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# Fern and fern allies diversity from the Northern Western Ghats of Maharashtra

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## ABSTRACT

Ferns and fern allies are seedless vascular plants traditionally referred to as pteridophytes. Pteridophytes are major components of tropical flora, but they show lower extant species diversity than seed plants. Western Ghats, is one of the world's richest areas in terms of its diversity of pteridophyte species, with an occurrence of no less than 320 species. Although this number appears to be an overestimate due to the presence of taxa that are typically synonymized in families with no published revisions of the flora. Thus, the present study was undertaken to analyse present status of pteridophytes with respect to their distribution, habitat and conservation status of the world's most fascinating and important area for pteridology.

**Keywords:** Fern and fern allies, Western Ghats, distribution, habitat, conservation

## I. INTRODUCTION

Pteridophytes form a noticeable part of vegetation all over the world. They are a group of plants having importance in phylogeny and evolutionary biology, because these plants explain the evolution of vascular system and clearly replicate the processes of that have gone into the emergence of seed habit in plants. About 10,000 species belonging to 305 genera of pteridophytes occur in the wild flora of the World of which around ca. 191 genera and 1080 species are distributed in different biogeographical regions of India mainly diversified in Himalayas, Western Ghats and Eastern Ghats [1,2]. Pteridophytes have played a significant role in creating the early land flora as they come forward in the process of the evolution of land plants [3]. A comprehensive study of ferns and fern allies of Northern Western Ghats hills of Maharashtra has not been conducted till date, except for some reports by [4,5,6]. In the recent years, however the pteridological studies have pulled out in various parts of the country, many questions related to the pteridophytic diversity of the Western Ghats remain unexplained and hence, more studies are required for developing in situ and ex situ conservation strategies for this wonderful and important group of plants. Hence the present study was undertaken.

## II. METHODS AND MATERIAL

An extensive floristic survey was carried out between July, 2006- September, 2016 to different parts of the Northern Western Ghats of Maharashtra, in the rainy seasons. Specimens of pteridophytes were collected and identified with the help of different floras. Soil samples were also collected from 10-20 cm depth and analysed for different characteristics with standard methods in the laboratory. Temperature and humidity of the study region was measured with the help of a thermo-hygrometer (M288CTH) and light intensity was measured with a digital light meter (TES-1332A) in the field.

## III. RESULTS AND DISCUSSION

The Western Ghats transverse the states of Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and South Gujrat. The Western Ghats presides over the ecology and biogeography of Peninsular India [7]. The Western Ghats harbour about 320 species of ferns and fern allies with more species diversity in the southern part. The major families of pteridophytes found in the Western Ghats are Aspleniaceae, Polypodiaceae, Thelypteridaceae, Selaginellaceae, Pteridaceae, etc. Whereas on the generic level, maximum diversity is observed in the genus Asplenium, Selaginella, Pteris, Athyrium, Diplazium, etc. The Western Ghats also harbors endemic species like Polystichum manickamii, Cyathea nilgiriensis, Bolbitis semicordata, Selaginella radicata, etc. The habitat of the pteridophytes consists of microclimatic conditions with special preference for moist and shady places and a minor disturbance in their microclimate conditions can lead to loss of large number of species (Dudani et al., 2012). In the present investigation major fern species occurred are Osmunda huegeliana Presl., Bolbitis appendiculata (Willd.) Iwats., Bolbitis subcrenatoides Fres.-Jenk., Bolbitis preslina (Fee) Ching., Lygodium flexuosum (L.) J.Sm., Lygodium microphyllum (Cav.) R. Brown, Pityrogramma calomelanos(L.) Link, Pteris biaurita Linn., Pteris pellucida Pr. Cheilanthes tenuifolia (Brum.) Sw., Cheilanthes farinosa (Forssk.) Kaulf., Adiantum capillus- veneris Linn., Adiantum philippense L., Pteridium aquilinum (L.) Kuhu., Lindsaea heterophylla (Bedd.) Bak., Athyrium hohenackerianum (Kze.) Moore Athyrium falcatum Bedd., Tectaria coadunata (Wall.ex.Hook.et Grev) C. Chr., Nephrolepis auriculata (L.) Trimen., Asplenium laciniatum D. Don, Thelypteris interrupta(Willd.) K. Iwatsuki, Blechnum orientale Linn., Pyrrosia adnescens (Sw.) Ching., Microsorium membranaceum (D.Don.) Ching., Pteris ensiformis Burm. f. There is much diversity of ferns in this area may be due to its weather conditions and moist atmosphere. It is observed during exploration that- diversity of fern species goes on decreeing as we go from lower side of hills to the top or at high altitudes. Specific ferns were collected at high altitude these include- Tectaria coadunata (Wall.ex.Hook.et Grev) C. Chr., Cheilanthes anceps Blanford., Pteris biaurita Linn., Microsorium membranaceum (D.Don.) Ching. These species were rarely observed or not at all in low areas.

A key for identification of rare and endangered ferns and fern allies in the Western Ghats [8]. Based on the field observations, data from herbarium collections and literature reference, Jenkins and other Indian pteridologists assessed the rare and threatened pteridophytes of India (Chandra et al, 2008).Previous study also confirmed that the most common pteridophyte species viz., Adiantum philippense L., Aleuritopteris anceps Blanf., A. bicolor (Roxb.) Fraser-Jenk.,Asplenium yoshinagae Makino,Christella dentata (Forssk.)Brownsey and Jermy, Christella parasitica (L.) Holttum., Isoetes coromandeliana L. f., I. dixitii Shende, Lepisorus nudus (Hook) Ching., Marsilea minuta L., Microsorum membranaceum (D.Don) Ching., Selaginella delicatula (Desv.exPoir.) Alston., Selaginellaciliaris (Ritz.) Spring, Selaginella tenera (Hook and Grev.) Spring., Ophioglossum costatum R. Br., O. gramineum Willd., O. lucitanicumL., O. nudicaule L., O. petiolatum Hook.,O. reticulatum L., Pityrogramma calomelanos, Pteris biaurita L, P. pellucida C. Presl., P. vittata L., Pyrrosia lanceolata (Wall.) Farw, Salvinia molesta D. Mitch., Selaginella ciliaris (Ritz.) Spring., S. crassipes Spring., S. delicatula (Desv. ex Poir.) Alston., and Tectaria coadunata (Wall. ex Hook. and Grev.) C. Chr., also found growing luxuriantly. Urbanization is a leading cause of habitat loss and biologicalhomogenization [9]. Due to unplanned felling of trees in the forests the members of epiphytic pteridophytes belonging to the families Polypodiaceae, Davalliaceae, Aspleniaceae, Vittariaceae, have been reduced day-by-day. The anthropogenic factors have posed a serious threat, due to which there is complete disappearance od some species. The rapidly shrinking fern cover of Northern Western Ghats prompted to ponder over the issue [10, 11].

## IV. CONCLUSION

The maximum diversity was observed at the high altitude zone, high rainfall zone, high atmospheric humidity and low temperature zone. Many pteridophytes were listed in the list of threatened species in one category or the other and yet, effective answers have not been investigated to contest this world-wide problem. As ferns are sensitive to minor changes in climatic change they are becoming rare and endangered. The efforts are required to aware the importance of these species among the local people. Further, these plant species are in great need to have in situ or ex situ conservation.

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