammitis*, and *Weatherbya* are united here.

Accordingly, for the Malesian region the new name **Lemmaphyllum** *accedens* (Bl.) Donk, *comb. nov.* (basinum, *Polypodium accedens* Bl., Enum. 121. 1828) is proposed. For those who want to keep apart in special groups within one genus the species with a tendency to form more or less complete coenosori and those with strictly round sori, *Lemmaphyllum* sect. *Pseudolepisorus* Ching. should be replaced by **Lemmaphyllum** sect. **Phlebodiopsis** (Moore) Donk, *comb. nov.* (basinum, *Pleopeltis* sect. *Phlebodiopsis* Moore, Index Filicum lxxvii, 1857). The original species of Moore's section form a heterogeneous lot, but Christensen (1906: 1) maintained it as a distinct group of *Polypodium* sect. *Pleopeltis* (Humb. & Bonpl. ex Willd.) C. Chr. and indicated *Polypodium accedem*, one of the original species, as the type (or else as the only example of a typical species), excluding at least most of the others.

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