

WESTERN HIMALAYA — A NEW RANGE OF DISTRIBUTION FOR A CRITICALLY ENDANGERED FERN, *DRYOPSIS MANIPURENSIS* (BEDD.) HOLTUM & P.J.EDWARDS

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During survey tours of Gini area at the base of Kalamuni mountain range, Munshiya, Pithoragarh, Uttarakhand, in 1998 and 2005, the authors came across an unrecognised fern. But due to its unusual frond-morphology, resembling on the one hand certain members of Thelypteridaceae (vis. *Thelypteris ornata* (Wall. ex Bedd.) Ching and *Thelypteris torresiana* (Gaudich.) Alston, in Sect. Macrothelypteris) and on the other some Dryopteroid ferns, it remained unidentified for more than 10 years. Recently Fraser-Jenkins (2008) published two photographs of *Dryopsis manipurensis* (Bedd.) Holttum & P.J. Edwards, which exactly match our specimen. On sending images to Fraser-Jenkins with further information and discussion at Gangtok during his recent visit (September-October 2009), he confirmed its identity as *Dryopsis manipurensis*.

This species was first described by Beddome (1888) as *Polypodium manipurensis* based on a collection of Sir George Watt, from Sirohifuror, 6000-7000 ft., Manipur, and in his subsequent publication (1892) he transferred it to the genus *Phegopteris*. Another two localities cited by Beddome are Mairang, Khasi Hills (a collection of Gustav Mann), and Nepal (Wallich, Num. List. 322. Sheet no. 2). However Fraser-Jenkins (pers. comm.) points out that Clarke (1880: 527) correctly identified Wallich's Cat. 322 sheet 2 as the very closely related S. Indian species, now known as *Dryopsis scabrosa* (Kunze) Holttum & P.J. Edwards. The specimen (in K-W, seen by CRFJ) has markedly longer basal basiscopic pinnae, more spaced segments and a less densely scaly stipe than *D. manipurensis* and belongs to *D. scabrosa*. Clarke clearly stated that he doubted the locality in Wallich's mixed numbers, which included Wight's S. Indian specimens sorted into his numbers by eye according to general likeness. *D. manipurensis* has never been known from Nepal, despite sometimes being so listed in error due to the muddled locality of Wallich's specimen.

D. manipurensis is one of the rarer pteridophytes of India. Chandra and Fraser-Jenkins (2008) listed it at risk of extinction and mentioned it under the Critically Endangered (CE) category of IUCN. Hence the occurrence of this rare, endangered and threatened (RET) plant in the Western Himalaya is important from the point of view of conservation and phytogeography. A brief note is given here concerning its distribution and taxonomy.

Out of 25 species of the S.E. Asian genus *Dryopsis* Holttum & P.J. Edwards, only 6 species occur in India (Fraser-Jenkins & Benniamin, in prep. and Baishya & Fraser-Jenkins, in prep., will report two more from Arunachal Pradesh), of which 4 are distributed in the Indo-Himalaya and further east, and two, *D. scabrosa* (Kunze) Holttum & P.J. Edwards and *D. ferruginea* (Baker) Holttum & P.J. Edwards, are endemic to South India (Fraser-Jenkins 2008). The Indo-Himalayan species were earlier thought to occur only from Nepal eastwards, but recently another, bipinnatifid species, *D. apiciflora* (Wall. ex Mett.) Holttum & P.J. Edwards has been found in Kumaon (Fraser-Jenkins, pers. comm. June 2010).

The differences between *D. manipurensis* (from North India) and *D. scabrosa* (from South India) have been clearly mentioned in the literature (Beddome 1892, Baker 1892). Before the establishment of *D. manipurensis*, Hooker and Baker (1868) while describing *D. scabrosa* (under *Nephrodium* (*Lastrea*) *scabrosum* Baker, from Neilgherries) also mentioned the distinctness between north and south Indian plants and said "We have a closely allied plant from Sikkim and Moulmein with tufted fronds, larger and more delicate in texture, which will probably prove distinct." but they did not cite any sheet from Sikkim or Moulmein (S.E. Myanmar) and to date there are no reports or specimens indicating the occurrence of *D. manipurensis*



Fig. 1. A. *Dryopsis manipurensis*; B. Basal pinnae; C. Undersurface of lamina showing sori.

or *D. scabrosa* from Sikkim or Myanmar. However, in recent Indian literature, these species are poorly understood and often confused with each other; hence their distribution was mistakenly confused by Chandra (2000) who listed both *D. manipurensis* and *D. scabrosa* from the Himalaya. Though Dixit (1984) omitted *D. manipurensis* and reported only *D. scabrosa* (under *Ctenitis*) from South India, Dixit & Ghosh (1987) detailed and illustrated it from their collection from Manipur.

The confusion was created among Indian Pteridologists probably after Clarke (1880) cited the specimen of Wallich Cat. 322. sheet no.2 as *Nephrodium scabrosum* Baker (= *Dryopsis scabrosa*) with the note “but is ticketed from Nepal”. On the other hand, while describing new species Beddome identified this sheet as *Polypodium manipurense* instead of *N. scabrosa* (Beddome 1888, 1892) and his mistake was also followed by Holttum and Edwards (1986) as they cited the same specimens under *Dryopsis manipurensis* during

establishment of genus *Dryopsis* by redefining and upgrading one of the subgenera of the genus *Ctenitis* (Ching 1938). But recently Fraser Jenkins (2008) agreed with Clarke (1880) about the mislabelling of sheet no 2. of Wall. Cat. 322 and has reidentified the specimen as belonging to *D. scabrosa* from South India. Despite the efforts of Indian Liaison officer at Kew the specimen from Nepal was not found by him, however, he was able to send good quality digital images of type-sheets of *D. manipurensis* and of *D. scabrosa*.

The range of distribution of *D. manipurensis* is India, the Philippines and Papua, New Guinea (Holttum and Edwards 1986). In the Indian region it is present in Uttarakhand (Gini, Pithoragarh, present collection); Arunachal Pradesh (Baishya & Fraser-Jenkins, in prep.); Meghalaya, Mairang in the Khasi hills (G. Mann) and recently recollected by Fraser-Jenkins) and Manipur (G. Watt; Dixit).

Dryopsis manipurensis (Bedd.) Holttum & P.J. Edwards, Kew Bull. 41(1): 200. 1985; Fraser-Jenkins, Tax. Rev. Three Hundred Indian Subcont. Pterid. 195 & 625. fig. 235-236. 2008. *Polypodium manipurense* Bedd., J. Bot. London. 235. 1888. *Phegopteris manipurensis* (Bedd.) Bedd., Suppl. Handb. Ferns Brit. India, 83. 1892. *Dryopteris manipurensis* (Bedd.) C. Chr., Ind. Fil. 1: 276. 1906. *Polypodium* (Subgen. *Phegopteris*) *manipurense* (Bedd.) Baker, Ann. Bot. 5: 76. 1891. *Ctenitis manipurensis* (Bedd.) Ching, Bull. Fan Mem. Inst. Biol. 8: 297. 1938; Dixit & Ghosh, Bull. Bot. Surv. India 27: 118. 1987. *Dryopteris copelandii* Christ, Philipp. J. Sci. 2C: 216. 1907. *Ctenitis copelandii* (Christ) Copel., Gen. Fil. 124. 1947.

Rhizome thick, short, erect, stipe 15-25 cm long, densely scaly, scales, ferrugineous-brown, translucent, broadly or ovate-lanceolate, pale brown, apex acuminate, narrow scales are also intermixed with broad scales; Lamina 30 - 40 × 12 - 20 cm, ovate-deltate, bipinnate and again pinnatifid, or becoming tripinnate at the base, herbaceous, setose and with hair like narrow scales; rachis densely covered by few broad scales and many narrow, hair-like scales; pinnae 20 pairs or more, basal pair largest and long stalked, up to 15 cm or more long, pinnules many pairs, basal pair largest though not abruptly so, 5-7 cm long, segments deeply lobed, roundish, dentate; veins forked; sori globose, medial, generally single in a lobe, medial, indusium not seen, but absent or vestigial (**Fig. 1**).

Specimens examined : Uttarakhand, Pithoragarh, Gini, 2100 -2200m before 1.5 Km to Gini from Girigaon, c. 1 km below the road B.S. Kholia 98-083, date Nov. 1998; B.S. Kholia & K. Bhakuni 2005-74, 2005-75, Sept. 2005 about 2 km after Gini to Ratapani c. 1 km above the road (collections deposited in Department of Botany, Govt. P. G. College, Pithoragarh) Digital images examined: Manipur, George Watt 6423 (Holotype, K); Mairang, Khasi Hills, G. Mann (K).

Digital images of *D. scabrosa* also examined: Acc. H 2005/00425 -13 K, Neotype, Ed. R. F. Hohenacker 124; Acc. H 2005/00425 -15 K, Beddome and Acc. H 2005/00425 -14 K.

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