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Polystichum hookerianum (C.Presl) C.Chr. (Dryopteridaceae), a new record for Thailand

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ABSTRACT. *Polystichum hookerianum* (C.Presl) C.Chr., a new record for Thailand, is described and illustrated.

KEY WORDS: *Cyrtomium*, Dryopteridaceae, fern, *Polystichum*, Thailand.

INTRODUCTION

The fern usually called *Cyrtomium hookerianum* (C.Presl) C.Chr. (e.g. Shieh et al., 1994; Kung, 2001) in the Dryopteridaceae has recently been collected at Doi Pha Hom Pok in Mae Ai district of Chiang Mai. Until this find the genus was known in Thailand only through *Cyrtomium fortunei* J.Sm. (Tagawa & Iwatsuki, 1988; Lindsay et al., 2009). However, the correct generic placement of *Cyrtomium hookerianum* and its correct specific epithet have been the subject of much debate. We are presenting this species as a new record for Thailand under the name *Polystichum hookerianum* (C.Presl) C.Chr. and *Cyrtomium fortunei* remains the only species of *Cyrtomium* C.Presl currently known from Thailand.

There have been a number of papers which have used molecular systematic methods to examine generic delimitation in the "polystichoid" ferns (Little & Barrington, 2003; Driscoll & Barrington, 2007; Lu et al., 2007), and in *Cyrtomium* in particular (Lu et al., 2005). All of them note that *Cyrtomium* would be paraphyletic unless the species of *Cyrtomium* subseries *Balansana* Shing, including *Cyrtomium hookerianum*, were excluded from the genus. This subseries formed a clade with three sections of *Polystichum* Roth and two segregate genera of *Polystichum*, *Cyrtogonellum* Ching and *Cyrtomidictyum* Ching (Lu et al., 2007). Little & Barrington (2003) proposed that this group be called *Cyrtomidictyum* but it was later noted (Lu et al., 2007) that if this clade were to be recognised as a separate genus then the name *Cyrtogonellum* would have priority. Lu et al. (2007), however, noted that although this clade is strongly supported the sampling to date is still only a small proportion of the total number of "polystichoid" ferns and to recognise *Cyrtogonellum* would leave *Polystichum* paraphyletic. Barrington (pers. comm.) recommended that this species be placed in *Polystichum*. *Polystichum hookerianum* has also previously been combined in *Phanerophlebia* C.Presl, a genus now restricted to tropical America (Lu et al., 2007) and *Phanerophlebiopsis* Ching, a synonym of *Arachniodes* Blume (Kramer, 1990; Barrington, pers. comm.).

There has been some confusion over the correct specific epithet for this taxon, '*hookerianum*' or '*caducum*'. The correct epithet is *hookerianum* and the correct basionym is *Lastrea hookeriana* C.Presl. This was published in 1836 without a description but is validated by a reference back to *Aspidium caducum* Wall. ex Hook. & Grev., which was published in 1831 with a description and an illustration. *Aspidium caducum* Wall. ex Hook. & Grev. [Icon. Filic. 171 (1831)] is a later homonym of *Aspidium caducum* Kunth [in Humboldt et al., Nov. Gen. Sp. 1: 12 (1815); now *Cyclopeltis semicordata* (Sw.) J.Sm.] and is, therefore, illegitimate (ICBN Art. 53.1, McNeill et al., 2006). All combinations based on *Aspidium caducum* Wall. ex Hook. & Grev. are also illegitimate (Art. 52.1, McNeill et al., 2006).

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DESCRIPTION

Polystichum hookerianum (C.Presl) C.Chr., Index Filic. 67. 1905.— *Lastrea hookeriana* C.Presl, Tent. Pterid. 77. 1836.— *Cyrtomium caducum* T.Moore, Index Filic. 276. 1861, nom. illeg. [superfluous name].— *Dryopteris caduca* Kuntze, Revis. Gen. Pl. 2: 812. 1891, nom. illeg.— *Polystichum caducum* Diels, Nat. Pflanzenfam. 1(4): 194. 1899, nom. illeg.— *Cyrtomium hookerianum* (C.Presl) C.Chr., Index Filic., Suppl. 101. 1913.— *Phanerophlebia hookeriana* (C.Presl) Copel., Gen. Fil. 111. 1947.— *Phanerophlebiopsis hookeriana* (C.Presl) Fraser-Jenk., Himalayan Ferns (Guide to Polystichum) 42. 1997.— *Phanerophlebiopsis caduca* Fraser-Jenk., New Sp. Syndr. Indian Pteridol. 190. 1997, nom. inval. [name rejected by the same author in the same publication] Type: Nepal, 1821, *Wallich* 381 (lectotype **E!** [barcode: E00348308], designated here; isolectotypes **E!** (x2) [barcodes: E00348309 & E00348310], **K-W!** (x2)). Figs. 1–2.

Rhizome short, erect, 1.5–2 cm in diam., bearing up to 14 fronds, apex scaly; scales ovate-oblong, apex acuminate, base rounded, to 5 by 2 mm, bicoloured, central portion shining castaneous brown, the edges light brown, margin minutely laciniate. Stipe stramineous, 34–55 cm long by 3 mm in diam., grooved above, sparsely scaly with small pale brown ovate scales ca 1–2 mm long throughout. Fronds with lamina oblong-lanceolate in outline, 71–85 by 18–24 cm, apex pinnatifid and shortly acuminate; rachis grooved above, sparsely scaly throughout with the same scale type as present on the stipe; simply pinnate with 17–27 pairs of free lateral pinnae (i.e. excluding pinnatifid apex), 4–6 cm apart near base, gradually becoming closer upwards, 1–4 pairs of basal pinnae slightly reduced or not; pinnae oblong, falcate, to 14 by 2.5 cm, subcoriaceous, upper surface dark green, shiny, glabrous or with a few minute scales, lower surface light green, minutely scaly throughout, acroscopic base truncate to broadly cuneate, sometimes also slightly auriculate, basiscopic base slightly to strongly dimidiate, with 2–3 mm long stalk, margin subentire at the base, becoming coarsely serrate toward an acuminate apex; costae narrowly grooved above, slightly raised below; veins partially anastomosing, forming 1–3(–4) rows of areoles, free near the margin, included veinlets (simple and excurrent) in the costal areoles. Sori in 1–2 rows on each side of costa, first row usually terminal or subterminal (rarely dorsal) on included veinlets, second row appearing to be dorsal on both anastomosing and free veins but actually terminal on microscopic branches obscured by the sporangia, round, 1–2 mm in diameter; indusia thin, somewhat round with entire but irregular margins, peltate, glabrous, caducous, ca 1–2 mm in diameter; sporangia numerous, glabrous; receptacles distinctly raised and persistent. Spores monolete.

Thailand.— NORTHERN: Chiang Mai [Doi Pha Hom Pok, northern slope, 23 Nov. 1998, *Suksathan* 1498 (**QBG**); ibid, 14 Dec. 2009, *Suksathan* 4950, 20º06'15"N, 99º07'44"E (**BKF**, **E**, **QBG**)].

Distribution.— Nepal, North-East India, China (Tibet, Yunnan, Sichuan, Guizhou, Hunan, Guangxi), Burma, northern Vietnam, Taiwan, Japan.

Ecology.— On rocks and humus-rich soil by a small stream in dense lower montane forest at 1900–2000 m altitude, locally rare.

IUCN Conservation Status.— Least Concern (LC). Although this species is only known from one locality in Thailand it is in an area of extensive forest and is a widespread species in eastern Asia.

Notes.— (1) The lectotype of *Lastrea hookeriana* C.Presl can be viewed online via the website of the Royal Botanic Garden Edinburgh (http://www.rbge.org.uk/).

(2) Tagawa & Iwatsuki (1988) and Lindsay et al. (2009) recognized 7 species of *Polystichum* in Thailand. *Polystichum hookerianum* differs most noticeably from the other Thai species (and, in fact, from most *Polystichum* species) by having partially anastomosing veins.

(3) The reports of *Polystichum hookerianum* in Taiwan and Japan need further investigation as Fraser-Jenkins (1997) claims that the Taiwanese and Japanese *Polystichum tachiroanum* (Luerss.) Tagawa and *Polystichum integripinnum* Hayata are not synonymous with *Polystichum hookerianum*.

Figure 1. *Polystichum hookerianum* (C.Presl) C.Chr.: A. plant in natural habitat; B. whole plant; C. fertile pinnae with young sori; D. fertile pinnae with mature sori; E. sori with peltate indusia; F. croziers with scales.

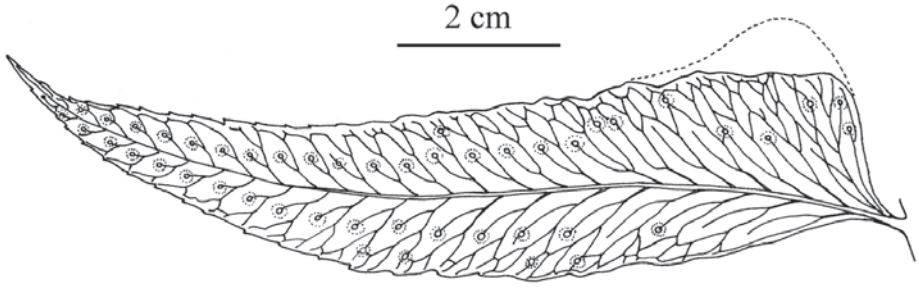

Figure 2. A fertile pinna of *Polystichum hookerianum* (C.Presl) C.Chr. showing the unusual venation pattern and the position of the sori. The first row of sori are usually terminal or sub-terminal (rarely dorsal) on included veinlets. The second row of sori appear to be dorsal on both anastomosing and free veins but are actually terminal on microscopic branches obscured by the sporangia. The dashed line shows the outline of an auricle that can be found at the acroscopic base of some pinnae. Drawn from *Suksathan* 4950 (QBG).

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