

Pteridophytes of Todgarh Raoli Wild Life Sanctuary Rajasthan, India

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ABSTRACT: The fern flora of Rajasthan is scanty due to the extreme and largely dry climate, which is characteristic feature of the state. The fern flora is small but significant element occurring quite frequent in Todgarh Raoli wild life sanctuary, Rajasthan. Systematic survey from all localities of ferns and fern-allies in this sanctuary has revealed the occurrence of 09 taxa belonging to 06 genera and 05 families. *Actiniopteris radiata*, *Marsilea minuta*, *Azolla pinnatasubsp. asiatica* and *Adiantum incisum* are widely distributed throughout the sanctuary. This sanctuary is also represented by *Adiantum capillus-veneris*, *Adiantum philippense*, *Marsilea aegyptiaca* and *Cheilanthes bicolor* in scattered habitat under shaded moisture and in rock crevices. A check list of fern flora along with its distributions in the sanctuary has been provided in this paper. Increasing exploitation of natural resources resulted in depletion of these important fern flora. RET, species were discussed and common household conservational techniques adapted by tribals of this region have also been discussed in this paper.

KEYWORDS: ferns, fern-allies, Todgarh Raoli wild life sanctuary, Tribals

1. INTRODUCTION AND REVIEW

Rajasthan state is situated in between 23°3' and 30°12' N latitude and 69°3' and 78°12' E longitude. The Aravalli range which is one of the oldest mountain range of the world, divides the Rajasthan into two vegetational segments like xerophytic and mesic. This range lies between both segments and thus it is an ecotone. Todgarh Raoli Wildlife Sanctuary located in central position of Aravalli range between 25°38' and 26°58' N latitudes and 73°54' and 75°22' E longitudes. Xerophytic and mesic vegetation occurs as mixed formation in this region. The sanctuary is also an ecotone of both vegetational segments. Naturally variations in fern flora are represented in this region. Despite the hostile climatic condition of this region, ferns and fern-allies form a small but significant component of the vegetation of Rajasthan (Kanodia & Deshpande 1962, Bir & Verma 1963, Vyas 1965, Mittal 1969, Gena 1998, Yadav *et al.* 2002, Chaudhary & Dulawat 2006, Chaudhary & Khichi 2006, Dulawat & Chaudhary 2008 and Kanther & Gena 2014). Pteridophytic plants are represented in the state by 21 genera and 42 species (Gena 1998, Dulawat & Chaudhary 2008, Fraser-Jenkins & Dulawat 2009, Yadav & Meena 2009, and Gupta & Bhardwaj 2010).

So far as pteridophytic flora of Todgarh Raoli wild life sanctuary is concerned, no work has been taken up by any of the earlier workers except a brief report of *Cheilanthes bicolor* by Mital (1967). Considering this aspect the present work has been investigated mainly Identification, habit, habitat, Phytodiversity and Phenology of the ferns and fern-allies occurring in this sanctuary. Increasing exploitation of natural resources resulted in depletion of these important taxa of ferns and fern-allies. The erosion of plant biodiversity is a matter of global concern. One by one the building blocks of entire ecosystem are disappearing. The 2008 IUCN Red Data list shows that in India hundreds of pteridophytes are under the list of threatened and at the risk of extinction. Some RET, species were discussed and common household conservational techniques adapted by tribals of this region have been discussed in this paper.

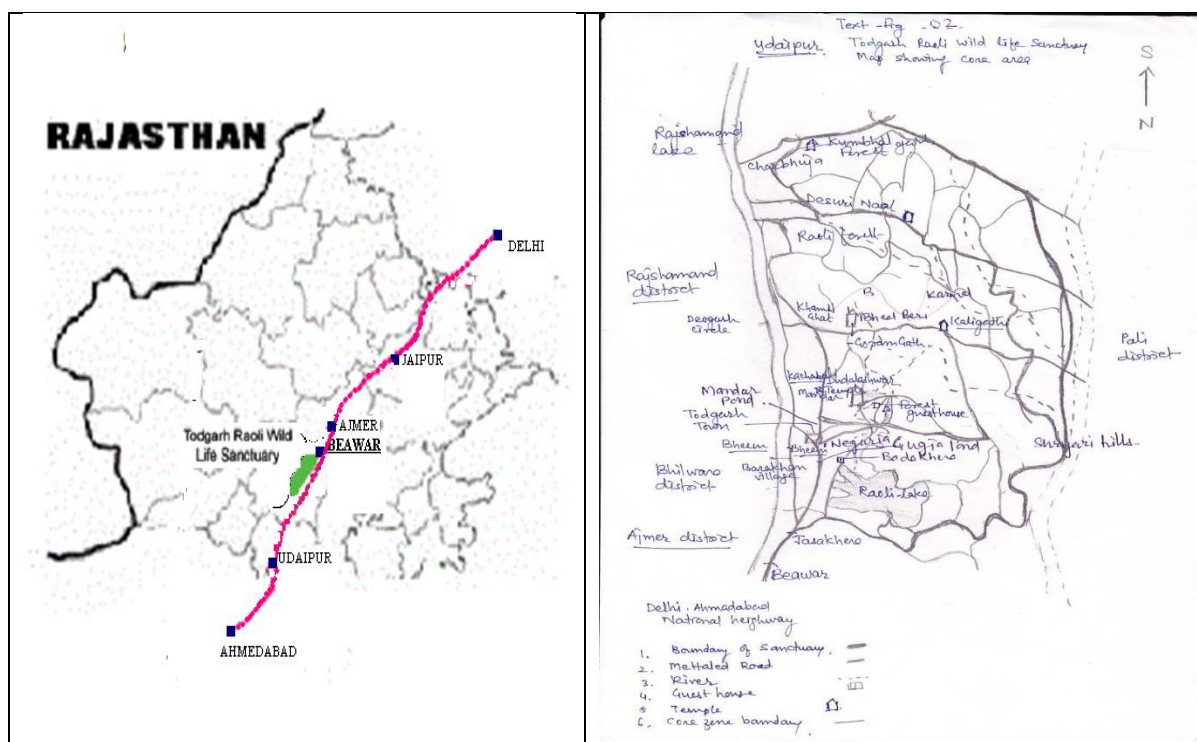


Fig. 1 Location of study area

II. MATERIALS AND METHODS

The present paper is based on the Phyto-diversity and Survey of pteridophytic flora in different parts of Todgarh Raoli Wild Life Sanctuary Rajasthan. All the localities have been visited time to time throughout the year and mainly during monsoon period. The Botanical excursions were undertaken from time to time. Rainy season (i.e. from July to October each year) is the best time to visit as many places for the study habit and habitats of ferns and fern-allies. Every locality of the entire areas was extensively covered. All localities were visited corresponding to seasonal variation round the year. It was possible due to research promotional support in respect to financial assistance as MRP by UGC. Topography of the sanctuary comprises of hilly rocky and deciduous forest. Therefore the vegetation was much diversified. Collection trips were arranged in such a way to cover all the habitats of enlists all fern species occurring in this sanctuary.

Efforts were made to identify the pteridophytic plants from fresh materials and common name in use by local people. The species were identified with the help of the pteridophytic flora and Efforts were made to identify the pteridophytic materials. The species were identified with the help of Khullar's (1994 & 2000) "An illustrated fern flora of the West-Himalaya" Vols. I & II and with the help of well-known pteridologist and former vice-chancellor and my Ph. D. guide Dr. C. B. Gena.

III. OBSERVATIONS

Out of 09 genera of ferns and fern-allies distributed in the various localities of Todgarh Raoli wild life sanctuary 04 genera namely *Actiniopteris*, *Cheilanthe*, *Salvinia* and *Azolla* are represent by single species each. *Marsilea* is represented by two species while *Adiantum* is represented by three species. The majority of fern genera are represented a single species in the sanctuary. It has been frequently observed that the population densities as well as number of individuals of *Marsilea aegyptiaca*, *Adiantum philippense* and *Cheilanthes bicolor* species fall in the category of RET and many fern taxa are gradually decreasing at an alarming rate. A checklist of all fern taxa distributed in Todgarh Raoli wild life sanctuary, Rajasthan has been provided in table-1.

TABLE-1: A checklist of all fern taxa distributed in Todgarh Raoli wild life sanctuary, Rajasthan

S.No.	Family	Species
1.	Adiantaceae	1. <i>Actiniopteris radiata</i> (Sw.) Link
		2. <i>Adiantum capillus-veneris</i> L
		3. <i>Adiantum incisum</i> Forssk.
		4. <i>Adiantum philippense</i> L.
2.	Cheilantheae	5. <i>Cheilanthes bicolor</i> (Roxb.) Fraser-Jenk
3.	Marsileaceae	6. <i>Marsilea aegyptiaca</i> Willd.
		7. <i>Marsilea minuta</i> L.
4.	Salviniaceae	8. <i>Salvinia molesta</i> Mitch.
5.	Azollaceae	9. <i>Azolla pinnata</i> R. Br. subsp. <i>asiatica</i> R M K Saunders

TABLE-02

A list with descriptions about distributions of ferns and fern- allies from various localities in Todgarh Raoli wild life sanctuary.

S.No	Name of family	Name of Genus	Name of fern species	Name of surveyed localities and Distributions.
1.	Adiantaceae	<i>Actiniopteris</i> Link	<i>Actiniopteris radiata</i> (Sw.) Link.	Most widely xerophytic fern found almost throughout sanctuary. Near Dudhaleshwar-Mahadev, Near Bheel-beri, Khambli Ghat.
		<i>Adiantum</i> L.	<i>Adiantum incisum</i> Forssk.	One of the most widely distributed fern of Aravalli range and also in throughout the sanctuary. On the way of Dudhaleshwar Mahadev, Raoli lake, Ghoram- Ghat and Behind the Forest guest house.
			<i>Adiantum capillus-veneris</i> L.	Quite common especially under moist region Near

				DudhaleshwarMahadev, Near Bheel-beri waterfalls KhambliGhat, Ghoram- Ghat.
			<i>Adiantumphilippense</i> L.	It found in the localities like Bheel-beri waterfall, KhambliGhat,Ghoram- Ghat in the sanctuary.
2.	Cheilanthaceae	<i>Cheilanthe</i> Kaul f.	<i>Cheilanthesbicolor</i> (Roxb.) Fraser- Jenk.	Various localities of the sanctuary, near Todgarh area hills. In the crevices of rock toward the way of Todgarh town.
3.	Marsileaceae	<i>Marsilea</i> L	<i>Marsileaminuta</i> L.	Widely distributed water fern various localities of the sanctuary, Near Negaria pond, Near Barakhan, Jassakhera pond and Ghoram- Ghat.
			<i>Marsileaegyptiaca</i> Willd.	Water fern found inGugia pond and ditches near Bara Khera pond.
4.	Salviniaceae	<i>Salvinia</i> Seg.	<i>Salviniamolesta</i> Mitch.	Commonly occur on stagnant water bodies throughout the sanctuary.
5.	Azollaceae	<i>Azolla</i> Lam	<i>Azollapinnata</i> R. Br. subsp. <i>asiatica</i> R M K Saunders	Widely distributed Free floating fern of ponds invarious localities of the sanctuary like Bara – Khera pond, Raoli lake area, Barakhan pond area, Negaria stream area.

IV. CONSERVATIONAL STRITEGES

The erosion of plant biodiversity is a matter of global concern. One by one the building blocks of entire ecosystem are disappearing. The 2008 IUCN Red Data list shows that in India hundreds of pteridophytes are under the list of threatened and at the risk of extinction. *Marsileaegyptiaca*, *Adiantumphilippense* and *Cheilanthesbicolor* species fall in the category of RET in this area.

The life of tribal people and rural communities are closely interwoven with their environment and local flora. It becomes the integrated parts of their culture and custom and folklore. These A large number of pteridophytes are being used by tribal to cure human and veterinary ailments, thus they co-relate it with god or spiritual power or religious ethics. The plants growing around them form an integral part of their culture and customs.

It is our duty to recognize and support the conservational strategies adopted by tribal and rural people by the term of faith, myths, taboos, tradition, religious aspect, sacred grove etc. Conservation of threatened pteridophytic flora is the responsibility of each and everyone's. We are needed to increase awareness among tribals and rural communities in ecological sensitive area.

V.DISCUSSIONS

Pteridophytes form a significant sometimes dominant component of biosphere. 09 taxa belonging to 06 genera and 05 families were recorded from various localities from Todgarh Raoli wild life sanctuary. The preceding data clearly indicate that pteridophytes have an important component of ecosystem of the sanctuary. *Actiniopteris radiata*, *Adiantum incisum*, and *A. capillus-veneris* are found growing more or less frequently throughout the sanctuary in crevices of rocks at low as well as higher altitude. These species are popular among the tribals due to its considerable medicinal value and is used for curing various skin diseases. Collectors totally uproot the plants with their rhizome, these species grows during the rainy season by their persisting rhizome. It was found from our survey that *Adiantum incisum*, *A. capillus-veneris*, *Azolla pinnata* subsp. *asiatica*, and *Marsilea minuta* occurs frequently at various localities but *Adiantum philippense* is of 'At Risk' status while *Cheilanthes bicolor* species fall in the category of RET in this area and it is restricted in particular area only *Marsilea aegyptiaca* is rare and it found only at found in Gugia pond and ditches near Bara Khera pond in the sanctuary. Two species of free floating water fern *Salvinia molesta* and *Azolla pinnata* subsp. *asiatica* are found growing abundantly in various ponds, ditches and stagnant water bodies in the sanctuary. It was also observed that *Azolla pinnata* subsp. *asiatica* is used as fodder for animals by local people. Conservational strategies adopted by tribals by the term of religious aspect may be fruitful in long time.

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