Three new combinations in *Haplopteris* (Pteridaceae subfam. Vittarioideae)

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ABSTRACT. Three new combinations are made here: *Haplopteris alternans* (Copel.) S.Linds. & C.W.Chen, *Haplopteris humblotii* (Hieron.) S.Linds. & C.W.Chen, and *Haplopteris dareicarpa* (Hook.) S.Linds. & C.W.Chen. Lectotypes for *Vittaria alternans* Copel. and *Vittaria humblotii* Hieron. are also designated here.

Keywords. Adiantaceae, *Haplopteris*, *Monogramma*, Pteridaceae subfam. Vittarioideae, *Vittaria*, Vittariaceae, Vittarioid

Introduction

In 1998 Crane published a revised circumscription of the genera of the fern family Vittariaceae (now Adiantaceae p.p. or Pteridaceae subfam. Vittarioideae p.p.) based on a phylogenetic analysis of *rbcL* gene sequences and supported by micro-morphological characters. He proposed a number of generic changes and many new combinations but the most significant change for Asia was the loss of the genus *Vittaria* Sm. (*Vittaria* s.s. was redefined as a small genus of approximately 6 species restricted to the Neotropics and Africa) and the resurrection of the genus *Haplopteris* C.Presl to accommodate the many Asian species formerly placed in *Vittaria*. Most of the necessary new combinations in *Haplopteris* have already been made (see Crane, 1998; Zhang, 2003; Lindsay, 2010) but a few species such as *Vittaria alternans* Copel. from the Philippines and *Vittaria humblotii* Hieron. from the Comoros and Madagascar appear to have been overlooked. Both of these species have soral paraphyses with funnelform apical cells, a character that they share with all existing species of *Haplopteris* but which is absent from *Vittaria* s.s. In view of this, two new combinations in *Haplopteris* need to be made.

Although Crane (1998) clarified the phylogenetic relationship of most genera of vittarioid ferns his work did not include the two small genera *Rheopteris* Alston and *Monogramma* Comm. ex Schkuhr s.l. A decade later, Ruhfel et al. (2008) published the results of another phylogenetic analysis of *rbcL* sequence data that included these genera. This analysis included *Rheopteris cheesmaniae* Alston, the sole member and

therefore the type of the genus *Rheopteris*, as well as four species of *Monogramma* s.l (*Monogramma dareicarpa* Hook., *M. paradoxa* (Fée) Bedd. (as *Vaginularia angustissima* (Brack.) Mett.), *M. trichoidea* J.Sm. ex Hook. and *M. acrocarpa* (Holttum) D.L.Jones) but not, unfortunately, *Monogramma graminea* (Poir.) Schkuhr, the type of the genus. Despite the absence of *Monogramma graminea*, this study clearly showed that *M. paradoxa*, *M. trichoidea* and *M. acrocarpa* form a strongly supported monophyletic group that is sister to *Rheopteris cheesmaniae* and that this clade is sister to the rest of the vittarioid ferns. *Monogramma dareicarpa*, conversely, is nested within *Haplopteris*. Moreover, *Monogramma dareicarpa* has bilateral spores and soral paraphyses with funnelform apical cells, characters that are shared with most species of *Haplopteris*, whereas *M. paradoxa*, *M. trichoidea* and *M. acrocarpa* have trilete spores and soral paraphyses with unspecialised apical cells. On the basis of these and other differences, and morphological differences to *M. graminea*, Ruhfel et al. (2008) argued that the genus *Vaginularia* Fée, a genus rarely recognized in recent literature but of which *Vaginularia* (*Monogramma*) *trichoidea* is the type, should be separated from *Monogramma* s.s. Ruhfel et al. (2008) also discussed the implications of *Monogramma dareicarpa* being nested within *Haplopteris* but were reluctant to formally transfer it to *Haplopteris* without knowing the placement of *M. graminea*. The main concern was that if *Monogramma graminea* were to be nested in *Haplopteris* then, under the principle of priority, and without conservation, the genus *Haplopteris* would become a synonym of *Monogramma* and the combination in *Haplopteris* would be pointless. There are also a number of key morphological differences between *Monogramma graminea* and *M. dareicarpa* that make assumptions of their relationship to each other problematic. Very recently the phylogenetic position of *Monogramma graminea* has been investigated using sequence data from four chloroplast genes (C.W. Chen, unpublished). Its precise placement in the phylogeny of vittarioid ferns is to be published separately after broader sampling and further analysis but it is already clear that *Monogramma graminea* is (1) not closely related to *M. dareicarpa*, (2) is not nested in *Haplopteris* and (3) is not closely related to any of the sampled *Vaginularia* species. These facts support our decision to also transfer *Monogramma dareicarpa* to *Haplopteris*.

New combinations

Haplopteris alternans (Copel.) S.Linds. & C.W.Chen, **comb. nov.** —*Vittaria alternans* Copel., Philipp. J. Sci. 1 (Suppl. 2): 157 (1906). TYPE: Philippines, Mindanao, Zamboanga, San Ramon, 2600 feet (800 m), 2 May 1905, In tree top in upland forest, *E.B. Copeland 1767* (lectotype MICH [MICH1191098], designated here; isolectotype BM (fragment) [BM000008869]).

Haplopteris humblotii (Hieron.) S.Linds. & C.W.Chen, **comb. nov.** — *Vittaria humblotii* Hieron., Bot. Jahrb. Syst. 53(3−5): 427 (1915). TYPE: Comoros, Island of

Anjouan, January 1887, *L. Humblot 1526* (lectotype P [P00149188], designated here; isolectotypes P (x3) [P00149187, P00149189, P00149190]).

Haplopteris dareicarpa (Hook.) S.Linds. & C.W.Chen, **comb. nov.** — *Monogramma dareicarpa* Hook., Sp. Fil. 5: 121, t.288A (1864). — *Pleurofossa dareicarpa* (Hook.) Nakai ex H.Ito., J. Jap. Bot. 12: 408 (1936). TYPE: Borneo, Labuan [Pulau Labuan, Sabah, Malaysia], s.d., On the trunks of trees, *E.S. Barber* [?*Motley*] *s.n.* (holotype K)

Note. A letter (dated 16 November 1853) in the archives at Kew from Edmund Scott Barber, Resident Director of the Eastern Archipelago Company at Labuan, to William Jackson Hooker reveals that Barber purchased a collection of more than 400 botanical specimens from James Motley (who he replaced at the Eastern Archipelago Company) in 1853 and, soon after, sent these to Hooker. Barber only arrived in Labuan from England in 1853 and died the following year so it is possible that many of the Bornean specimens that are attributed to Barber, including the type of *M. dareicarpa*, should be attributed to Motley instead. Motley lived in Labuan from 1849 to 1853 (and then elsewhere in the region until his death in 1859) and is reported to have been a keen botanist and collector of natural history specimens.

References

Crane, E.H. (1998 [1997]). A revised circumscription of the genera of the fern family Vittariaceae. *Syst. Bot.* 22(3): 509–517.

Lindsay, S. (2010). New combinations in *Haplopteris* (Adiantaceae) for the Flora of Peninsular Malaysia. *Gard. Bull. Singapore* 62(1): 119–120.

Ruhfel, B., Lindsay, S. & Davis, C.C. (2008). Phylogenetic placement of *Rheopteris* and the polyphyly of *Monogramma* (Pteridaceae s.l.): Evidence from *rbcL* sequence data. *Syst. Bot.* 33(1): 37–43.

Zhang, X-C. (2003). New combinations in *Haplopteris* (Pteridophyta: Vittariaceae). *Ann. Bot. Fennici* 40(6): 459–461.