

A new species of *Rhachidosorus* (Rhachidosoraceae), a genus new to Thailand

STUART LINDSAY*, DAVID J. MIDDLETON* & PIYAKASET SUKSATHAN**

ABSTRACT. The genus *Rhachidosorus* is newly recorded for Thailand and the species *Rhachidosorus siamensis* S.Linds. is described.

KEY WORDS: *Rhachidosorus*, Rhachidosoraceae, fern, Thailand.

Rhachidosorus is a genus of about seven species from East and Southeast Asia, from Japan to Sumatra and the Philippines (Christenhusz et al., 2011). The genus has been variously placed in Athyriaceae (e.g., Chu et al., 1999), Woodsiaceae (e.g., Smith et al., 2006, 2008) and, most recently, in Rhachidosoraceae (Christenhusz et al., 2011; Rothfels et al., 2012). On a joint expedition of the Royal Botanic Garden Edinburgh and the Queen Sirikit Botanic Garden in 2009 a fern was collected in Doi Pha Hom Pok National Park in Chiang Mai Province which proved not only to be a new record of the genus *Rhachidosorus* for Thailand but a new species in the genus.

Descriptions of the genus and the new species are given below.

RHACHIDOSORUS

Ching, Acta Phytotax. Sin. 9: 73. 1964; Chu et al., Fl. Reipubl. Popularis Sin. 3(2): 267. 1999.

Terrestrial or lithophytic, medium-sized to large ferns. *Rhizome* creeping, ascending or erect, scaly; scales brown, clathrate or only weakly so, sometimes of quite disparate shapes and sizes but generally narrowly triangular to linear, margin entire, basally attached. *Fronde* with distinct stipe and lamina. *Stipes* not thickened at base, not winged. *Laminae* bipinnate to tripinnate or quadripinnatifid, rarely pinnate; pinnae usually not opposite,

anadromic. *Veins* free, forked or pinnate. *Sori* oblong, narrowly elliptic or elongate, mostly on acroscopic veins in ultimate segments; indusia membranous, oblong or elongate, attached on one side along veins. *Spore* surface muriform or with warty projections.

About seven species from East and Southeast Asia, from Japan to Sumatra and the Philippines.

***Rhachidosorus siamensis* S.Linds., sp. nov.** Similar to *Rhachidosorus blotianus* Ching but differing in darker stipe and rachis, lamina much less divided and sori more remote from costule/costulet. Typus: Thailand, Chiang Mai, Fang District, Doi Pha Hom Pok National Park, trail from Kew Lom Ranger Substation to Pang Mong Kon, 1750 m altitude, 20°3'56" N, 99°8'6" E, in shady gully of small stream in lower montane forest on granite bedrock, 2 October 2009, D.J. Middleton, S. Lindsay & P. Suksathan 5051 (holotype QBG; isotypes BKF, E, P). Fig. 1.

Terrestrial. *Rhizome* ascending, 2–3 cm diameter (when fresh), producing a mass of fibrous roots; scales on rhizome and stipe very variable in shape and size, brown or golden brown, weakly clathrate with elongate cells, narrowly triangular to linear, often rather crisped, 2–14 x 0.1–2.3 mm. *Fronde* to 113 cm long. *Stipe* and rachis mid to dark green above, very dark green to black beneath

* Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh, EH3 5LR, Scotland, U.K. Email: s.lindsay@rbge.ac.uk

** Herbarium, Queen Sirikit Botanic Garden, P.O. Box 7, Mae Rim, Chiang Mai 50180, Thailand.

(distinction less obvious when dry), stipe 20–36 cm long, densely scaly at base, becoming sparser towards rachis and into rachis. *Lamina* mid to dark green and slightly shiny above, much paler beneath, 47–78 x 18–36 cm, bipinnate to tripinnate, ovate in outline, apex acuminate, formed from progressively smaller and closer pinnae without a distinct terminal pinna; rachis \pm terete but with a narrow wing on either side visible from above, each with a thickened margin, with linear scales and short glandular hairs; 18–22 pairs of free pinnae, 3.5–12 cm apart near base, triangular, apex acuminate, largest pinnae towards base but not basal, 9.8–20 x 2.9–8.7 cm, stalked for 4–8 mm; axes winged, wings with thickened margins which are sometimes also slightly inrolled, lowest pinnae reflexed or not; ultimate segments ovate to elliptic, dentate, apex obtuse to acute, glabrous above, with many scattered short glandular hairs on veins and lamina beneath; venation clearly visible, veinlets not reaching margin and with enlarged endings visible above. *Sori* oblong or narrowly elliptic, mostly on acroscopic veins, one per pinnule lobe, basal lobes often larger and then with sori on both acroscopic and basiscopic veins and opening towards each other, 2–4 mm long, more or less equidistant from costule/costulet (depending on whether frond is bipinnate or tripinnate) and segment margin; indusia pale green, often translucent, margin slightly darker and minutely irregular to fimbriate. *Spore* surface muriform.

Distribution.— Only known from the type locality.

Ecology.— Terrestrial on clay bank in shady gully of small stream in lower montane forest on granite bedrock at 1750 m.

Note.— In the key to fern families in the Flora of Thailand (Tagawa & Iwatsuki, 1979) *Rhachidosorus siamensis* would key out to Athyriaceae, a family in which the genus was

previously included. See Rothfels et. al (2012) for the differences that are now recognised between Rhachidosoraceae, Athyriaceae and Woodsiaceae.

ACKNOWLEDGEMENTS

We thank the Leverhulme Trust and Queen Sirikit Botanic Garden for the funding for this work; the director and staff of Doi Pha Hom Pok National Park for their logistical support in the field; and Dr Harald Schneider for helpful discussions.

REFERENCES

- Christenhusz, M.J.M., Zhang, X-C. & Schneider, H. (2011). A linear sequence of extant families and genera of lycophytes and ferns. *Phytotaxa* 19: 7–54.
- Chu Wei-ming, Wang Zhong-ren, Hsieh Yin-tang & He Zhao-rong (1999). Athyriaceae. *In*: Chu Wei-ming, ed., *Fl. Reipubl. Popularis Sin.* 3(2): 32–504. Science Press, Beijing
- Rothfels, C.J., Sundue, M.A., Kuo, L.-Y., Larsson, A., Kato, M., Schuettpelz, E. & Pryer, K.M. (2012). A revised family-level classification for eupolypod II ferns (Polypodiidae: Polypodiales). *Taxon* 61: 515–533.
- Smith, A.R., Pryer, K.M., Schuettpelz, E., Korall, P., Schneider, H. & Wolf, P.G. (2006). A classification of extant ferns. *Taxon* 55: 705–731.
- Smith, A.R., Pryer, K.M., Schuettpelz, E., Korall, P., Schneider, H. & Wolf, P.G. (2008). Fern Classification. Pp. 417–467 *In*: Ranker, T.A. & Haufler, C.H. (eds), *Biology and Evolution of Ferns and Lycophytes*, CUP, Cambridge.
- Tagawa, M. & Iwatsuki, K. (1979). *In*: Smitinand, T. & Larsen, K. (eds), *Flora of Thailand* 3 (1). Royal Forest Department, Bangkok.

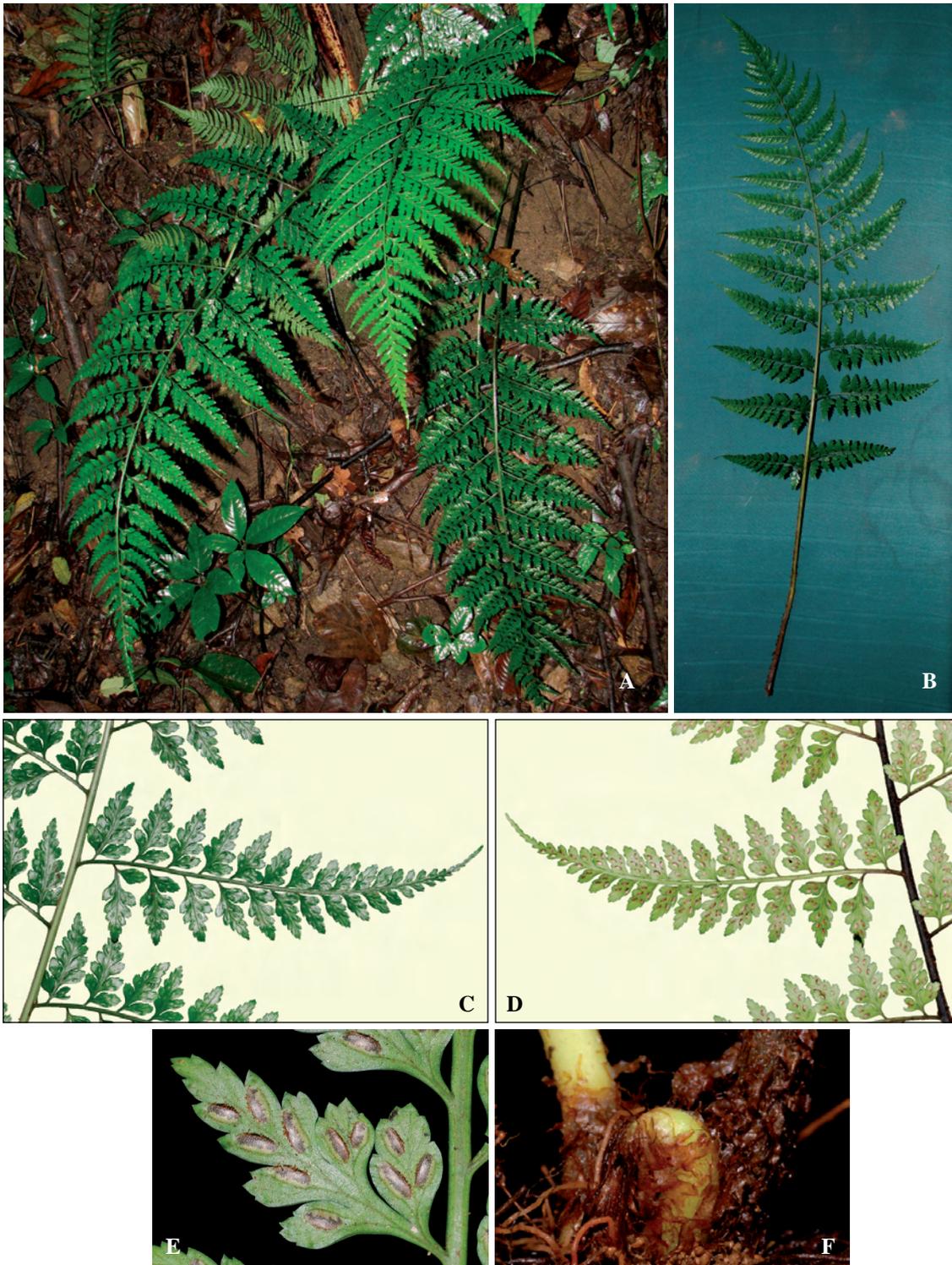


Figure 1. *Rhachidosorus siamensis* S.Linds. A. Habit; B. Whole frond from above; C. Rachis and pinna above; D. The same rachis and pinna beneath; E. Pinnule with sori; F. Scales on crozier. All photos from *Middleton et al. 5051*. A by Piyakaset Suksathan, B-F by David J. Middleton.