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Phytogeographical Assessment of Medicinal Plant Resources in the Shekhawati Region, Rajasthan

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Abstract: **The Shekhawati region of Rajasthan, India, is well-known for its rich repository of medicinal plants, supported by diverse phytogeographical habitats such as sand dunes, rocky hills, and riverine zones. This study employs a phytogeographical approach to assess the spatial distribution, diversity, and ethnomedicinal value of medicinal plant resources in the area. Methods include systematic surveys, documentation of species diversity and abundance, and interviews with local communities and traditional healers. Results indicate the existence of over 120 medicinal plant species, with notable families including Fabaceae, Asteraceae, and Euphorbiaceae. Distribution patterns are influenced by habitat tropism and environmental factors, while ethnobotanical data reveal deep integration of medicinal plants in local healing traditions. Conservation challenges are discussed, emphasizing the need for preservation and sustainable use.**

Keywords: Phytogeography, Medicinal Plants, Shekhawati Region, Ethnobotany, Rajasthan, Biodiversity, Plant Distribution, Habitat Assessment.

1. Introduction

The Shekhawati region, located in the northeastern part of Rajasthan, spans the districts of Jhunjhunu, Sikar, and Churu. Its physiographic variation supports a remarkable diversity of flora, making it a significant area for phytogeographical and ethnobotanical studies . Medicinal plants play a crucial role in both indigenous health systems and modern pharmacology, especially in arid and semi-arid climates where traditional medicine is heavily relied upon .

2. Objectives

This research aims to:

- Assess the spatial distribution and habitat-wise occurrence of medicinal plants in Shekhawati.
- Document the phyto-ecological and ethnomedicinal significance of key species.
- Identify threats and conservation needs.

3. Methodology

3.1. Survey and Data Collection

The assessment relied on:

- Field surveys conducted in representative sites within all three habitat types .
- Compilation of species data from previous floristic and ethnobotanical studies up to 2013 .
- Semi-structured interviews with local healers and villagers to gather ethnomedicinal knowledge .

3.2. Species Identification

Plant specimens were identified using local and scientific nomenclature, cross-referenced with herbarium material and existing literature .

3.3. Phytogeographical Analysis

Data were tabulated to reflect species richness, abundance, and spatial distribution, using categories such as rare, frequent, common, and abundant .

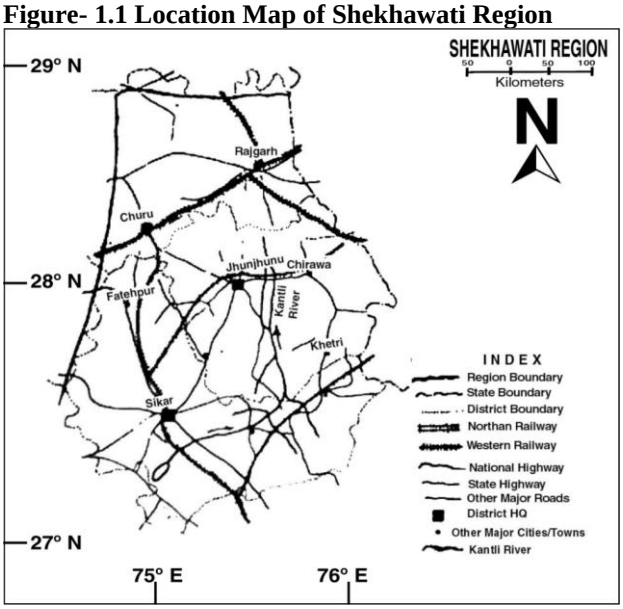
4. Study Area

Figure-1.1 shows the area under study i.e. Shekhawati region which is located in the north-eastern part of Rajasthan state and the region has geographical extension from 26°26’ to 29°20’ N latitude and 74° 44’ to 76°34’ E longitude on the map of Rajasthan. The area under study covers fully or partly three districts, namely Churu, Jhujhunun and Sikar. Churu district’s out of 7, only 3 tehsils fall under Shekhawati region (Churu, Rajgarh and Taranagar) whereas Jhunjhunu district as a whole with its six tehsils (Buhana, Chirawa, Khetri, Jhunjhunu, Nawalgarh and Udaipurwati) in which Buhana tehsil emerged out as a new tehsil on the map of Jhunjhunu district (2001), it was no more existence in the year of 1991 and Sikar district also covered fully with it’s six tehsils (Data Ramgarh, Fatehpur, Laxmangarh, Neem ka Thana, Sikar and Shri Madhopur). The region has 23 Panchayat Samitis in all. Thus, the region under study has 15 tehsils in total with it’s total 15343 sq. km. geographical area which makes 5.6% of the state’s total. At the part of district-wise contribution by area point of view in Shekhawati region it is observed that part and portion of Churu district contributes 29%, Jhunjhunu district contributes 31% and Sikar by 40%, respectively.

Among these tehsils area point of view, the tehsil of Churu is largest one and Buhana smallest, respectively. District-wise area point of view Sikar stands at first position which is followed by Jhunjhunu and lowest contribution is made by Churu i.e. 1683 sq. km. only.

At the part of population, Shekhawati region contributes 8.7 percent of the state’s total in which sex-ratio is 948 females per thousand males in Total Population whereas it is very low i.e. 887 in Child Population for the area under study.

Figure- 1.1 Location Map of Shekhawati Region



The region obtains high Literacy rate which is about 10% more than that of the state's average. Among tehsils, Buhana ranks at first position while as Neem ka Thana contributes lowest in this aspect. The region obtains high density (244) i.e. 50 percent more than that of state's average which is 165 persons per sq. area 2001. The region has also Slum population but it is very low or to say negligible i.e. 2.5% only of the urban area's total.

The whole region has distribution of two types of soils; Sandy soil and Red Loamy soil. The former soil type has obvious distribution in Churu district, the areas of sand dunes topography; the later soil group is mostly distributed over the districts of Jhunjhunu and Sikar (classification based on dominancy, availability and agricultural productivity). The distribution of soil type and it's physical as well as chemical nature is a significant aspect from vegetation as well as plant species distribution point of view.

On the basis of another type of soil type classification according Prof. Thorpe and Smith based on the origin of the soil, the observations revealed in this direction that Remosols type of soil has distribution in the areas of sand dunes topography; all three tehsils of Churu districts have, Red sandy soil which is more alkaline in nature. Hilly topography soil and Riverine soil have their distribution according the distribution of habitat of study area.

Habitat Type	% Area	No. of Species	Dominant Groups
Sandy Plains & Sand Dunes	~60%	65	Xerophytes, trees, shrubs
Stony & Rocky Formations	~32.5%	95	Herbs, shrubs, climbers
Riverine & Aquatic Zones	~7.5%	20	Hydrophytes, semi-aquatic herbs

5. Results and Discussion

5.1. Diversity and Distribution of Medicinal Plants

A total of approximately 120 to 122 medicinal plant species were recorded in the Shekhawati region prior to 2013 . These species belong to 35% of the total plant families found in Rajasthan, with the main families being Fabaceae, Asteraceae, Euphorbiaceae, and Apocynaceae .

5.2. Major Habitats

- Sandy Plains and Sand Dunes: These support xerophytic species such as Acacia senegal, Tribulus terrestris, and Butea monosperma .
- Stony and Rocky Formations: The highest medicinal plant diversity is found here; common herbs include Boerhavia diffusa and Withania somnifera .
- Riverine/Aquatic: Less species but notable ones include Bacopa monnieri and Hydrocotyle asiatica .

5.3. Vegetation Groups

Species composition varies across habitats, with trees (e.g., Azadirachta indica, Ficus religiosa), shrubs (Adhatoda vasica), herbs (Boerhavia diffusa), and climbers represented .

5.4. Phytogeographical Patterns

Spatial distribution is categorized as:

- **Rare**: Species with limited site occurrence, e.g., Mimosa hamata .
- **Frequent**: Moderately distributed species, e.g., Withania somnifera .
- **Common/Abundant**: Widespread, e.g., Acacia senegal, Azadirachta indica .

80% of medicinal species are common to both sandy and rocky habitats, with 20% unique to sand dunes or riverine areas .

5.5. Ethnobotanical Uses

Ethnomedicinal knowledge is rich among local communities. Surveyed groups reported routine use of 48-105 medicinal species for diverse ailments . Key uses include:

- Digestive disorders: Centratherum anthelminticum, Cassia auriculata
- Respiratory ailments: Adhatoda vasica, Tinospora cordifolia
- Skin diseases: Azadirachta indica, Balanites aegyptiaca
- Musculoskeletal: Tribulus terrestris, Commiphora wightii

5.6. Plant parts most utilized:

- Roots (for decoctions)
- Leaves (for pastes/salves)
- Bark (for extracts)
- Seeds/fruits (for tonics and infusions) .

5.7. Ecological Factors Affecting Distribution

Key factors influencing medicinal plant distribution include:

- Soil composition: Sandy and alluvial soils favor xeric species .
- Moisture regimes: Aquatic/herbaceous species cluster in riverine zones .
- Human activities: Overgrazing, woodcutting reduce population density and increase rarity .

6. Conservation Status and Threats

The Shekhawati region faces increasing anthropogenic pressure. Overharvesting, habitat fragmentation, and climate variability threaten plant diversity and abundance . Some medicinal plants are now considered rare or endangered.

Conservation recommended actions include:

- Promotion of sustainable harvesting
- Community-based conservation programs
- Scientific cultivation of key species (e.g., Commiphora wightii for gum production) .

● Documentation and preservation of ethnomedicinal knowledge .

7. Conclusion

The Shekhawati region exemplifies a diverse phytogeographical landscape supporting a rich assemblage of medicinal plants integral to local health systems. Patterns of distribution and abundance reflect the interplay of habitat type, ecological conditions, and human use. Urgent conservation interventions are required to maintain this natural heritage, ensuring sustainable benefits for future generations.

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