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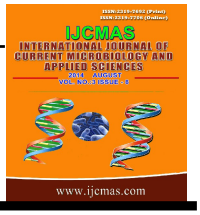

Original Research Article

Pteridophytes diversity of Satpura Hills

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A B S T R A C T

The present study mainly focuses on the Pteridophytes (ferns and ferns alliance) diversity of Satpura Hills. A total of 96 members of pteridophytes have been collected from the area. These include some rare species such as *Psilotum nudam, Selaginella exigua, Cyathea spinulosa, Ophioglossum nudicaule* and *Polybotrya appendiculata*. In addition to these the tree ferns such as and *Cyathea spinulosa* are not only conspicuous but are also abundant. Ecological and distribution notes are given for all the species. Majority of the pteridophytic members are terrestrial, growing inside deep gorges. The first vascular plants rapidly diversified to cover the earth. The sporophyte was the dominant phase of the life cycle of these early Pteridophytes. Some species namely *Angiopteris helferiana, Cheilanthes tenuifolia, Nephrolepis exaltata, Cyathea gigantea, C. spinulosa, Polystichum amabile, Cyclosorus cylindrothrix, Asplenium cheilosorum, A. normale, Paraleptochilus decurrens* and *Athyrium macrocarpa* recorded at Pachmarhi are also common with Eastern Himalayas, but not recorded from the Western part. These constitute about 19.4% of the pteridophytic flora of the area *Selaginella radicata, Ophioglossum nudicaule, Athyrium falcatum* and *Asplenium inaequilaterale*, growing at Pachmarhi, are also found in South India but not known from the Himalayas. It is also interesting to note that *Equisetum ramosissimum, Athyrium schimperi* and *Cyclosorus cylindrothrix* met with both at Pachmarhi and in the Himalayas, are not recorded from South India. There are only two species namely *Selaginella exigua* and *Isoetes panchananni* that are found at Pachmarhi but are not recorded either from the Himalayas or South India.

K e y w o r d s

Pteridophytes, Satpura hills, diversity, Ecology

Introduction

The Satpura Range is a range of hills in central India. The range rises in eastern Gujrat state near the Arabian Sea coast, running east through Maharashtra and Madhya Pradesh to Chhattisgarh. The range parallels the Vindhya Range to the north, and these two east-west ranges divide the Indo-Gangetic plane of northern India and Pakistan from the Deccan Plateau to the south. The Narmada River runs in the depression between the Satpura and Vindhya ranges, and draining the northern slope of the Satpura range and running west towards the Arabian Sea. The Tapti River drains the southern slopes of the western end of the Satpura Range. At its eastern end, the

Satpura range meets the hills of the Chota Nagpur plateau. The pteridophytic flora of Satpura region is very rich, as various gorges provide ideal habitat for the growth of such plants. This place has one of the richest floras of India the representing the elements of north and south Indian flora.

The name 'pteridophytes' were derived from the Greek words, *'pteron'* denoting feather and *'phyta'* plant, due to feather like leaves. The ferns and fern allies together from the pteridophytes; the fern are considered as primitive in the characterized by the circinate vernation the spore bearing structure, usually many, aggregated to from distinct, superficial or marginal sorus on the lower surface of sporophylls and usually with well-developed and copiously veinated leaves. The internal structure of rhizome, the vescular cylinder is characterized by presence of leaf gaps. Their leaves are usually microphyllous and not well-veinated.

Materials and Methods

The present study is the outcome of the one years of critical field survey in the different parts of Satpura hills in various seasons. Ethnobotanical and ecological information was gathered from the local and tribal people. All the specimens were collected in duplicate forms and they were deposited in the Herbarium of Botany department of Botany, government Narmada post graduate college, Hoshangabad, (MP) Descriptions of species and identification were done with the help of literature given by Beddome, R.H. (1973 and 1983) Khullar, S.P. (1994 and 2000), Khullar *et al*. 1991 and Pande and Pande, 2002.

The Satpura hills lying between 20°10' to 22°50'N latitude and 77°45'to 78°56'E longitude constitutes a major component of central Indian subtropical evergreen forest. The Satpura hills, a composite of Satpura Mountains ranging from 320-1352 meter altitude pertains 50-230 cm annual rainfall having large deep ravines between two steep mountains. This unique geographical architecture has christened more specific and distinct microclimate which has led the Satpura hills to be biological richest territory next to the Himalayas and peninsular India. The Pachmarhi Biosphere Reserve composed of three districts Hoshangabad, Betul and Chindwara invariably provide auspicious distinct climatic conditions for frequent and continuous growth of plant diversity particularly pteridophytes.

A total of 96 taxa of pteridophytes belonging to 32 families have been found from Satpura Hills (Figure-1). During the present study the most dominant families are Thelypteridaceae, Polypodiaceae, Pteridaceae, Athyriaceae, Adiantaceae, Aspleniaceae, Aspidiaceae and Nephrolepidaceae

A total of 48 genuses belonging to 96 species have been found from Satpura Hills. During the present study the most dominant genus were present *Asplenium, Nephrolepis, Pteris, Adiantum, Athyrium* and *Cheilanthes.* The maximum percentage variations are 12.5 genuses *Asplenium, Nephrolepis, Pteris* and minimum percentage variations are 2.08 (Figure-2) *Actiniopteris, Ampelopteris, Angiopteris, Arachinodes, Araiostegia, Azolla, Bolbitis, Ceratopteris, Davallia, Dicranopteris, Diplazium, Gymnopteris, Hypodematium, Lepisorus, Leucostegia, Lindsaea, Lygodium, Marsilea, Microsorium, Osmunda, Paraleptochilus, Pronephrium, Pseudocyclosorus, Psilotum, Salvinia, Sphaerostephanos, Sphenomeris* and *Trigonospora.*

The pteridophytes are widely use by local people of the Satpura Hills such as Styptic,

Anthelmintic, Bronchitis, Gynecological, Tuberculosis, Cough, Diabetes, good health, Chicken pox, Internal burning, Fever, skin diseases, Asthma, Dysentery, Sterility, Leprosy, Tatttoo, Hair Falling, Tonic, Expectorant, Astringent, Emetic, Diuretic, Scorpion Bite, Vegetable curry, Indigestion, treatment hair loss of the cattle caused either due to infection or injury Enlargement of spleen in continuance of urine, Calculus, Jaundice, Malaria, colds, Gonorrhoea, Leucorrhoea, Anthelminic, Poultry feed, rhizome Typhoid, Vulnerary, Antiseptic, Urine problems, Epilepsy, General tonic, Gout rheumatism, Spermatorrhea, Hair tonic, sudorific, aphrodisiac white discharges, sudorific and aphrodisiac, Antibacterial constipation, Roofs and house walls, Aqueous, cushion for cattle shed, green vegetables, Snakebite, cuts, Wounds, Ulcers, Swelling and pains, Bone fracture, Kidney trouble, Enema, Stomach disorders in children, Rheumatism, Jadu-tona, Locket for avoiding evil spirit, Beri-beri as lotion, skin eruption, Flatulence, Lung ailments, Sprains, Cut wounds, Casbundes, Spastic conditions of leg muscles, in Sedation and Insomnia Purgative, healing wound, Wound to check bleeding, intestinal Disorders, Stomach ulcer and Acidity, Hair fall, Menstrual disorders, burns as Cooling agent, Burns as cooling agent, Vulnerary, Remedy for wounds, Old skin disease, Intestinal problems, Rickets, Pyorrhoea, Diarrhea, Cuts and Bruises, Hypotonic, Antiviral, Antibacterial, Swelling of Joints till it is cured, Early Maturation of boils, Irregular Menstrual cycle, Gonorrhoea, Antibacterial agent, Toothache, Swelling and sprains, Eczema and Scabies. 82 pteridophytes are ethnobotanic useble but 14 are not out of 96.

Results and Discussion

In the present study it was seen that Satpura hills observed ninety six species belonging to thirty two families of pteridophytes in various Ethno-Botanical uses. Out of these 96 species in Satpura hills *Isoetes panchananai* Pant & Srivastava, *Psilotum nudum* (L.), *Ophioglosum nudicaule* L., *Leptochilus lanceolatus* Fee., *Selaginella jainii* Dixit., *Cyathea balakrishnanii* (Dixit et Tripathi), *Cyathea gigantea* (Wall. ex Hook.), and *Cyathea spinulosa* (Wall. ex Hook.) are endemic. During study I have reported one new species *Leptochilus lanceolatus* Fee Upadhyay and Singh (2010) in central India. The use of some species were found to be similar with some other tribes else were from different places of India, Clarke (1880), Beddome (1883) who largely emphasized the species composition of the pteridophytes in northern, southern and western India respectively. These studies were continued by Hope (1899-1904), Chatterjee (1940), Chandra (1982), Chandra and Kaur (1987, 1994), Dixit (1984), Nayar and Kaur (1974), Singh and Panigrahi (2005) to provide pteridophytic wealth in different regions of Indian sub-continent. Except few scattered contributions *viz*. Graham (1915), Tiwari (1964), Panigrahi and Dixit (1966), and Dixit (1988, 1989), the Central Indian region particularly Satpura mountains range of Pachmarhi Biosphere Reserve could not receive proper attention of pteridologists for documentation of pteridophytic wealth. The first effort to enlist the pteridophytic diversity in Pachmarhi Biosphere Reserve was made by Bir and Vasudeva (1972, 1973) thirty nine years back who chronicled 73 species altogether with fern and fern-allies. One species Upadhyay and Singh (2010), Upadhyay *et al.* (2011), Singh and Upadhyay (2010a, 2010b), Singh *et al*. (2009, 2013) Subsequently, Vasudeva and Bir (1992, 1993a), Vasudeva (1995) listed 68 species of ferns and 10 species of fern-allies from the Pachmarhi Biosphere Reserve on the basis of the collections made

during 1969-1978, where they mentioned three species viz. *O. gramineum* Willd., *O. nudicaule* L. and *O. reticulatum* L. under the genus *Ophioglossum*.

Pteridophytes are particularly distributed in the Himalayan and coastal regions. Khullar (1991, 1994) recorded 356 species of Pteridophytes from Western Himalaya. Pteridophytes prefer shady, moist habitats with moderate temperature but also occur throughout a very diverse range of habitats from high altitude. Like other groups of plants, Pteridophytes are also show medicinal utility and many of them are being used medicinally from ancient time (Kumar and Kaushik, 1999). The tribal communities, ethic groups and folklore throughout the world are utilizing plant parts like rhizome, stem, fronds, pinnae and spores in various ways for the treatment of various ailments since ancient time. The numbers of contribution about the taxonomy, ecology and distribution of Pteridophytes have been published from time to time but enough attention has not been paid towards their medicinal useful aspects (Dixit, 1975). In the present attempt have been made to explore ethnomedicinally important Pteridophytes and properly documented their useful aspect.

Figure-1

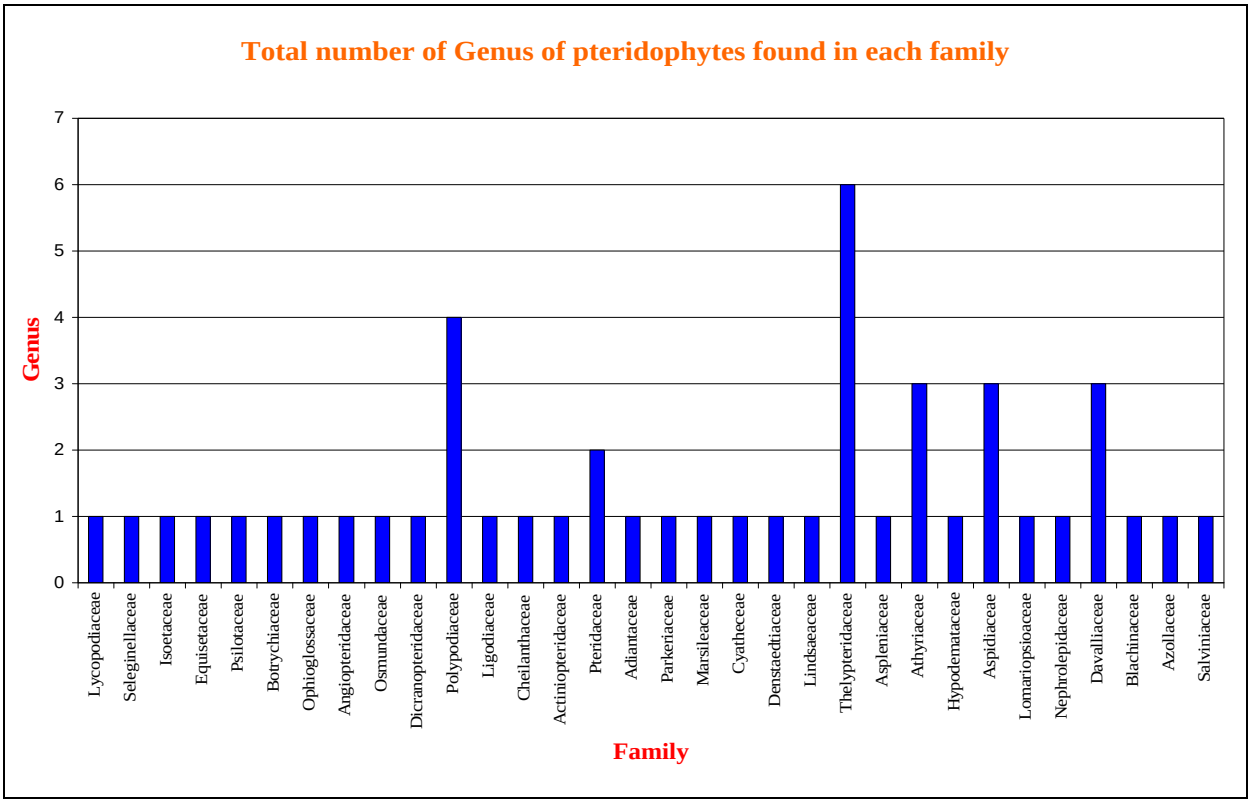


Figure-2

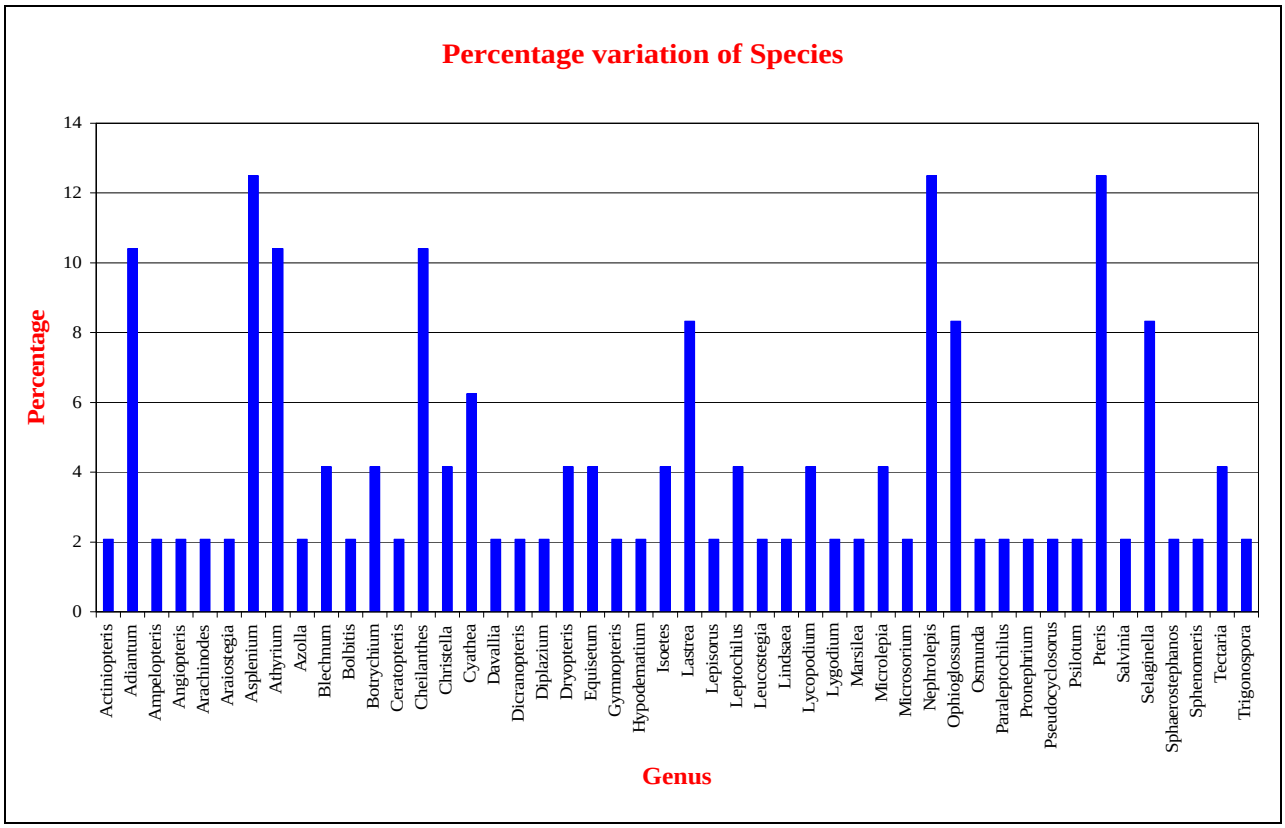
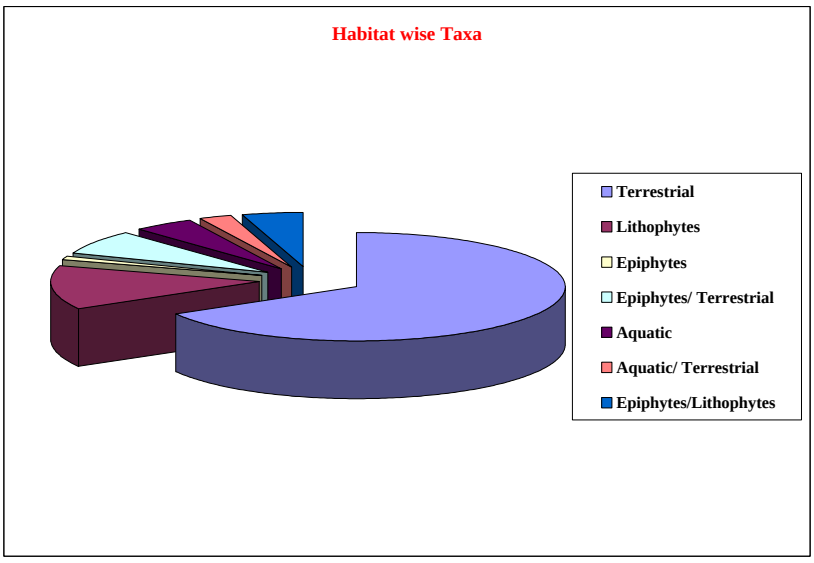


Figure-3



A total of 96 specieses belonging to 7 habitats have been found from Satpura Hills. During the present study the most dominant habitat were found terrestrial and recesive habitat were Lithophytes, Epiphytes, Epiphytes/ Terrestrial, Aquatic, Aquatic/Terrestrial, Epiphytes/Lithophytes (Figure-3).

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