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ORIGINAL ARTICLE

Biodiversity and Conservation: Analyzing the Ethnobotanical Wealth of Keoladeo National Park in Rajasthan, India

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ABSTRACT
This study analyzes the ecological and medicinal significance of the herbal flora within Keoladeo National Park, drawing upon species richness data and traditional use documentation. An initial survey revealed a high floral diversity, documenting 93 distinct herbal species distributed across numerous families, with Fabaceae and Asteraceae being the most prevalent groups. Further ethnobotanical analysis of a subset of these species demonstrated a robust and diversified system of traditional medicine among local communities. The primary therapeutic applications identified are treatments for digestive disorders, skin ailments, and inflammatory conditions, highlighting the plant's role in addressing common health issues. The convergence of remarkable biodiversity, as shown by the number of species, with a deeply ingrained body of traditional knowledge regarding their utilization underscores Keoladeo National Park's vital role as a reservoir of medicinal value resources. This research emphasizes the urgent need for conservation strategies focused on preserving both this critical plant heritage and the associated indigenous knowledge for future pharmacological and ecological studies.

Key Words: *Herbal Flora, Ethnobotany, Keoladeo National Park, Species Richness, Traditional*

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INTRODUCTION
Biodiversity in ecosystems like Keoladeo National Park plays a critical role in maintaining ecological balance and supporting traditional knowledge systems. Herbal plants, particularly in this region, serve not only as ecological stabilizers but also hold immense ethnobotanical importance, providing medicinal, nutritional, and cultural resources to local communities. Despite extensive research on the faunal diversity of the park, there is limited information on its herbal flora and their ethnobotanical significance. The natural plant sources account for 25 % of healthcare drugs in the pharmaceutical field (Shelar & Shirot, 2011). The health and medicinal purposes of an estimated 50,000 to 80,000 plant species have been utilized worldwide as reported by the International Union for Conservation of Nature (IUCN) and the World Wildlife Fund (Chen *et al.*, 2016).This research seeks to bridge this gap by conducting a comprehensive survey of herbal plants, documenting their biodiversity, and analyzing their ethnobotanical relevance.

KEOLADEO NATIONAL PARK
Keoladeo National Park is a Ramsar wetland site and a world heritage site with the local name "Ghana" which means dense forest. The Keoladeo National Park is located in

Bharatpur, Rajasthan and Keoladeo National Park encompass a total area of 29 square kilometers
(27° 7' 06" N – 27° 12' 02" N latitude and 77° 29' 05' E – 77° 33' 09" E longitude) and boasts an impressive variety of plant species with a remarkable concentration of biodiversity in this semi – arid zone, comparable to the species richness found in similarly sized areas in Rajasthan, here is a diverse and ecologically significant natural reserve known for its rich biodiversity, including a wide variety of herbal medicinal plants. Despite being situated in a subtropical region, the Keoladeo National Park showcases an abundance of floral diversity, ranging from aquatic to terrestrial species, and is renowned for housing 375 plant species (Prasad *et al.,* 1996 & Middleton, 2009). These plants have been traditionally used by local communities for their therapeutic properties. It is a biodiversity hotspot, home to several plant species of medicinal and ecological importance.

STUDY AREA

Keoladeo National Park is located in the Bharatpur district of Rajasthan, India, covering an area of approximately 29 km^2. It is a UNESCO World Heritage Site known for its wetland ecosystem and grasslands, which serve as a habitat for various plant species, including herbs and medicinal plants.

METHODS

The study for the assessment of biodiversity of herbs was conducted during March 2024 to August 2024 using random sampling method on the trails. Quadrate method was followed to record the herbs species diversity. 60 quadrates of 1×1m for the herbs were laid down randomly in the study site. Identification of plants was done by referring to taxonomic literature (Maheshwari, 1963; Prasad *et al.,* 1996). The plants species based on exclusive morphological characters.

ETHNOBOTANICAL ASSESSMENT

Ethnobotanical data was gathered through interviews with local communities and traditional healers residing near the park. They provided insights into the medicinal and cultural uses of the identified herbal plants.

RESULTS

BIODIVERSITY OF HERBAL PLANTS

A total of 90+ herbal species across 25 families were identified during the survey. These species belong to various families such as Asteraceae (21 species), Fabaceae (18 species), Malvaceae (9 species), Convolvulaceae (6 species), Solanaceae (5 species), and Tiliaceae (5 species), they were primarily found in grasslands and woodland areas.

Table 1: Herbal Plants in Keoladeo National Park

S.No.	Scientific name	Family	S.No.	Scientific name	Family
1	*Argemone mexicana L.*	Papaveraceae	49	*Cassia occidentalis L.*	Caesalpiniaceae
2	*Argemone ochroleuca sweet*	Papaveraceae	50	*Cassia pumila Lamk.*	Caesalpiniaceae
3	*Cochleria cochlearioides (Roth) Santapau& Mahesh*	Brassicaceae	51	*Cassia tora L.*	Caesalpiniaceae
4	*Coronopus didymus (L.) Sm.*	Brassicaceae	52	*Potentilla supine L.*	Rosaceae
5	*Rorippa indica (L.) Hiern*	Brassicaceae	53	*Ammannia auricultata Willd.*	Lythraceae
6	*Cleome gynandra L.*	Cleomaceae	54	*Ammannia baccifera L.*	Lythraceae
7	*Cleome viscosa L.*	Cleomaceae	55	*Rotala densiflora*	Lythraceae

8	*Spergula arvensis L.*	Caryophyllaceae	56	*Rotala indica (Willd.)*	Lythraceae
9	*Portulaca qradrifida L.*	Portulacaceae	57	*Ludwigia perennis L.`*	Onagraceae
10	*Bergia ammannioides Roxb.*	Elatinaceae	58	*Coccinia grandis (L.)*	Cucurbitaceae
11	*Elatina triandra Schk.*	Elatinaceae	59	*Opuntia elatior Mill.*	Cactaceae
12	*Abelmoschus ficulneus (L.) Wt.&Arn.*	Malvaceae	60	*Glinus lotoides L.*	Molluginaceae
13	*Abutilon indicum (L.) sweet*	Malvaceae	61	*Glinus oppositifolia (L) A. DC.*	Molluginaceae
14	*Abutilon ramosum Guill. & Perr.*	Malvaceae	62	*Trianthema portulacastrum L.*	Aizoaceae
15	*Althaea ludwigit L.*	Malvaceae	63	*Trianthema triquetra Rottl. & Willd.*	Aizoaceae
16	*Malva parviflora L.*	Malvaceae	64	*Zaleya govindia (Buch. Ham. Ex G. Don)*	Aizoaceae
17	*Malvastrum corommandelianum (L.)*	Malvaceae	65	*Seseli diffusum (Roxb. Ex Sm.)*	Apiaceae
18	*Sida cordata (Brum.f.) Borss.*	Malvaceae	66	*Dentella repens (L.) Forst.*	Rubiaceae
19	*Sida rhombifolia L.*	Malvaceae	67	*Oldenlandia corymbosa L.*	Rubiaceae
20	*Sida spinosa L.*	Malvaceae	68	*Oldenlandia pseudocorymbosa (Bakh.f.)*	Rubiaceae
21	*Melochia corchorifolia L.*	Sterculiaceae	69	*Ageratum conyzoides L.*	Asteraceae
22	*Corchorus aestuans L.*	Tiliaceae	70	*Bidens biternata (Lour.)*	Asteraceae
23	*Corchorus capsularis L.*	Tiliaceae	71	*Blumera eriantha DC.*	Asteraceae
24	*Corchorus fascicularis Lamk.*	Tiliaceae	72	*Blumea laciniata (Roxb.)*	Asteraceae
25	*Corchorus olitorius L.*	Tiliaceae	73	*Blumea membranaceae DC.*	Asteraceae
26	*Corchorus tridens L.*	Tiliaceae	74	*Blumea mollis (D. Don) Merr.*	Asteraceae
27	*Tribulus terrestris L.*	Zygophyllaceae	75	*Blumea oblique (L.)*	Asteraceae
28	*Oxalis corniculata L.*	Oxalidaceae	76	*Caesulia axillaris Roxb.*	Asteraceae
29	*Cardiospermum halicacabum L.*	Sapindaceae	77	*Conyza bonariensis (L.)*	Asteraceae
30	*Abrus precatorius L.*	Fabaceae	78	*Cotula anthemoides L.*	Asteraceae
31	*Aeschnomene indica L.*	Fabaceae	79	*Echinops echinatus Roxb.*	Asteraceae
32	*Alysicarpus longifolius (Roth.) Wt.& Arn.*	Fabaceae	80	*Eclipta prostrate (L.)*	Asteraceae
33	*Alysicarpus vaginalis DC.*	Fabaceae	81	*Gnaphalium luteo- ablum L.*	Asteraceae
34	*Clitoria ternatea L.*	Fabaceae	82	*Gnaphalium polycaulon Pers.*	Asteraceae
35	*Crotalaria medicaginea Lamk.*	Fabaceae	83	*Gnaphalium pulvinatum Del.*	Asteraceae
36	*Goniogyna hirta (Willd.) Ali.*	Fabaceae	84	*Gnaphalium purpureum L.*	Asteraceae
37	*Indigofera cordifolia Heyne ex Roth*	Fabaceae	85	*Grangea maderaspatana (L.) Poir.*	Asteraceae
38	*Indigofera trita L.f.*	Fabaceae	86	*Leggera aurita (Willd.)*	Asteraceae
39	*Lathyrus aphaca L.*	Fabaceae	87	*Launaea procumbens (Roxb.)*	Asteraceae
40	*Medicago polymorpha L.*	Fabaceae	88	*Oligochaeta ramose (Roxb.)*	Asteraceae
41	*Meliotus indica All.*	Fabaceae	89	Pluchea lanceolata (DC.)	Asteraceae
42	*Rhynchosia minima (L.) DC.*	Fabaceae	90	*Pluchea wallichiana (DC.)*	Asteraceae
43	*Sesbania bispinosa (Jacq.) W.F. Wight*	Fabaceae	91	*Pulicaria crispa Sch. Bip*	Asteraceae
44	*Teramnus labialis (L.)*	Fabaceae	92	*Sonchus asper (L.) Hill*	Asteraceae
45	*Trigonella hamosa L.*	Fabaceae	93	*Sonchus oleraceus L.*	Asteraceae
46	*Trigonella occulta Del.*	Fabaceae		-	-
47	*Vicia sativa L.*	Fabaceae		-	-
48	*Vigna trilobata (L.) Verdcourt*	Fabaceeae		-	-

Source: Researcher's Own Survey (2024)

Table 1 shows 93 distinct species of herbal plants, listing their scientific name and family. This extensive list highlights the rich biodiversity of the park's flora, specifically focusing on plants with potential medicinal or traditional uses. The sheer number of recorded species across numerous families, such as Asteraceae (25 species), Fabaceae (19 species), Malvaceae (8 species), and Tiliaceae (5 species), indicates a diverse and complex ecosystem capable of supporting a wide variety of plant life. The Asteraceae family, commonly known as the daisy or sunflower family, is the most dominant group, suggesting that many of the park's herbal species may be weedy or pioneer plants, typical of disturbed or open habitats, which is common in wetland or partially aquatic environments like Keoladeo.

The distribution of species across families reveals the ecological structure and key plant groups within the park. The prominence of Fabaceae (the pea family) is significant, as these plants are often nitrogen-fixers, contributing to soil fertility, which is vital for the health of the entire ecosystem. Other well-represented families, like Brassicaceae (mustards), Lythraceae (loosestrife), and Caesalpiniaceae (a subfamily of Fabaceae), further emphasize the diversity. The large number of documented species underscores the conservation importance of Keoladeo National Park not just for its famous avifauna, but also as a crucial repository for the region's herbal and floral genetic resources, necessitating continued monitoring and protection of this diverse plant community.

ETHNOBOTANICAL ASSESSMENT

Herbal Plants and Medicinal & Cultural Uses

Ethnobotanical data was gathered through interviews with local communities and traditional healers residing near the park. They provided insights into the medicinal and cultural uses of the identified herbal plants.

Table 2: Herbal Plants and Medicinal & Cultural Uses

S.No	Botanical Name	Family	Medicinal Uses
01.	Argemone mexicana L.	Papaveraceae	Used for treating skin diseases, jaundice, and pain relief.
02.	Argemone ochroleuca Sweet	Papaveraceae	Similar uses as A. mexicana; also used as an anti-inflammatory.
03.	Cochlearia cochlearioides (Roth) Santapau & Mahesh	Brassicaceae	Known for its use in treating respiratory issues and as a diuretic.
04.	Coronopus didymus (L.) Sm.	Brassicaceae	Used to treat wounds and as a blood purifier
05.	Rorippa indica (L.) Hiern	Brassicaceae	Traditionally used for digestive problems and skin ailments.
06.	Cleome gynandra L.	Cleomaceae	Used for respiratory issues and has anti-diabetic properties.
07.	Cleome viscosa L.	Cleomaceae	Known for its use in treating fevers and as an anti-inflammatory.
08.	Spergula arvensis L.	Caryophyllaceae	Used traditionally to improve digestion and as a mild laxative.
09.	Portulaca quadrifida L.	Portulacaceae	Used for its anti-inflammatory properties and in wound healing.
10.	Bergia ammannioides Roxb.	Elatinaceae	Traditionally used for treating kidney problems.
11.	Elatine triandra Schk.	Elatinaceae	Known for its use as a diuretic and in treating urinary issues.
12.	Abelmoschus ficulneus (L.) Wt. & Arn.	Malvaceae	Used for digestive issues and skin ailments.
13.	Abutilon indicum (L.) Sweet	Malvaceae	Known for its use in respiratory problems and as a cough remedy.
14.	Abutilon ramosum Guill. & Perr.	Malvaceae	Traditionally used to treat skin disorders and as an anti-inflammatory.

15.	Althaea ludwigii L.	Malvaceae	Used for throat infections and as a soothing remedy.
16.	Malva parviflora L.	Malvaceae	Traditionally used to treat digestive issues and respiratory ailments.
17.	Malvastrum corommandelianum (L.)	Malvaceae	Used for its anti-inflammatory properties and skin issues.
18.	Sida cordata (Brum.f.) Borss.	Malvaceae	Known for its traditional use in treating wounds and infections.
19.	Sida rhombifolia L.	Malvaceae	Used for its anti-inflammatory properties and in skin treatments.
20.	Sida spinosa L.	Malvaceae	Traditionally used for digestive problems and as a mild laxative.
21.	Melochia corchorifolia L.	Sterculiaceae	Known for its use in treating respiratory issues and as an anti-inflammatory.
22.	Corchorus aestuans L.	Tiliaceae	Used for its anti-inflammatory properties and in wound healing.
23.	Corchorus capsularis L.	Tiliaceae	Traditionally used for treating digestive issues and as a diuretic.
24.	Corchorus fascicularis Lamk.	Tiliaceae	Known for its use in traditional medicine for skin ailments.
25.	Corchoru solitorius L.	Tiliaceae	Used as a vegetable and for its medicinal properties in treating fever.
26.	Corchorus tridens L.	Tiliaceae	Traditionally used for its anti-inflammatory and diuretic properties.
27.	Tribulus terrestris L.	Zygophyllaceae	Known for its use in enhancing libido and as a diuretic.
28.	Oxalis corniculata L.	Oxalidaceae	Used traditionally for digestive issues and as a blood purifier.
29.	Cardiospermum halicacabum L.	Sapindaceae	Known for its anti-inflammatory and pain-relieving properties.
30.	Abrus precatorius L.	Fabaceae	Used in traditional medicine for its laxative effects and as an anti-inflammatory.
31.	Aeschynomene indica L.	Fabaceae	Known for its use in treating wounds and skin conditions.
32.	Alysicarpus longifolius (Roth.) Wt. &Arn.	Fabaceae .	Traditionally used for its anti-inflammatory properties.
33.	Alysicarpus vaginalis DC.	Fabaceae	Used for its medicinal properties in treating wounds.
34.	Clitoria ternatea L.	Fabaceae	Known for its cognitive enhancement properties and as a tranquilizer.
35.	Crotalaria medicaginea Lamk.	Fabaceae	Used for digestive issues and as a mild laxative.
36.	Goniogyna hirta (Willd.) Ali.	Fabaceae	Traditionally used for skin ailments and respiratory issues.
37.	Indigofera cordifolia Heyne ex Roth	Fabaceae	Known for its use in treating digestive problems and skin issues.
38.	Indigofera trita L.f.	Fabaceae	Used for its anti-inflammatory and blood-purifying properties.
39.	Lathyrus aphaca L.	Fabaceae	Traditionally used to treat digestive issues and as an analgesic.
40.	Medicago polymorpha L.	Fabaceae	Known for its use in traditional medicine for digestive issues.
41.	Melilotus indica All.	Fabaceae	Used for its anticoagulant properties and in treating respiratory issues.
42.	Rhynchosia minima (L.) DC.	Fabaceae	Traditionally used for its diuretic properties.
43.	Sesbania bispinosa (Jacq.) W.F. Wight	Fabaceae	Used for its anti-inflammatory properties and in treating skin issues.
44.	Teramnus labialis (L.)	Fabaceae	Known for its use in treating wounds and as a blood purifier.
45.	Trigonella hamosa L.	Fabaceae	Used traditionally to treat digestive and respiratory issues.
46.	Trigonella occulta Del.	Fabaceae	Known for its anti-inflammatory and analgesic properties.
47.	Vicia sativa L.	Fabaceae	Used for its nutritional value and in treating digestive problems.

48.	Vigna trilobata (L.) Verdcourt	Fabaceae	Known for its use in treating respiratory and skin ailments.
49.	Cassia occidentalis L.	Caesalpinaceae	Traditionally used for digestive issues and as a mild laxative.
50.	Cassia pumila Lamk.	Caesalpinaceae	Used for its anti-inflammatory and skin healing properties.
51.	Cassia tora L.	Caesalpinaceae	Known for its use in treating skin diseases and as a laxative.
52.	Potentilla supina L.	Rosaceae	Used for its astringent properties and in treating diarrhoea.
53.	Ammannia auriculata Willd.	Lythraceae	Known for its use in treating urinary tract infections.
54.	Ammannia baccifera L.	Lythraceae	Traditionally used for its anti-inflammatory properties.
55.	Rotala densiflora	Lythraceae	Used for its diuretic properties and in treating digestive issues.
56.	Rotala indica (Willd.)	Lythraceae	Known for its use in treating skin ailments and as a diuretic.
57.	Ludwigia perennis L.	Onagraceae	Traditionally used for treating wounds and as a blood purifier.
58.	Coccinia grandis (L.)	Cucurbitaceae	Used for its anti-diabetic properties and in treating skin infections.
59.	Opuntia elatior Mill.	Cactaceae	Known for its use in treating wounds and as a blood purifier.

Source: Researcher's Own Survey (2024)

Table 2 highlights 59 different herbal plant species along with their corresponding Botanical Name, Family, and traditional Medicinal Uses. The analysis reveals a significant reliance on these plants to address a wide array of health issues, with notable therapeutic applications grouped around a few key areas. The most frequently cited traditional uses include treatments for Digestive Issues (e.g., laxative, treating digestive problems in Sida spinosa, Crotalaria medicaginea, Cassia occidentalis), Skin Ailments (e.g., treating skin diseases, wounds, and infections in Argemone mexicana, Coronopus didymus, Aeschynomene indica, Coccinia grandis), and various forms of Inflammation/Pain (e.g., anti-inflammatory properties in Argemone ochroleuca, Portulaca quadrifida, Cardiospermum halicacabum). The dominance of the Fabaceae (19 species) and Malvaceae (9 species) families in this medicinal list suggests that plant groups are particularly rich in compounds traditionally valued by local practitioners for their efficacy in multiple physiological systems. A deeper look into the recorded uses highlights that the plants offer solutions for both general and specific health concerns. A large proportion of the species are used as Diuretics or for treating Urinary Issues (e.g., Cochleria cochlearioides, Elatine triandra, Tribulus terrestris, Rhynchosia minima), which may reflect the need for remedies targeting the genitourinary system in the local population. Additionally, remedies for Respiratory Issues (e.g., Cochleria cochlearioides, Abutilon indicum, Melochia corchorifolia) and Blood Purification are common. This comprehensive catalog underscores the profound ethnobotanical knowledge and cultural heritage associated with the flora of the region, providing a critical baseline for modern research aimed at validating the efficacy and safety of these traditional medicines.

CONSERVATION IMPLICATIONS

Given the important role these herbal plants play in local ethnomedicinal practices, conservation efforts must focus on preserving their habitats, particularly grasslands and scrublands, which are vital for sustaining their biodiversity.

CONCLUSION

The flora of Keoladeo National Park constitutes a significant biological and ethnobotanical resource. There are high species richness with 93 documented herbal plants, where the

Fabaceae and Asteraceae families are notably dominant, highlighting the diverse ecological structure of the park. The traditional uses of a subset of these species revealed that this diverse flora is heavily utilized in traditional medicine, particularly for treating digestive issues, skin ailments, and inflammatory conditions. The convergence of high plant diversity with extensive traditional knowledge underscores the critical need for conservation efforts focused not only on the park's wildlife but also on protecting these under-documented and economically valuable plant resources, ensuring the preservation of both the ecosystem and the associated indigenous medicinal heritage. This research emphasizes the interconnectedness of biodiversity and human culture, underlining the importance of both in conservation strategies. Moving forward, integrating scientific research with traditional knowledge will be key to protecting and utilizing the invaluable resources of Keoladeo National Park. Further research should focus on the biochemical properties of these herbal plants to better understand their medicinal potential.

REFERENCES

1. Chen, S. L., Yu, H., Luo, H. M., Wu, Q., Li, C. F., & Steinmetz, A. (2016). *Conservation and sustainable use of medicinal plants: Problems, progress, and prospects*. Chinese Medicine, 11, 37.
2. Michael, P. (1984). *Ecological methods for field and laboratory investigations*. Tata McGraw–Hill Publishing Company Limited.
3. Middleton, B. A. (2009). *Vegetation status of the Keoladeo National Park, Bharatpur, Rajasthan, India* (US Geological Survey Scientific Investigations Report 5193). U.S. Geological Survey.
4. Prasad, V. P., Mason, D., Marburger, J. E., & Kumar, A. C. R. (1996). *Illustrated flora of Keoladeo National Park, Bharatpur, Rajasthan*. Bombay Natural History Society.
5. Shelar, D. B., & Shirote, P. J. (2011). Natural products in drug discovery: Back to future. *Biomedical and Pharmacology Journal, 4*(1), 141–146.
6. Shiva, M. P. (1996). *Inventory of forestry resources for sustainable management and biodiversity conservation*. Indus Publishing Company.