

Review of Pteridophytic Flora in Rajasthan

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Abstract:

One of the least common floristic resources in Rajasthan is pteridophytic vegetation. Pteridophytes are more widely distributed in some places, though, including Mt. Abu, Kumbhalgarh, Sitamata, Todgarh-Raoli Sanctuary, and Bundi. In his "Sketch of Flora of Rajputana" (1878–1799), King listed roughly 63 species of pteridophytes belonging to 29 genera. Subsequently, thorough studies by several explorers turned up just 44 species from 23 genera. Comprehensive searches have turned up no species of *Athyrium hohenockerianum*, *A. parasnathense*, *Asplenium lanulatum*, *Botrychium lanuginosum*, *Cheilanthes belangeri*, *Dryopteris parasitica*, *Pityrogramma calomelanos*, and *Pteris cretica*, suggesting that these taxa may have been lost or extinct from Rajasthan. This indicates that pteridophytic plants should be the main focus, especially restricted taxa such as *Asplenium pumilum* var. *hymenophylloides*, *Isoetes reticulata*, *I. rajasthanensis*, *Marsilea aegyptiaca*, and *Selaginella rajasthanensis*. Additionally, some fern populations—like *Araiostegia pseudocystopteris*, *Dryopteris cochleata*, *Nephrolepis cordifolia*, *Ophioglossum gramineum*, and *Pteris vittata*—are declining and are increasingly limited to Mt. Abu. The pteridophytic flora of Rajasthan is under danger, thus conservation measures must be done immediately. Rajasthan's pteridophytic flora now includes *Negripteris scioana* (Chiov.) Pic.Serm.

Keywords: Pteridophytic flora, Rajasthan, Conservation, Species eradication, Restricted taxa

Introduction

Rajasthan lies between latitudes 23°03' and 30°12' N and longitudes 69°03' and 78°12' E. Rajasthan is split into xerophytic and mesic vegetation zones by the oldest mountain range in the world, the Aravalli Range. Though pteridophytic flora is one of Rajasthan's less common floristic resources, it is more widely distributed in places like Mt. Abu, Kumbhalgarh, Sitamata, Todgarh-Raoli Sanctuary, and Bundi. About 63 species from 29 genera of pteridophytes were recorded in King's "Sketch of Flora of Rajputana" (1878–79). Though the researchers have searched extensively, they have not found any reports of *A. parasnathense*, *Asplenium lanulatum*, *Botrychium lanuginosum*, *Athyrium hohenockerianum*, *Pteris cretica*, *Dryopteris parasitic* and *Cheilanthes belangeri*.

This amply proves that these taxa have vanished or been lost from Rajasthan. The pteridophytic vegetation needs immediate attention, particularly to restricted taxa such as *Asplenium pumilum* var. *hymenophylloides*, *Isoetes reticulata*, *I. rajasthanensis*, *Marsilea aegyptiaca*, and *Selaginella rajasthanensis*. Additionally becoming rare and exclusive to Mt. Abu are populations of several ferns,

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including *Araiostegia pseudocystopteris*, *Dryopteris cochleata*, *Nephrolepis cordifolia*, *Ophioglossum gramineum*, and *Pteris vittata*. The serious threat to the pteridophytic flora of Rajasthan calls for conservation measures to preserve this breathtaking scenery. (Bhardwaja, 1987)

Central to the Aravalli range is the Todgarh-Raoli Wildlife Sanctuary. Furthermore forming an ecotone between xeric and mesic vegetational zones is the vegetation of the Sanctuary. Here, the pteridophytic vegetation exhibits natural variances. Its borders are as follows: the district of Rajsamand is on the east; the district of Udaipur is on the south; the district of Pali is on the west.



Todgarh-Raoli Wildlife Sanctuary

Of the nine species spread over six genera in the Todgarh-Raoli wild life sanctuary, four genera—*Actiniopteris*, *Azolla*, *Cheilanthes*, and *Salvinia*—have one species each. Two species represent *Marsilea* and three species represent *Adiantum*



Actiniopteris

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Most genera in the sanctuary are represented by a single species. Studies of pteridophytic flora have shown that several taxa are progressively declining in the RET category, which includes the population densities and number of individuals of species like *Adiantum philippense*, *Cheilanthes farinosa*, and *Marsilea aegyptiaca*. The xerophytic fern *Actiniopteris radiata* (Swartz) Link is widely distributed in the Todgarh-Raoli wild life refuge. Commonly found are *Adiantum capillus-veneris*, *Marsilea minuta*, and *Azolla pinnata*. (Todarwal, 2013; Kanther and Gena, 2020)



Azolla

Nestled in the south-central region of Rajasthan, the districts of Udaipur, Pali, Ajmer, and Rajsamand include the Kumbhalgarh Wildlife Sanctuary. Between the Aravallis' steep woods and the Thar Desert to the west, it acts as a special transition zone. This sanctuary has mostly disregarded pteridophytes, which make up a big portion of Rajasthan's floral diversity and have great academic and medical importance. Many explorers have visited the Kumbhalgarh Wildlife Sanctuary often to record and evaluate the present condition of these plant species.



Cheilanthes farinosa

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Rich variety of pteridophytes has been discovered in the Kumbhalgarh Wildlife Sanctuary (KWS). In all, 23 species from 16 genera of pteridophytes have been recorded in this sanctuary in Rajasthan. Twelve genera among them are represented by a single species each: *Actiniopteris radiata* (Swartz) Link, *Ampelopteris prolifera* (Retz.) Copel, *Azolla pinnata* R.Br., *Christella dentata* (Forsk.) Holuum, *Equisetum ramosissimum* Desf., *Hypodematium crenatum* (Forsk) Kuhn, *Negripteris scioana* (Chiov.) Pic.Serm., *Ophioglossum reticulatum* Linn., *Pteris vittata* Linn., *Salvinia auriculata* Roxb., and *Selaginella repanda* (Desv.) Spring.



Kumbhalgarh Wildlife Sanctuary

Rarely observed in other regions of the state, dense populations of *Equisetum ramosissimum* and *Pteris vittata* Linn. have been documented at multiple locations in this sanctuary area. Four species of the genus *Adiantum* have been identified; three species belong to *Marsilea*; two species to *Aleuritopteris* and *Cheilanthes*. (Hussain and Meena, 2015; Chaudhary and Khichi, 2006)



Equisetum ramosissimum

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Pteridophytic diversity in Sitamata Wildlife Sanctuary, situated in the districts of Pratapgarh and Chittorgarh, has been investigated. Twenty-one species were found in all, including sixteen fern species and five fern associates. *Actiniopteris radiata* (Swartz) Link, *Adiantum capillus-veneris* Linn., *A. incisum* Forsk., *A. lunulatum* Burm., *Ampelopteris prolifera* (Retz.) Copel, *Azolla pinnata* R.Br., *Cheilanthes albomarginata* Clarke, *C. farinosa* (Forsk.) Kaulf., *Christella dentata* (Forsk.) Holttum, *Equisetum ramosissimum* Desf., *Hypodematium crenatum* (Forsk) Kuhn, *Isoetes rajasthanensis* Gena, *Marsilea minuta* Linn., *M. rajasthanensis* var. *billardii* Gupta, *M. aegyptiaca* Willd., *Ophioglossum reticulatum* Linn., *Pteris vittata* Linn., *Salvinia auriculata* Roxb., *Selaginella ciliaris* (Retz.) Spring, and *S. reticulata* (Hook. & Grev.) Spring. (Chaudhary and Dulawaat, 2006; Dulawaat and Chaudhary, 2006; Yadav et al., 2011)



Sitamata Wildlife Sanctuary

Pteridophyte species have been recorded in several areas of Rajasthan through floristic surveys:

Hadoti Plateau, Rajasthan:

A survey identified 11 species from 8 genera, including *Actiniopteris radiata* (Swartz) Link, *Adiantum capillus-veneris* Linn., *A. incisum* Forsk., *Ampelopteris prolifera* (Retz.) Copel, *Ceratopteris thalictroides* (L.) Brongn., *Equisetum ramosissimum* Desf., *Marsilea minuta* Linn., *Ophioglossum constatum* R.Br., *O. petiolatum* Hook., *O. reticulatum* Linn., and *Pteris vittata* Linn. (Sharma, 2002)

Bundi, Rajasthan:

The survey documented 15 species from 11 genera, including *Actiniopteris radiata* (Swartz) Link, *Adiantum capillus-veneris* Linn., *A. incisum* Forsk., *Azolla pinnata* R.Br., *Cheilanthes farinosa* (Forsk.) Kaulf., *Christella dentata* (Forsk.) Holttum, *Hypodematium crenatum* (Forsk) Kuhn, *Isoetes tuberculata* Gena, *Marsilea aegyptiaca* Willd., *M. minuta* Linn., *Ophioglossum constatum*, *O. nudicaule* L.f., *O. petiolatum* Hook., *Pteris vittata* Linn., and *Salvinia auriculata* Roxb. (Sharma, 2005)

Ajmer, Rajasthan:

Another survey found 11 species from 8 genera, including *Actiniopteris radiata* (Swartz) Link,

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Adiantum incisum Forsk., *A. capillus-veneris* Linn., *Azolla pinnata* R.Br., *Cheilanthes farinosa* (Forsk.) Kaulf., *Equisetum ramosissimum* Desf., *Marsilea aegyptiaca* Willd., *M. minuta* Linn., *M. rajasthanensis* var. *billardii* Gupta, *Nephrolepis cordifolia* (L.) C. Presl, and *Pteris vittata* Linn. (Todarwal, 2014)

RESULT AND DISCUSSION

Numerous explorers have carried out extensive studies that reveal that 44 species in 23 genera make up Rajasthan's pteridophytic flora. With their varied climates, the Aravalli range (which includes Mt. Abu, Kumbhalgarh, Sitamata, Todgarh-Raoli Sanctuary) and the Hadoti plateau are the main locations of this flora. Rajasthan is renowned for its fluctuations in climate, and the north and northeast, with their vast sand dunes, typically have less variety in pteridophytic vegetation.

S. No.	Genus	Species
1	<i>Actinopteris</i>	<i>A. radiata</i> (Swartz) Link.
2	<i>Adiantum</i>	<i>A. capillus-veneris</i> Linn.
		<i>A. caudatum</i> L.
		<i>A. incisum</i> Forsk.
		<i>A. lunulatum</i> Burm.
3	<i>Aleritopteris</i>	<i>A. anceps</i> (Blanf.) Panigrahi
		<i>A. bicolor</i> (Roxb.) Fraser-Jenk.
4	<i>Ampelopteris</i>	<i>A. prolifera</i> (Retz.) Copel
5	<i>Asplenium</i>	<i>A. pumilum</i> var. <i>hymenophylloides</i> Fee.
6	<i>Araiostegia</i>	<i>A. pseudocystopteris</i> (Kunze) Copel.
7	<i>Athyrium</i>	<i>A. falcatum</i> Bedd.
		<i>A. pectinatum</i> (Wall. ex C.Hope) C.Presl
		<i>A. schimperii</i> Moug. ex Fee.
8	<i>Azolla</i>	<i>A. pinnata</i> R.Br.
9	<i>Ceratopteris</i>	<i>C. thalictroides</i> (L.) Brongn.
10	<i>Cheilanthes</i>	<i>C. albomarginata</i> Clarke.
		<i>C. farinosa</i> (Forsk.) Kaulf.
11	<i>Christella</i>	<i>C. dentata</i> (Forsk.) Holttum.
12	<i>Dryopteris</i>	<i>D. cochleata</i> (D.Don) C.Chr.
13	<i>Equisetum</i>	<i>E. ramosissimum</i> Desf.
14	<i>Hypodematum</i>	<i>H. crenatum</i> (Forsk) Kuhn.
15	<i>Isoetes</i>	<i>I. rajasthanensis</i> Gena
		<i>I. reticulata</i> Gena
		<i>I. tuberculata</i> Gena
16	<i>Marsilea</i>	<i>M. aegyptiaca</i> Willd.
		<i>M. condensata</i> Bak.
		<i>M. coromandelina</i> Willd.
		<i>M. minuta</i> Linn.

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		<i>M. rajasthanensis</i> var. <i>billardii</i> Gupta.
17	<i>Negripteris</i>	<i>N. scioana</i> (Chiov.) Pic.Serm.
18	<i>Nephrolepis</i>	<i>N. cordifolia</i> (L.) C.Presl
19	<i>Ophioglossum</i>	<i>O. constatum</i> R.Br.
		<i>O. graminium</i> Willd.
		<i>O. nudicaule</i> L.f.
		<i>O. petiolatum</i> Hook.
		<i>O. reticulatum</i> Linn.
20	<i>Pteris</i>	<i>P. vittata</i> Linn.
21	<i>Salvinia</i>	<i>S. auriculata</i> Roxb.
		<i>S. molesta</i> Mitch.
22	<i>Selaginella</i>	<i>S. ciliaris</i> (Retz.) Spring
		<i>S. rajasthanensis</i> Gena
		<i>S. repanda</i> (Desv.) Spring.
		<i>S. reticulata</i> (Hook. & Grev.) Spring
23	<i>Tectoria</i>	<i>T. macrodonta</i> C.Chr

Pteridophytic flora of Rajasthan

Of all the pteridophyte locations in Rajasthan, Mt. Abu is particularly biodiverse. There are many of ferns and they mostly flourish during the rainy season. Pteridophytes are also notable to be found on the Hadoti plateau, in addition to the Aravalli mountains.



Aravalli mountains

CONCLUSION

The non-flowering vascular plants known as pteridophytes are sporadically distributed throughout Rajasthan. Twenty-three genera are home to 44 species in all in the state. Among these, a single

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species each represents the genera *Actiniopteris*, *Ampelopteris*, *Asplenium*, *Araiostegia*, *Azolla*, *Ceratopteris*, *Christella*, *Dryopteris*, *Equisetum*, *Hypodematium*, *Negripteris*, *Nephrolepis*, *Pteris*, and *Tectoria* are represented by a single species each. *Aleuritopteris*, *Cheilanthes*, and *Salvinia*. There are three species of each of *Athyrium* and *Isoetes*. There are four species of each of *Adiantum* and *Selaginella*. There are five species of each of *Marsilea* and *Ophioglossum*.

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References

1. Bhardwaja, T. N.; Yadav, A. K.; VERMA, S. (1987). "Status surveys of pteridophytic flora of Rajasthan with special reference to endangered ferns and fern-allies". Indian fern Journal. 4:47- 50.
2. Chaudhary, B.L; Dulawaat, C.S. (2006). "Distribution of ferns and fern-allies in Sitamata Wildlife Sanctuary, Rajasthan, India". Indian fern Journal. 23(1-2):75-82.
3. Chaudhary, B.L; Khichi, Y.S. (2006). "Ferns of Kumbhalgarh Wildlife Sanctuary, Rajasthan, India". Indian fern Journal. 23(1-2):83-91.
4. Dulawaat, C.S; Chaudhary, B.L. (2006). "Selaginella ciliaris (Retz.) Spring (Selaginella ceae: Pteridophyta) - A new record for Rajasthan, India". Indian Fern Journal. 25: 106- 109.
5. <https://bs.plantnet.org/image/o/2af01c8d7d2c91bde116929aa78d5e8956abec30>
6. <https://bs.plantnet.org/image/o/86fdeb801d8ddfe2a78ca1291562f29282024498>
7. https://upload.wikimedia.org/wikipedia/commons/2/2b/Wilderness_and_existance.jpg
8. <https://upload.wikimedia.org/wikipedia/commons/a/aa/Aravalli.jpg>
9. <https://www.cabi.org/wp-content/uploads/Azolla.jpg>
10. https://www.sitamatawildlifesanctuary.com/places_to_see.jpg
11. Hussain, S; Meena, K. (2015). "Pteridophytic diversity of Kumbhalgarh Wildlife Sanctuary, Rajasthan, India". Phot on. 115:465-472.
12. Kanther, R.P; Gena, D. (2020). "Floristic analysis of ferns and fern-allies from Todgarh - Raoli Wildlife Sanctuary, Rajasthan, India". J. Phytol. Res. 33(1):25-31.
13. Sharma, N. K. (2002). "Ethnomedicinal on ferns and fern-allies of Hadoti plateau southeastern Rajasthan". Zoos' Print Journal. 17(3):732-34.

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14. Sharma, O. P. (2005). "Pteridophytic flora of Bundi district south-eastern Rajasthan". Zoos' Print Journal. 20(4):1836-1837.
15. Todarwal, R. (2013). "Pteridophytes of Todgarh Raoli Wildlife Sanctuary, Rajasthan, India". IJIRSET. 2(10):7151-7155.
16. Todarwal, R. (2014). "Distribution of Pteridophytes in Ajmer District, Rajasthan". IJIRSET. 3(3):10844-10846.
17. Yadav, B. L; Meena, K.L; Meena, K; Hussain, S. (2011). "Selaginella reticulata (Hook. & Grev.) Spring (Selaginellaceae) - A new record to the Pteridophytic flora of Rajasthan, NorthWestern India". J. Bombay Nat. Hist. Soc., 108 (3): 239-241.

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