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Gymnocarpium oyamense (Bak) Ching, a critically endangered fern from Arunachal Pradesh

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Abstract

This paper reports *Gymnocarpium oyamense* (Bak.) Ching collected from Mechukha, West Siang district, Arunachal Pradesh. This species is assessed as Critically Endangered in India. This epiphytic species can be found on moist rock and trees in undisturbed semi-evergreen forests at elevation above 1400 m. Taxonomic description, ecological status and distribution are described in this article.

Keywords: Mechukha, Pteridophyte, India.

Arunachal Pradesh is considered as a biogeographically gateway of biological resources and has been recognized as the 25th biodiversity hotspot in the world and harbors a large number of rare, endangered and endemic plant species (Myers *et al.,* 2000). Hence, it provides an ideal background for further exploration and discovery of taxonomic novelties. The first author has collected an interesting epiphytic fern *Gymnocarpium* belonging to the family Woodsiaceae during a floristic exploration tour to Mechukha, West Siang district in Arunachal Pradesh.

Gymnocarpium is a small genus with two species known namely *G. dryopteris* (Pande and Pande, 2003) and *G. oyamense* (Chandra *et al.*, 2008). Since then, this genus has been entirely omitted (Chandra *et al.,* 2008). Previously *Gymnocarpium dryopteris* was listed as *Currania dryopteris* (L.) Wherry, where well known to be erroneous. The genus *Gymnocarpium* in India was initially studied by Fraser Jenkins (1993) to consist of a single species common in the west and west central Indo-Himalaya. Chandra *et al.,* (2008) mentioned the occurrence of this species in Arunachal Pradesh without any specimen reference. A specimen collected from Mechukha area in Arunachal Pradesh A.Benniamin shares similar character to hat of *Gymnocarpium oyamense*. Critical analysis and scrutiny of the floristic work done by several researchers helped to us to identify the collected specimen as *Gymnocarpium oyamense* (Bir *et al.,* 1990; Borthakur *et al.,* 2000; Jamir and Rao, 1998; Baishya and Rao, 1982; Khullar, 2000; Singh and Panigraghi, 2005; Chandra, 2000). Later, the specimen was confirmed as *Gymnocarpium oyamense* (Bak.) Ching. by Fraser Jenkins in 2011 during his visit at Arunachal Pradesh Regional Centre of Botanical Survey of India, Itanagar.

G. oyamense is a Critically Endangered species (Chandra *et al.*, 2008), highly variable taxon and has been growing in moist rock and trees at 1400–1800 msl in the undisturbed semi evergreen forests from Arunachal Pradesh, North East India. Previously it has been reported from China, Japan, Nepal, Taiwan and Philippines. This is a curious species with a very delicate, stipe bearing a small, horizontal (or yet more sloping), deltate, bipinnatifid lamina with wide, crowded lobes and strongly deflected, falcate lowest pinnae. It is popular in cultivation outside in British gardens, dying down in winter, coming

originally from China and Japan, but now widely propagated. Here, taxonomic description, geographical distribution and ecology of the species are provided.

Gymnocarpium oyamense (Bak) Ching in Cont. Biol.Lab.Sci.China 40.f.3.1933.Devol & kuo in Fl. Taiwan 1: 471.1975. *Polypodium oyamense* Bak.in Jour.Bot.6:366.1877. *Dryopteris oyamense* (Bak.) C.Chr. Ind.Fil.282.1905.

Rhizome long creeping, usually black, dichotomously branching, sparsely scaly, scales thin, Ovate-lanceolate, entire easily abraded. Stipes 10–20 cm long stramineous, distant. Sparsely scaly near base grooved on upper side. Lamina deltoid, pinnatifid,6-16cm long, 5-10cm broad; base of lamina articulate to top of stipe, lowest lobe somewhat falcate, margin crenulated; texture thin; glabrous veins free forking, rachis groove. Sori oval dorsal on veins, exindusiate (Figure 1).

Figure 1: *Gymnocarpium oyamense*: A. Habit; B. Venation and Sori

Fertile: October to March.

Habitat: Grows as epiphytes, found in shaded forest between 1000–1500 m.

Distribution: India, China, Japan, Nepal and Philippines.

Status: Critically endangered (Chandra *et al*, 2008)

Specimen examined: India, Arunachal Pradesh, Mechukha forest area, West Siang district 16.11.2008, 26208 ARUN, A.Benniamin.

Conservation

Although this minute species is very seldom noticed and is thus of critically endangered known occurrence, it is probable that it is more often overlooked than not actually occurring in various suitable areas. It may not really be as rare as it seems, and should definitely be expected to turn up elsewhere in the East Himalaya from Central Nepal eastwards. However, due to its very limited known occurrence and the somewhat fragile nature of its habitat-localities, it was listed by Chandra *et al*., (2008) as a Critically Endangered fern at risk of obliteration under the IUCN categories. But it has to be said that while this appears to be the case elsewhere in the Indian subcontinent, Arunachal Pradesh for long such a poorly known area botanically, often has surprises in store concerning its Pteridophyte flora. Considerable numbers of species that are very rare and highly threatened everywhere else in India etc., are in many cases common, even beside roads and in disturbed places of Arunachal Pradesh. The number of rare species are much more common than elsewhere.

But in recent past, the rich floristic diversity of Arunachal Pradesh has been severely degraded. The increasing human population and the various anthropogenic activities through direct and indirect coupled

with natural calamities are resulting in loss of habitats. These factors are contributing to the increasing rate of plant species disappearance or extinction especially the epiphytes. To conserve this species, it is necessary to maintain its habitat. This includes maintenance of the hydrologic cycle of northern white cedar swamps as well as providing an intact canopy. The effects of timber harvesting in cedar swamps is poorly known, but it is expected that this species could experience habitat degradation through excessive clear cutting. The cycle of beaver activity within swamps is a natural disturbance feature that undoubtedly affects populations as well. Better ecological information, combined with faster risk assessment of ferns at regional and global levels, will facilitate production of essential risk management plans. Contemporary in situ plant conservation strategies should always focus on a mixed approach of species and habitat protection. Habit protection may refer to micro habits for specialized species (e.g epiphytes) or hot spots for fern diversity such as mid elevation cloud forests and tropical forests are subject to heavy destruction. The propagation of endangered ferns in tissue culture is an additional tool for conservation that also can satisfy the demand for ornamental fern without damaging natural populations.

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