THE GENERIC IDENTITY OF *POLYPODIUM BANAENSE*

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ABSTRACT

The species *Polypodium banaense* C.Chr. is transferred to *Crypsinus*. The recognition of a genus *Phymatopteris* Pic. Ser. (= *Phymatopsis* J.Sm.) separate from *Crypsinus* is discussed.

INTRODUCTION

In the course of my studies on the venation of Polypodiaceae, I visited the Paris herbarium and came across a few sheets of the indochinese fern originally published by Christensen (1934a) as *Polypodium banaense*. Subsequent character analysis of the venation, frond shape, rhizome scales and spores supports the view that the species belongs to *Crypsinus* (Polypodiaceae s.str.) as interpreted by Copeland (1947), and is therefore referred to that genus.

Crypsinus banaensis (C.Chr.) Hetterscheid **comb. nov.**

Polypodium banaense C.Chr., Bull. Mus. (Hist. Nat., Paris), 2e sér, 1934: 105. *Phymatodes banaense* (C.Chr.) C.Chr. et Tard., Not. Syst., 8(4), 1939: 190. Tard. & C.Chr. in Lecomte; Fl. gén. Indoch., 7(2) fasc. 9, 1941: 468. *Paragramma banaensis* (C.Chr.) Ching, Sunyatsenia 5(4), 1940: 258. Type: Sallet (Herb. École sup. d'Agric. Hanoi, n. 3534), (BM, non vidi).

TAXONOMIC HISTORY

In the same year of its publication, Christensen listed *Polypodium banaense* in his Index Filicum (1934b, suppl. tert.) as belonging to *Polypodium* subg. *Microsorium*. Christensen & Tardieu-Blot (1939) transferred the species to *Phymatodes* Presl (= *Phymatosorus* Pic. Ser.) sect. *Paragramma*, on account of its indistinct venation, as opposed to sect. *Euphymatodes*. Ching (1940) accepted *Paragramma* Moore as a valid genus and proposed *Paragramma banaensis* (C.Chr.) Ching, which was not followed by Tardieu-Blot & Christensen (1941), who retained the species in *Phymatodes*, still regarding sect. *Paragramma* as part of it.

OBSERVATIONS

In addition to the descriptions given by Christensen (1934a) and Tardieu-Blot & Christensen (1941) the following observations are considered to be relevant. Contrary to Christensen's (1934a) remarks, the species is not dimorphic. Gradual frond elongation in both sterile and fertile specimens exists. The margin of small fronds is regularly notched (Fig. 1a,b), whereas this feature becomes irregular in fronds of intermediate lengths (Fig. 1c), and is absent in the largest fronds (Fig. 1d,e).

The venation (Fig. 1) consists essentially of the following parts: a series of narrow elongated areoles on either side of the rhachis, in small fronds empty (Fig. 1a,b), in larger fronds sometimes containing one free recurrent vein (Fig. 1d,e). Each of these rows is bordered by a row of large more isodiametrical areoles. The included venation of the latter in the smallest fronds consists of one or two, usually free, excurrent veins (Fig. 1a,b). In all larger fronds the included venation is branched and anastomosed, thus developing smaller types of areoles (Fig. 1c,d,e), which are usually empty. Outside these larger areoles excurrent veins exist, which sometimes anastomose to form small marginal areoles.

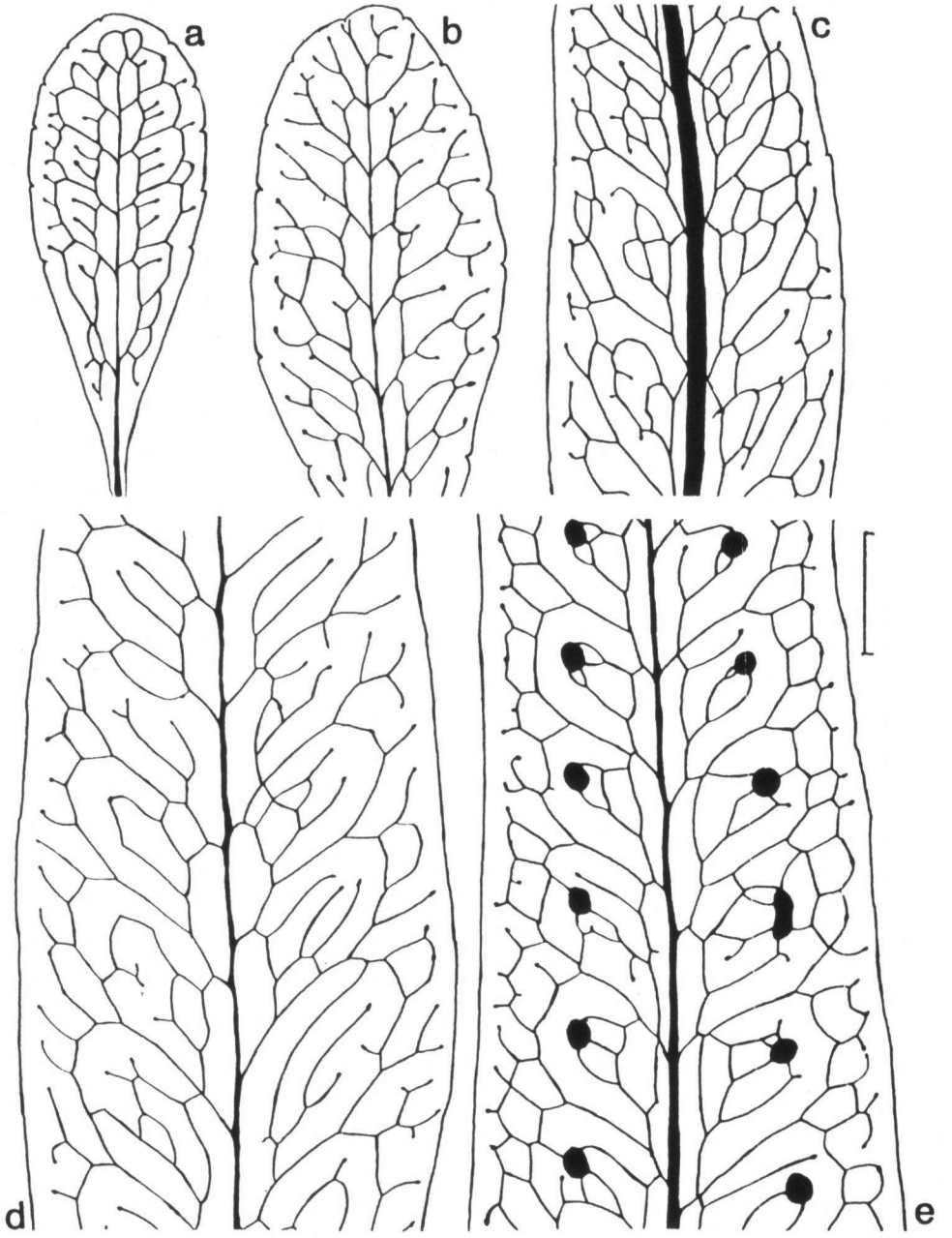

FIGURE 1. Venation patterns in *Crypsinus banaensis* (C.Chr.) Hetterscheid. a,b, small sterile fronds; c, intermediate sterile frond; d, large sterile frond; e, large fertile frond. (a,b, Sallet s.n. (P); c, Poilane 3524 (P); d,e, Poilane 5111 (P).). Scale bar: 5 mm.

The sori are situated in the larger areoles on fusion points in the included venation, one in each of them (Fig. 1e).

The spores are of the *Microsorium*-type (Hennipman & Roos 1983) and have a thick perispore as found in all species of *Crypsinus* and in some of the drynarioid ferns (pers. comm. E. Hennipman).

Contrary to Christensen (1934a) and Tardieu-Blot & Christensen (1941), I was unable to find receptacular paraphyses. The filiform paraphyses referred to are probably decapitated sporangial stalks which may be abundant in the sori.

DISCUSSION

A number of arguments indicate that inclusion of *Polypodium banaense* in either *Phymatosorus* or *Paragramma* is not justified. The venation is in essence different from that in both genera, the latter superficially resembling a goniophlebioid pattern, but possessing a much more complicated included venation in the larger areoles, and developing from a very different series of blastogenetic stages (Mitsuta 1981, Hetterscheid & Hennipman 1984). The rhizome scales in both genera are clathrate, whereas those in *P. banaense* are opaque. The spores of *P. banaense* do not correspond to the type found in *Paragramma* or typical *Phymatosorus,* which possess the rather unique lepisorioid type (Hennipman & Roos 1983). Furthermore species of *Paragramma* possess peltate paraphyses of the type found in *Lepisorus,* which are absent in the present species.

The venation of the young fronds, the rhizome scales, the notching of the small fronds, and the spores all clearly correspond to features found in species of *Crypsinus.* Christensen (1934a) mentioned the strong similarity of *P. banaense* to *P. stenophyllum* Bl. (= *Crypsinus stenophyllus* (Bl.) Holtt.). He also compared the present species to *P. rhynchophyllum* Hook. (= *Phymatopteris (Crypsinus) rhynchophylla* (Hook.) Pic. Ser.).

The distinctions given by Ching (1964) to separate *Phymatopteris* from *Crypsinus* s.str., do not seem to be very conclusive. The species *Polypodium (Crypsinus) ensiforme* Thunb.* for instance, has a very striking goniophlebioid venation (a character used by Ching to delineate *Crypsinus* s.str.), whereas the distinct lateral veins and large sori and pinnatifid frond point to an inclusion in *Phymatopteris.* Furthermore, in narrow frond parts of certain species of *Phymatopteris,* the venation reduces to a goniophlebioid pattern (e.g. *P. albidosquamata* (Bl.) Pic. Ser.; Mitsuta 1984, Figs. 580-581). The "drynarioid" venation mentioned as a character of *Phymatopteris* is not useful, as a number of species of *Drynaria* have a goniophlebioid venation (e.g. *D. parishii, D. sinica;* pers. comm. M.C. Roos). I therefore suggest that the genus *Crypsinus* be used in its broadest sense (Copeland 1947) until it is dealt with monographically.

The venation of *Crypsinus banaensis* shows an intriguing mixture of characters common to both *Crypsinus* and *Microgramma* Presl/ *Pleopeltis* Humb. et Bonpl. ex Willd. The small fronds contain a venation found in many young specimens of *Crypsinus* species or allies (e.g. *Pycnoloma* C.Chr.). the adult venation on the other hand shows a striking similarity to that found in species of *Microgramma* (compare Fig. 1e with de la Sota & Pérez-García 1982, Fig. 3a,b), or *Pleopeltis* (e.g. Mitsuta 1981, Fig. 6, 11, 17). In the light of morphogenesis of adult venations in blastogenetic frond series this is an interesting observation, showing that the *Microgramma* type of venation can develop via two different pathways, one, in most species of *Microgramma,* following the pattern found in *Polypodium* L. and *Goniophlebium* Presl, and another following part of the development in most *Crypsinus* species (Mitsuta 1984).

*The suggestion that *Phymatodes ensiformis* belongs to *Crypsinus* is debatable (it certainly is not a *Phymatodes*).

MATERIAL STUDIED

Poilane 3524 (P), 5111 (P), 6925 (P), 23913 (P); Sallet s.n. (P).

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