

Phytogeographical Distribution Of *Adhatoda Vasica* In Shekhawati Region, Rajasthan

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Abstract: *natural vegetation i.e. Adhatoda vasica. The area under investigation i.e. Shekhawati region, popularly known as historical heritage, geographical and cultural zone in Jaipur division of Rajasthan state, India. Besides this zone has unique combination of beautiful ecosystems viz; riverine ecosystem, sandy plain ecosystem, sand dunes ecosystem and stony and rocky ecosystem. In these ecosystem, the sand dunes is the heart of Churu. The Shekhawati zone has a great variety of climates (semi-arid and arid) biotic and edafic conditions, physiography and diversity of natural vegetations which has on a wide range of natural ecosystem*

Keywords: *Adhatoda vasica, Shekhawati region, vegetations.*

1. Introduction

The present paper discusses the potentiality of natural vegetation i.e. *Adhatoda vasica*. The area under investigation i.e. Shekhawati region, popularly known as historical heritage, geographical and cultural zone in Jaipur division of Rajasthan state, India. Besides this zone has unique combination of beautiful ecosystems viz; riverine ecosystem, sandy plain ecosystem, sand dunes ecosystem and stony and rocky ecosystem. In these ecosystem, the sand dunes is the heart of Churu. The Shekhawati zone has a great variety of climates (semi-arid and arid) biotic and edafic conditions, physiography and diversity of natural vegetations which has on a wide range of natural ecosystem.

Actually, there is no plant species on this planet which may be termed as useless indeed, whether it is another matter that mankind have acquire knowledge of the uses or applications of the particular plant species. One can visualize very well the uncountable uses at the part of applied aspect of plant kingdom which left no activity of daily life of human beings requirements without any sort of their impact of usefulness by quantitative or qualitative point of view. The green cover on the earth surface whatever in the form of vegetation or forest wealth is an essential component as well as part and portion of the surrounding complex of the nature of which man is an important biological elements. Hence, generally the plant species whose uses are known to the human beings in applied sense for the mankind welfare as well as for domestic animals are termed as useful plant species - at the part of his knowledge.

By thus, one can visualize Multi-purpose Medicinal Plant Species (MPMPS) i.e. *Adhatoda vasica* has their varied applied values in the cure of different kind of diseases for the welfare of human beings which naturally show their importance that MPMPS is really may be termed as “Medicinal Plant Wealth” of Shekhawati Region, Rajasthan.

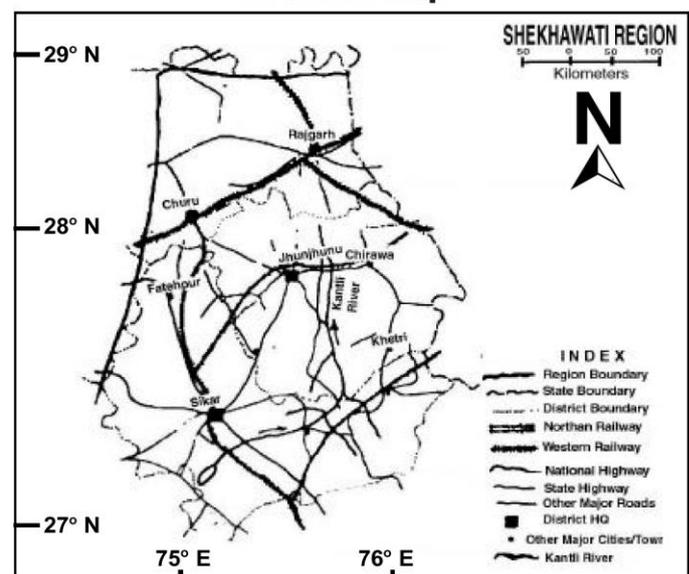
2. Introduction of The Research Area

Shekhawati region is located in the north-eastern part of Rajasthan state and the region has geographical extension from

26°26' to 29°20' north latitude and 74° 44' to 76°34' east longitude on the map of Rajasthan.

The area under study covers fully or partly three districts, namely Churu, Jhunjhunu 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).

Location Map



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.

3. Review of Literature

The area under research work was studied by following botanists and time to time viz; first of all the Sekhawati region was touched from vegetational study point of view by Mulay and Ratnam (1950), Bikaner and pilani neighbourhood areas by Joshi (1956 and 1958), vegetation of Chirawa by Nair (1956), again Nair and Joshi for Pilani and neighbourhood areas (1957), vegetation of Harsh Nath in Aravalli's hills was studied by Nair and Nathawat (1957), vegetation of Jhunjhunu, Manderella and neighbourhood by Nair (1961), vegetation of Aji Sagar dam by Nair and Kanodia (1959); Nair, Kanodia and Thomas (1961) studied the vegetation of Khetri town and neighbourhood areas and vegetation of Lohargal and its neighbourhood areas of Sikar district by Nair and Malhotra (1961). After the work of Nair and Malhotra (1961), i.e. four decades ago, the area was again left for any sort of further research work in the field of applied Botany.

A significant, very authentic taxonomic work was contributed in the field of botany by Bhandari with the publication of a book *Flora of the Indian Desert* (1990). From the field of applied phytogeography point of view, Charan gave a valuable contribution with a publication of a book on *Plant Geography* (1992). Bhattacharjee (2000) gave a very valuable authentic contribution through the publication of a book on *Handbook of Medicinal Plants* in which he presented the medicinal plants of Indian Sub-continental background with their coloured photographs also and Sharma (2007) gave a very valuable authentic contribution through the publication of a book on *Medical Plant Geography*.

4. Objectives

As the nature of the research work, it becomes the prime most duty of a phytogeographer to trace out to identify the plants and then their geographic interpretation from their origin point of view, their cartographic presentation from spatial distribution point of view and lastly also to prepare their layout planning map for on going plantation programme at least for the applied plant species for the area under study.

5. Hypothesis

Naturally, the present study will cover the present position of phytogeographic pattern of spatial distribution of applied plant species, so a phytogeographer can propose their allocation of sites of coinciding habitats from their conservation point of view for the welfare of future generation of the area under study.

We can conserve those plant species which have their applied values for the welfare of human beings inhabiting in that particular area or the area under study. For this purpose, a phytogeographer has to give an account of the layout maps of that area under study which covers the allocation of the sites with favourable habitats according to the nature of the existing applied plant species for the area under investigation.

6. Methodology

The present study has been substantiated by extensive field work. The essential data have been collected from a wide range of sources. The remote sensing available data have been used. Survey of India topo-sheets for the entire region and a bioclimatic map, have been used as base maps. Additionally,

data from reports, maps, pamphlets, research papers, books, monographs, soil survey data, forest survey data from published and unpublished materials have been collected from different agencies. After examining the remote sensing and other data related to physical (climate, soil, land forms and water) biological (flora and fauna) and social (population dynamics, economic activities land use and productivity) indicators, a few survey sites were located. The sites were visited during field survey.

To illustrate the frequency of distribution of particular plant species the prescribed method of Raunkier's will be exercised to show whether the particular plant species is rare, frequent, common or abundant for the area under investigation. The nature of habitats and the eco-climatic conditions will be dealt as a part and portion of the study to support the phyto-climatic account of the research problem for the area under study.

From phytogeographic study point of view, a cartographic interpretation of the multi-purpose plant species will be dealt at two levels i.e. at macro-level and at microlevel, basically it may be dealt phytogeographic sense.

7. Observations

BOTANICAL NAME : *Adhatoda vasica*

LOCAL NAME : Arusa, Ardoos, Ardusa (**Plate : 1.1**).

A. Vegetational Characteristics :

The plant belongs to the family - *Acanthaceae*. From vegetational group point of view, the plant belongs to the group of "Tree", it is a medium sized tree, in nature some times it is also observed in the form of shrub. It is tall, much branched (branches are terete) and mostly evergreen tree. The leaves of the plant are lanceolate, large and dark green in colour. From leaf-class classification point of view the plant falls in 'Micro-phylls' class (i.e. 12 to 20 cm. long and 2.5 to 0.5 cm in width). The leaves have some characteristic odour and bitter in taste. Leaves margins are crenate and apex is acuminate with glabrous surface and smooth texture. From life-forms point of view, the plant falls in the group of "micro-phanerophytes". Its flowers are dense and white in colour with purplish markings. Its fruit's are capsular.

PLATE -1.1 *Adhatoda vasica*



B. Eco-Climatic Conditions And Habitat

The plant has favourable annual average rainfall condition in between 40 cm. to 150 cm.. From temperatures variation point of view-it's favourable range lies in between 10°C mean monthly minimum to 40°C mean monthly maximum, respectively. The plant needs good moisture conditions, dry winds are harmful for it's growth and development. Plant's favourable habitats are sandy plains, gravel formation with compact soil, and also some times the rocky places. Thus, it is observed frequently in semi-arid climate, it is quite common in sub-humid climate and humid climate. It's plantation is very common on both sides of routes of roads at may places, it is also observed frequent to common on the places which fall under waste - lands in Shekhawati region.

C. Phyto-Chemicals Of Parts And Portion

The leaves contain very small amount of essential oil and qinazolin alkaloids (0.5 to 1%) such as vasicine and vasicinone. The roots as well as bark of the plant is also found to contain alkaloids, in addition to the alkaloides, it contains, yellow colouring matter and vasakin a non-nitrogenous crystalline substance.

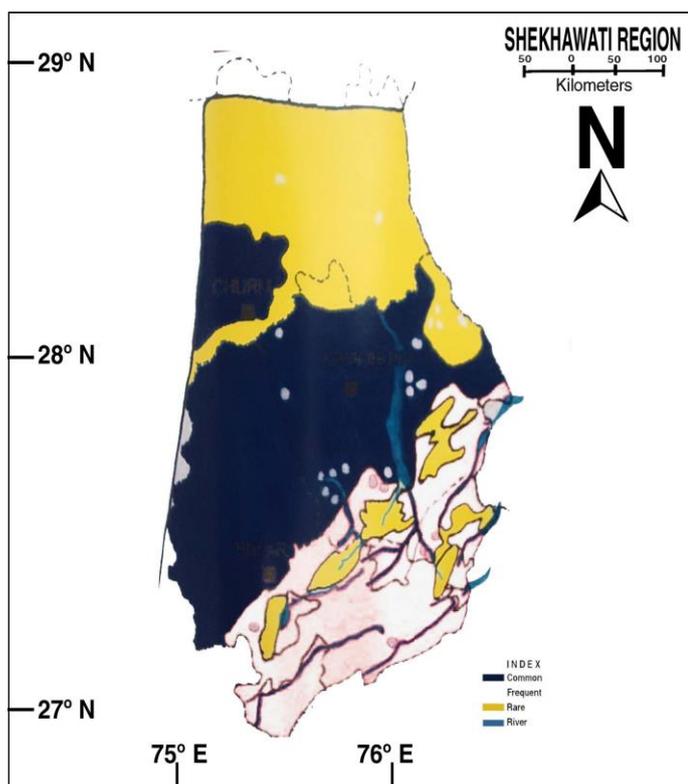
The plant's phyto-chemicals are also studied by Kanwal et al. In 1983 on seasonal variation of alkaloids.

D. MEDICINAL APPLIED ASPECT :

The plant has some significant medicinal applied aspect in the cure of some disease viz; in Asthma, in Bronchitis, in Cough, normal Fever, Pneumonia, Orthodex as a native medicine. The plants parts are boiled in water and used for bath in the treatment of body inflammation and bodyache. The leaves decoction is administered in cough and chronic bronchitis.

Thus, it is used as an expectorant, bronchodilator and as mild bronchial antispasmodic, vasicine is reported to possess oxytocic action. Vasicine is reported to be bronchoconstrictor, whereas it's autooxidised from vasicinone is a bronchodilator.

FIG. : PHYTO-GEOGRAPHICAL DISTRIBUTION OF *Adhatoda vasica*



E. Phyto-Geographical Distribution :

a. At Global Level :

At global level, the plant is native to Oriental floristic region by covering following countries in the world - Ceylon, Burma, Malaysia, and throughout India. In India, it is commonly found in Chhindwara district of Madhya Pradesh, at Chhindi and Chintipur and also occurs throughout the plain and sub-mountainous regions.

b. At Regional Level :

As shown in figure that the plant has rare phyto-geographic pattern of distribution in Rajgarh and Taranagar tehsils of Churu district. Besides this, the plant has rare distribution in the areas under hilly patches of Shekhawati region. Churu tehsil of Churu district; Fatehpur, Lachhmangarh, Sikar tehsils of Sikar district i.e. western portion of Sikar district, and most of the tehsil of Jhunjhunu and Chirawa, Buhana tehsil and Nawalgarh tehsil of Jhunjhunu district it shows common occurrence, respectively. Whereas the plant shows frequent occurrence of phyto-geographic pattern of distribution in the eastern parts tehsils of Sikar district, and most of the parts and portion of south-eastern located tehsils of Jhunjhunu district i.e. Khetri and Udaipurwati, respectively. No where an study area it was observed as an abundant locality, thus, no pure association of this plant was observed; although on road side plantation, the plant shows it's frequent occurrence at many places of Shekhawati region. The plant also shows no occurrence on the top of sand dunes habitat as well as on hilly habitat.

8. Results

Being a phyto-geographer, the best efforts has been made in this research paper to conserve and analyse of decrease of natural vegetation and associated factors in Shekhawati region, Rajasthan. Further in this aspect, one can visualise very well the results of any sort of contribution of the efforts made by Department of Forest and public awareness in this aspect, in enhancement of the land under green coverage through implementation of successful afforestation and plantation programmes.

Natural vegetation i.e. *Adhatoda vasica* degradation is taking place in shekhawati region through irregular rainfall, public interfere, wind erosion, water erosion, high temperature, storms and soil erosion. These processes have been accelerated by increasing technogenic and human activities it has resulted in the degradation of *Adhatoda vasica* of the region due to in irregular rainfall and wind erosion and high temperature are more serious and widespread. Overgrazing and indiscriminate felling of under shrubs resulted in the degradation of vegetation cover and decrease in biomass production. In case these problems continue uncontrolled, large acreage of forest area will be affected in future.

The results suggest to take up immediate steps to adopt the improved forest management technologies with people's participation to lack of effects of decrease of natural vegetation in the region but it is not possible to conserve completely. Further the results of the study could be fruitfully utilized by the planners bio-scientists, botanists, phyto-geographers, naturalists and policy makers to evolve suitable forest management technologies and strategies commensurate to the bio-conditions of the region.

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