

Review Article

CONSERVATION OF PTERIDOPHYTES IN THE WESTERN GHATS OF NILGIRIS

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ABSTRACT

Ferns and fern allies are almost neglected group of plants distributed all over the world over. The present review on current status of the pteridophytes relates to 272 species of ferns and fern-allies belonging to 95 genera and 34 families of Nilgiris. Most of the pteridophytes are listed in the category of endemic and rare species. There is an urgent need for the conservation of pteridophytes in the Nilgiris of Western Ghats region. As a preliminary step, Government Botanical Garden at Ooty, kept a step forward to conserve Endangered ferns by *ex-situ* conservation.

Key Words: Conservation, Pteridophytes, Western Ghats, Endemic, In- Situ And Ex -Situ

INTRODUCTION

India is a mega biodiversity country with about 13,000 species of vascular plants including about 1000 species of ferns and ferns allies (Benniamine *et al.*, 2008) The Western Ghats is one of the hotspots of the world and also one of the significant geographical regions. Around 233 species of ferns occur in southern India (Manickam and Irudayaraj, 1992).

The International Union Code Of Nomenclature (IUCN) report says that in India 7.7% of the plants are under threat. In Western Ghats, a number of epiphytic and lithophytic ferns are destroyed due to various deforestation activities. In the Western Ghats, 44 threatened ferns are facing extinction and the conservation of these species is a major concern of biologists (Manickam, 1995) although recent studies have shown that about 18% of the approximately 270 fern species found in southern India are endemic to the region.

Western Ghats

Western Ghats, a chain of mountains of 1600 km in length running parallel to the West coast of Peninsular India from the river valley in Tapti (Gujarat) to Kanyakumari (Tamil Nadu), the Southern tip of the Peninsular India Covering an estimated area of 159,000 sq. km, the Western Ghats are an area of exceptional biological diversity and conservation interest, and are "one of the major Tropical Evergreen Forest regions in India" (Rodgers and Panwar, 1988).

The region lies between 8° 20'-8°40' North latitude 73° 77' East longitude and is almost a narrow strip of land with an average altitude ranging from 200- 2700m. The annual rainfall is 2,000 - 6,000 mm, with the western slopes receiving the greatest precipitation. The Western Ghats runs through the states of Southern Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu. The Western Ghats possess a large extent of biodiversity presides over the ecology and biogeography of Peninsular India (Nayar and Daniel, 1986). The highest mountain Doddabetta (2637m).

Current Status of Pteridophytes

IUCN (1998) listed 770 threatened species of Pteridophytes worldwide. . Jain and Sastry (1980) had been reported that 17 rare and endangered species of Pteridophytes from India. Dixit (1984) listed in the 25 rare and interesting pteridophytes were reported. . Bhardwaja *et al.*, (1987) enumerated 36 endangered species belonging to 21 genera of ferns and fern-allies from Rajasthan The World Conservation Monitoring Centre at Cambridge, England, listed 1650 threatened species of Pteridophytes world-wide, under the following categories: Presumed Extinct - 20, Endangered- 67, Vulnerable - 91 and Rare - 354

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(Jermy, 1990). IUCN reported the major revision and recommendations in 1994 and 2001 in order to formulate a new conservation strategy of natural resources, and based on their new criteria the species are included in the Red List. Nayar and Sastry (1987; 1988; 1990) included 31 threatened pteridophytes in the volumes of the Botanical Survey of India's Red Data Book of Indian Plants.



Figure 1: Wild species and conserved in ferneries of Botanical garden

Madhusoodanan (1991) listed rare and endangered ferns of the Western Ghats of Kerala More than 1200 species of ferns and fern allies have been reported from India (Dixit, 1984 and Chandra, 2000), though new genera and species were made from time to time. The ferns and fern allies were identified by several characters such as on habit, habitat, rhizome, venation, spore morphology, spore size, and spore growth period were recorded The largest family is the Thelypteridaceae, which containwith 16 genus genera and 25 species and the largest genus is *Asplenium*, withcontain 22 species. Epiphytes prefer high altitude forests and only robust species like *Drynaria quelsifolia* will be found at lower levels. About a third of the southern Indian fern species are epiphytic or epilithic; the rest are terrestrial. Two thirds of the lycopods are epiphytic or epilithic; half of the *Selaginella* species are terrestrial and half are epiphytic or epilithic, *Equisetum*, Isoetes and a few ferns grow in aquatic habitats or marshes.

Some species may require *ex-situ* conservation either by multiplying species by conventional methods .Such multiplied ferns are collected from the wild species and conserved in ferneries of Botanical garden and the same is represented in figure.1.

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Table 1: List of Ferns and Fern allies under *ex-situ* conservation in Government Botanical Garden, Ooty

FAMILY	NAME OF THE PLANT
ADIANTACEAE	<i>Adiantum aethiopicum</i> L. <i>Adiantum cuneatum</i> L. <i>Adiantum raddianum</i> Presl. <i>Adiantum hispidulam</i> Sw. <i>Adiantum lunulatum</i> Burm.
ASPLENIACEAE	<i>Asplenium scolopendrium</i> L. <i>Asplenium nidus</i> L. <i>Asplenium lunulatum</i> Sw.
SELAGINELLACEAE	<i>Selaginella bryopteris</i> (L.)Baker <i>Selaginella aurea</i> W. <i>Selaginella barbata</i> Kaulf. <i>Selaginella involvens</i> Sw. <i>Selaginella plumose</i> L.
NEPHROLEPIDACEAE	<i>Nephrolepis cordifolia</i> Wall. <i>Nephrolepis plumosa</i> (L)C-Presal. <i>Nephrolepis extalta</i> L. <i>Nephrolepis verona</i> (L)Schott. <i>Nephrolepis multiflora</i> Roxb. <i>Nephrodium fragrans</i> Richards.
DRYOPTERIDACEAE	<i>Aneimia tomentosa</i> Sw.
SCHIZAEACEAE	<i>Alsophila australis</i> R.Brown.
CYATHEACEAE	<i>Cyathea spinulosa</i> Wall.
BLECHNACEAE	<i>Blechnum braziliens</i> Desv. <i>Blechnum orientale</i> L. <i>Blechnum occidentale</i> L.
DRYOPTERIDACEAE	<i>Cyrtomium falcatum</i> Sw. <i>Cyrtomium caryotideum</i> Sw.
DAVALLIACEAE	<i>Davallia bullata</i> Wall.
CHEILANTHACEAE	<i>Cheilanthes farinosa</i> Kaulf. <i>Cheilanthes argentea</i> Kunze.
SINOPTERIDACEAE	<i>Pellaea rotundifolia</i> (G.Forst)Hook. <i>Pellaea falcata</i> Fee. <i>Pellaea boivini</i> Hook. <i>Pleopeltis macrocarpa</i> Kaulf.
POLYPODIACEAE	<i>Pyrosia mollis</i> (Kunze) Ching.
POLYPODIACEAE	<i>Tectaria macrodonata</i> Houutt.
DRYOPTERIDACEAE	<i>Doodia dives</i> Kunze.
BLECHNACEAE	<i>Ceratopteris thalictroides</i> L.
PARKERIACEAE	<i>Lycopodium phlegmaria</i> L.
LYCOPODIACEAE	<i>Lycopodium cernuum</i> L. <i>Lycopodium clavatum</i> L.
OSMUNDACEAE	<i>Osmunda regalis</i> L.
DRYOPTERIDACEAE	<i>Dryopteris sparsa</i> Buch. <i>Dryopteris palmate</i> (Wild)J.Sm <i>Phaneroplebia caryotideum</i> Wall. <i>Polystichum aculeatum</i> Sw.
HEMIONITIDACEAE	<i>Hemionitis arifolia</i> Burm.
POLYPODIACEAE	<i>Polypodium vulgare</i> Hook. <i>Polypodium phegopteris</i> L. <i>Platyserium bifurcatum</i> (Cav)C.Chr.
PSILOTACEAE	<i>Psilotum nudum</i> L.
LINDSAEACEAE	<i>Lindsaea odorata</i> Roxb. <i>Odontosoria chinensis</i> (L.)J.Sm
POLYPODIACEAE	<i>Lepisorus nudus</i> Hook.
PTERIDACEAE	<i>Pteris cretica</i> L. <i>Pteris vittata</i> L.
EQUISETACEAE	<i>Equisetum debile</i> Roxb.
DRYOPTERIDACEAE	<i>Polystichum angulare</i> Sw.
SALVINIACEAE	<i>Salvinia molesta</i> Mitch.

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CONCLUSION

Between one third and a half of Indian Pteridophyte-species appear to be under threat or rare and in a number of cases these species were described as common, or relatively so, in the "classical" works of Beddome, Clarke and Hope from the late 19th century. It therefore appears that a considerable decline has occurred since that time, the main cause of which is undoubtedly the ever-increasing level of deforestation throughout the region. Approximately 15% (16-17%) or *c.* one sixth of Indian Pteridophyte species are Critically endangered and thus very rare species which are very seldom seen. Of the Critically endangered species, the present study combined with Fraser-Jenkins (2008b, in press) has allowed us to identify 13 species to be considered of top priority, being Indian endemics, which as they exist nowhere else, will be permanently eliminated from the world's biodiversity resources if they become extinct in India. The particular habitats and localities of these species should therefore be made an urgent and special study of, including locality-mapping, and specifically targeted by State Governments *etc.* for immediate and strict conservation. Cases also need to be submitted for their official inclusion in the IUCN Red-List.

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