

Volume 18: 159–163
 Publication date: 13 July 2015
 dx.doi.org/10.7751/telopea8713

TELOPEA

Journal of Plant Systematics



plantnet.rbgsyd.nsw.gov.au/Telopea • escholarship.usyd.edu.au/journals/index.php/TEL • ISSN 0312-9764 (Print) • ISSN 2200-4025 (Online)

New distributional records of *Arthromeris elegans* Ching in India and Bhutan and lectotypification of *A. himalayensis* (Hook.) Ching (Polypodiaceae)

Jaideep Mazumdar

Department of Biological Sciences, Burdwan Town School, Burdwan-713101, India.
jaideepmazumdar10@gmail.com

Abstract

Arthromeris elegans Ching (Polypodiaceae), a Sino-Himalayan species, is reported for the first time from India and Bhutan. A lectotype is designated for *A. himalayensis*.

Introduction

The fern genus *Arthromeris* (T.Moore) J.Sm. (Polypodiaceae) is represented by about 20 species, distributed in tropical and subtropical Asia (Zhang et al. 2013). Nine species of *Arthromeris* are already reported as occurring in India (see Fraser-Jenkins 2008, 2012), namely, *A. cyrtomioides* S.G.Lu & C.D.Xu (synonym: *A. notholaenoides* V.K.Rawat & Fraser-Jenk.), *A. himalayensis* (Hook.) Ching (synonym: *A. himalayensis* (Hook.) Ching var. *niphoboloides* (C.B.Clarke) S.G.Lu), *A. lehmannii* (Mett.) Ching (synonyms: *A. venusta* (J.Sm.) J.Sm. and *A. lungtauensis* Ching), *A. mairei* (Brause) Ching, *A. tatsienensis* (Franch. & Bureau ex Christ) Ching, *A. tenuicauda* (Hook.) Ching, *A. tomentosa* W.M.Chu, *A. wallichiana* (Spreng.) Ching and *A. wardii* (C.B.Clarke) Ching.

Arthromeris elegans Ching is known to occur naturally in N. Myanmar and S.W. China (Zhang et al. 2013). During a revisionary study of ferns of Eastern India, specimens examined at the Central National Herbarium, Howrah, India (CAL), and personally collected from Darjeeling, India (Figs 1, 2), supported the conclusion that *A. elegans* also occurs in India and Bhutan. This distinct species (see key below), is often misidentified in herbaria as *A. himalayensis* or as *A. lehmannii*, but is correctly maintained by Zhang et al. (2013). *Arthromeris elegans* has more than 4 pairs of narrower lanceolate pinnae (Fig. 1), and sori in up to 2 (rarely 3) rows close to the costa (Fig. 2). In contrast to this, *A. himalayensis* has up to 4 pairs of wider ovate-lanceolate pinnae, and sori in 3 or more rows extending to the margin. Type specimens (syntypes) of *A. himalayensis* from Bhutan (held at B and K) are *A. elegans*. Lectotypification of *A. himalayensis* is designated below to clarify the application of this name.

Arthromeris lehmannii has pinna with caudate-acuminate apices, small scattered sori, and narrow or indistinct cartilaginous margin, whereas, *A. elegans* has pinnae with prominent cartilaginous margins, long caudate apices and large sori near the costa (Fig. 2).

One collection from Darjeeling (Mazumdar 178) has lamina that are hairy on the abaxial surface and rhizome scales that have a ciliate margin, thus resembling *A. elegans* Ching f. *pianmaensis* S.G.Lu (Lu 1998). However, the present author has not yet examined sufficient specimens necessary to comment on the distinctness of this forma.

Arthromeris elegans is morphologically close to *A. himalayensis* in having a similar caudate pinna apex and cartilaginous margin. The species is a Sino-Himalayan element that has reached Eastern India, Bhutan and N. Myanmar from S.W. China.

Taxonomic treatment

Arthromeris elegans Ching, *Sunyatsenia* 6: 8 (1941).

Type: China, Yunnan, Mekong-Salwin Divide, Londjrela, 3600 m, upon trunk of trees, 29 September 1938, T.T. Yü 23165 (Holotype: PE1048921, Isotype: PE1048919 – images!).

Description: Epiphytic on trees, Rhizome 4–5 mm wide, covered by dense scales; scales with darker centre and paler margin, ovate-lanceolate, wide at base; margin ciliate; apex acuminate. Fronds monomorphic, pinnate; stipe stramineous, glabrous, 11–18 cm long, 2 mm wide; lamina herbaceous, imparipinnate, 25–30 cm long, 18–21 cm wide, glabrous adaxially, sparsely hairy abaxially; lateral pinnae in 5–7 pairs (Fig. 1), opposite, sessile, lanceolate or narrowly elliptical, 10–14 × 2–2.5 cm, base rounded or cordate, cartilaginous margin prominent, apex long caudate. Sori orbicular, often confluent, up to 3 rows on each side of the costa, close to costa, in up to 2 rows between costules (Fig. 2).

Distribution: India (Arunachal Pradesh, West Bengal), Bhutan, China, Myanmar.

Specimens examined: INDIA. Arunachal Pradesh: Subansiri District, *Anonymous* 60864 (CAL); Arunachal Pradesh: Kameng F.D. (N.E.F.A.), Chalko, 1 Apr 1957, 8200 ft, *G. Panigrahi* 6321 (CAL); West Bengal: Darjeeling, Neora Valley, 3000 m, 2 Oct 1997, *J. Mazumdar* 178 (CAL, to be distributed, Fig. 1, 2). BHUTAN. *W. Griffith* s.n. (B200157576), *Booth* s.n. (K1044106, frond at right); Lisipong, 27 Oct 1965, *N.P. Balakrishnan* 44412 (CAL); Mar 1858, *Anonymous* s.n. (CAL22241).

Note: Types of *A. elegans* can be viewed on the PE website (<http://pe.ibcas.ac.cn/en/>).

Key to species of *Arthromeris* in India:

- 1a. Sori in one row on each side of costa
 - 2a. Pinnae (at least in lower part of frond) stalked *A. tenuicauda*
 - 2b. Pinnae sessile
 - 3a. Rhizome scales with caudate apex *A. tatsienensis*
 - 3b. Rhizome scales with acuminate apex *A. wallichiana*
- 1b. Sori in more than one row on each side of costa
 - 4a. Sori in single row in between costules *A. wardii*
 - 4b. Sori in more than one (commonly two) row between costules, or scattered
 - 5a. Lateral pinnae in 1–4 pairs
 - 6a. Rhizome scales dense, whitish *A. tomentosa*
 - 6b. Rhizome scales sparse, brown *A. himalayensis*
 - 5b. Lateral pinnae in more than 4 pairs
 - 7a. Sori close to costa, pinna apex caudate *A. elegans*
 - 7b. Sori distributed up to margin, pinna apex caudate–acuminate
 - 8a. Abaxial lamina glabrous *A. mairei*
 - 8b. Abaxial lamina glabrous to hairy
 - 9a. Costa not scaly *A. lehmannii*
 - 9b. Costa scaly *A. cyrtomioides*

Lectotypification

Arthromeris himalayensis (Hook.) Ching, *Contributions from the Institute of Botany, National Academy of Peiping* 2(3): 99 (1933).

Polypodium himalayense Hook., *Species Filicum* 5: 91 (1863).

Lectotype (designated here): INDIA, Sikkim [“Regio temp.”], alt. 6–8000 ped., *J.D. Hooker s.n.*, Herb. Ind. Or. Hook. fil. & Thomson (B200157568), Isolectotypes: B200157570, K1044110, P1462036).

Specimens examined: INDIA. West Bengal: Darjeeling, Gairibas, Singalila N. Park, 2620 m, 18 Sep 2002, *A.K. Ghosh* 31947 (CAL), Darjeeling, Upper Rimbier, Palmazwa block III-X, 2600 m, 28 May 1983, *S.R. Ghosh* 57636 (CAL), 2620 m, 28 May 1983, *S.R. Ghosh* 31947 (CAL), Darjeeling, Tonglu, Mighma, 15 May 1975, *R.D. Dixit* 52981 (CAL4568), Darjeeling, Tonglu, Gairibas, 10000 ft, 13 May 1975, *R.D. Dixit* 52954 (CAL4566); Sikkim: Chungthang, 2550 m, 26 Mar 1984, *S.R. Ghosh* 58359 (CAL, 3 sheets), Lachung, 9000 ft, 10 Sep 1892, *G.A. Gammie* 700 (CAL, 2 sheets).

Hooker (1863) proposed the name *Polypodium himalayense* as a replacement name for *Polypodium venustum* sensu Wall. (1829) non Desv. (1811) and in the protologue cited collections of *Wallich* (Catalogue no. 305) from Nepal, *Griffith* and *Booth* from Bhutan, *Hooker & Thomson* from Sikkim, India, and *Simons* from Khasia (Meghalaya, India).

An examination of the syntypes and Hooker’s (1863) description in protologue “sori vary, 1–2 biseriate between the costules, sometimes there is only one series parallel with the costa, sometimes 3–4” revealed that he had mixed four distinct species in his concept of *P. himalayense*, namely *A. elegans*, *A. himalayensis*, *A. lehmannii* and *A. wardii*. Here, for nomenclatural stability, a specimen held at B (*J.D. Hooker s.n.*, B200157568), is selected as lectotype of *A. himalayensis* to restrict the application of the name to its current sense. Identities of the other syntypes are as follows:

1. *A. elegans*: Bhutan, *W. Griffith s.n.* (B200157576), Bhutan, *Booth s.n.* (K001044106, frond at right).
2. *A. himalayensis*: Bhutan, *W. Griffith* 2724 (K1044107, specimen at left).
3. *A. lehmannii*: Nepal, 1820, *Wallich* Cat. no. 305 (BM93793, K1109762; K1044108), Nepal, 1821, *N. Wallich s.n.* (BM1039689, K1044109).
4. *A. wardii*: Bhutan [‘Bhotan’], *W. Griffith s.n.* (B200146503).

For a long time, in the literature (see *Beddome* 1869: 318, t. 318; 1892: 372, Plate No. 212), *A. himalayensis* was depicted as a plant with an imparipinnate frond; pinnae up to 4 pairs, obovate-lanceolate, pinnae apex caudate, margin broad cartilaginous; rhizome with a whitish bloom and lower lamina with variable amount of hairs.

An extreme form with densely hairy lamina has been recognised as *A. himalayensis* var. *niphoboloides* (C.B. Clarke) S.G. Lu (Lu 1998) but the present author considers this a synonym of *A. himalayensis* and not a distinct variety as cited by *Zhang et al.* (2013). It should be noted that *Clarke* (1880), himself, said that “there is a series of examples connecting this var. with the type.”

The name *A. venusta* (J.Sm.) J.Sm. is also based on *Wallich* Cat. no. 305 and has priority over *A. himalayensis*. However, specimens of *Wallich* Cat. no. 305 in K are actually *A. lehmannii* and *Fraser-Jenkins* (2008) correctly reduced *A. venusta* to the synonymy of *A. lehmannii*.

Acknowledgments

I sincerely thank the Director, Botanical Survey of India (BSI), Howrah for providing an opportunity to examine the CAL specimens; Dr A. Bhattacharya, Scientist, BSI for helping in herbarium study; Dr A. Budden and The Board of Trustees of the Royal Botanic Gardens, Kew for sending high resolution images of Kew specimens (*Wallich* Cat. no. 305); Dr K.N. Gandhi, Harvard University Herbaria, USA, and Mr N.J. Turland, Botanical Garden & Botanical Museum Berlin-Dahlem, Berlin (B) for nomenclatural advice; Prof. Dr B. Zimmer (B) for useful information; and Dr Peter G. Wilson, Associate Editor *Telopea*, and an anonymous reviewer for constructive suggestions.



Fig. 1. Specimen of *Arthromeris elegans* Ching (Polypodiaceae) from India (J. Mazumdar 178) showing habit.



Fig. 2. Part of specimen of *Arthromeris elegans* Ching (J. Mazumdar 178) showing shape of pinnae and soral arrangement.

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Manuscript received 11 May 2015, accepted 3 July 2015