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Floristic Diversity of Chirawa: An overview

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Abstract:
This study documents the floristic diversity and ethnomedicinal knowledge of Chirawa tehsil, Jhunjhunu district, Rajasthan. Surveys during the monsoon and spring seasons recorded native, medicinal, and endemic species, classified by life form and leaf spectra. Despite semi-arid conditions and high groundwater fluoride, the region supports rich plant biodiversity. The findings provide baseline data for conservation and sustainable use of local flora.
Keywords: Semi-arid, medicinal, endemic, leaf spectra.

Introduction:
The term floristic composition describes the variety and arrangement of plant species in a specific region, which is shaped by multiple factors such as overgrazing, soil degradation, deforestation, and reliance of local communities on vegetation. A thorough survey of local plants, together with an environmental description, is crucial for identifying native species, understanding their seasonal growth patterns, evaluating their resilience, recording any newly established flora, and examining the effects of environmental stresses such as drought and excessive grazing (Ali, 2008).

Studying floristic composition is fundamental for understanding the structure and functioning of ecosystems. Floristic diversity refers to the range of plant species in a defined area and provides the foundation for accurate identification, sustainable utilization, and conservation of plant resources (Rafay et al., 2013). Documenting the flora of a region offers valuable insight into its biodiversity and prevailing environmental conditions (Thakur et al., 2014). Floristic inventories—taxonomic surveys of plants in a given location—often serve as the starting point for broader ecological research (Panda et al., 2014). Environmental factors such as altitude, climate, and soil characteristics influence plant diversity and ecological traits like life form, leaf type, and seasonal development, which can act as indicators of environmental status.

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The idea of life form was first presented by Humboldt under the term "vegetative form." It ranks alongside floristic composition in ecological importance and reflects plant adaptation to specific climatic regimes. Raunkiaer's classification system, which organizes plants according to the location and protection of their perennating buds, remains one of the most widely used frameworks (Amjad et al., 2017).

Ethnobotany examines the interactions between humans and plants within a cultural and ecological context. While indigenous knowledge has existed for millennia, the term "ethnobotany" was introduced by Harshburger to describe studies of plant use among indigenous peoples. Over time, the definition has broadened to incorporate modern ecological concepts. Medicinal plants play a particularly significant role in traditional healthcare systems. Historical data show that up to 84% of Pakistan's population once relied primarily on traditional medicine (Hocking, 1950). Even today, nearly one-quarter of pharmaceutical drugs are derived from plants, and many synthetic drugs are modeled after plant-based compounds (Qureshi et al., 2008).

Despite the importance of such research, there has been no documented study on floristic diversity and medicinal plant usage in educational institutions within Pakistan. This investigation was undertaken to evaluate both the plant diversity and the associated traditional knowledge of medicinal plants unique to the Chirawa region of Jhunjhunu district, Rajasthan.

Study Area

Jhunjhunu district is situated in northeastern Rajasthan, between latitudes 27°38′–28°31′ N and longitudes 75°02′–76°06′ E, with a total area of 5,926 km². It lies within the Shekhawati region, bordered by Haryana on the northeast and east, Sikar district to the south, and Churu district to the northwest. The climate is predominantly semi-arid, with summer temperatures climbing to 48°C and winter temperatures occasionally dropping below freezing. Annual rainfall, concentrated during the monsoon months of July to September, ranges from 300–400 mm. Following the rains, the region's vegetation includes numerous medicinal, rare, and endemic species.

Chirawa tehsil, the focus of this study, occupies 1,923.27 km² in the district's northeastern zone. The area experiences hot, dry summers accompanied by frequent sandstorms. Agriculture depends mainly on groundwater, which often contains high fluoride levels. This contamination has been linked to health issues such as fluorosis, arthritis, and dental problems. The region's

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flat, sandy terrain influences the type and distribution of its vegetation as well as the livelihoods of its residents.

Materials and Methods

Fieldwork was conducted during the monsoon and spring flowering seasons to gather a wide range of plant specimens. Tools included a field notebook, plant press, polythene bags, newspaper, trowel, gloves, pruning tools, a digital camera, tags, and herbarium sheets.

Plants were collected at the flowering stage, pressed, and preserved for identification. Ethnobotanical information was obtained through structured interviews with local residents, students, and teachers using questionnaires. Species were then categorized according to life form and leaf spectra following the methods of Raunkiaer (1934) and Hussain (1989).

Results and Discussion

Changes in floristic composition often signal shifts in environmental conditions, making it a useful ecological indicator. Variations in plant species presence and abundance can reflect factors that drive both inter- and intra-species diversity (Safidkon et al., 2003). Recording the plant life of a region not only reveals its species richness and seasonal patterns but also helps detect the arrival of new species and the impacts of climatic stressors such as drought and overgrazing (Ali, 2008; Ahmad et al., 2008).

Numerous studies have compiled floristic checklists for different regions (Baig et al., 1998; Qureshi & Bhatti, 2008; Abdullahi et al., 2009; Jabeen et al., 2009; Shaheen & Qureshi, 2011; Udayakumar et al., 2011; Qin et al., 2012; Youcef et al., 2012). The Chirawa region, with its varied landscapes and microhabitats, demonstrates considerable potential for supporting a diverse array of plant life.Due to presence of diverse topographic features and microhabitats, the selected study area has a great potential for flourishing a rich plant biodiversity.

In the present study, a list of total 37 plants were identified in the study area. 16 plants were tree, 8 were shrub, 4 were undershrub, 7 were herbs while 1 plant was recorded as climber. The details of the plants are given in table 1.

Table 1: List of plants surveyed in Chirawa, Rajasthan.

S. No.	Plant name	Local name	Family	Habit
1.	*Acacia nilotica*	Desi babul	Momosacease	Tree
2.	*Acacia senegal*	Kumat	Mimosaceae	Tree

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3.	*Adhatoda vasica*	Ardu	Acanthaceae	Tree
4.	*Anogeissus pendula*	Dhok	Combretaceae	Tree
5.	*Azadiracta indica*	Neem	Meliaceae	Tree
6.	*Boswellia serrata*	Salar	Burseraceae	Tree
7.	*Butea monosperma*	Palas	Fapaceae	Tree
8.	*Balanites aegyptica*	Hintotia	Simaroubaceae	Tree
9.	*Cordia gharaf*	Gundi	Ehretiaceae	Tree
10.	*Ficus bengalensis*	Bargad	Moraceae	Tree
11.	*Ficus religiosa*	Pipal	Moraceae	tree
12.	*Mangifera indica*	Aam	Anacardiaceae	Tree
13.	*Prosopis cinararia*	Khejra	Mimosaceae	Tree
14.	*Salvadora oleoides*	Jal	Salvadoraceae	Tree
15.	*Tamarindus indica*	Imli	Caesalpiniaceae	Tree
16.	*Tamarix dioica*	Jhau	Tamaricaceae	Tree
17.	*Ziziphus nummularia*	Bordi, beri	Rhamnaceae	Tree
18.	*Calligonum polygonoides*	Phog	Polygonaceae	Shrub
19.	*Calotropis procera*	Aak	Asclepiadaceae	Shrub
20.	*Capparis decidua*	Ker	Capparidaceae	Shrub
21.	*Euphorbia caducifolia*	Dandathor	Euphorbiaceae	Shrub
22.	*Indigofera oblongifolia*	Golia	Fabaceae	Shrub
23.	*Leptadaenia pyrotechnica*	Khip	Asclepiadaceae	Shrub
24.	*Lyceum barbarum*	Murali	Solanaceae	Shrub
25.	*Withania somnifera*	Aasgandh	Solanaceae	Shrub
26.	*Achyranthes aspera*	Andhi jhara	Amaranthaceae	undershrub
27.	*Barleria prinoitis*	Bajardanti	Acanthaceae	Undershrub
28.	*Oscimum americanum*	Bapchi	Lamiaceae	Undershrub
29.	*Rhus mysorensis*	Danser	Anacardiaceae	Undershrub
30.	*Citrullus colocynthis*	Tumbo	Cucurbitaceae	Herb
31.	*Cleome viscosa*	Hultnal	Capparaceae	Herb
32.	*Indigofera oblongifolia*	Neela Baker	Fabaceae	Herb

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33.	*Solanum nigrum*	Makai	Solanaceae	Herb
34.	*T. portulacastrum*	Safed-Santo	Aizoaceae	Herb
35.	*Desmostachya bipinata*	Dhab	Poaceae	Herb
36.	*Saccharum begangalense*	Munja Ghass	Poaceae	Herb
37.	*Momordica balsmina*	Ban-karelo	Cucurbitaceae	Cucumber

Conclusion

From the results of the present investigation, it can be concluded that the study area Chirawa is rich in floral diversity. In the area, various ethnobotanical plants have been reported which can be sued for various purposes.

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