Phytogeographical Distribution of Medicinal Plant- *Withania Somnifera* in Shekhawati Region, Rajasthan

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I. INTRODUCTION

The present paper discusses the potentiality of natural vegetation i.e. ***Withania somnifera***. 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.

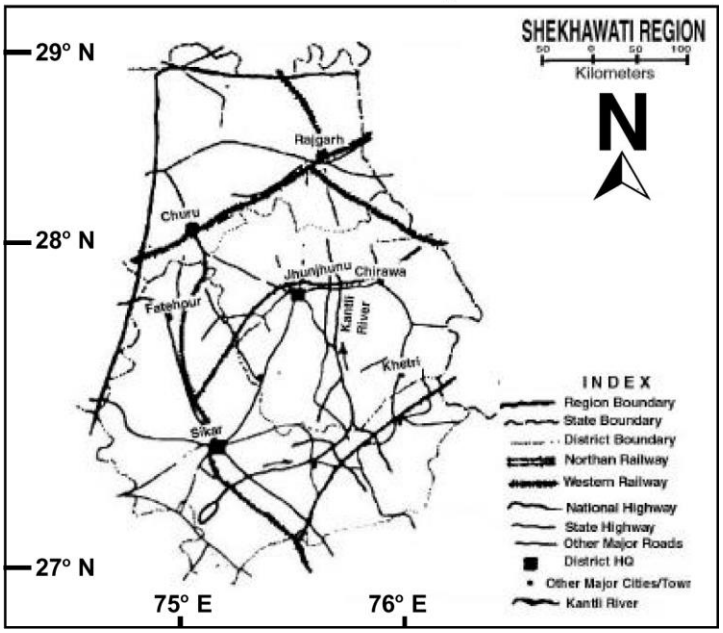
By thus, one can visualize Multi-purpose Medicinal Plant Species (MPMPS) i.e. ***Withania somnifera*** has their varied applied values in the cure of different kind of diseases for the welfare of human beings which naturally show their importance that MPMPS is really may be termed as "Medicinal Plant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

II. INTRODUCTION OF THE RESEARCH AREA

Shekhawati region is located in the north-eastern part of Rajasthan state and the region has geographical extension from $26^{o}26'$ to $29^{o}20'$ north latitude and 74^{o} 44' to $76^{o}34'$ east longitude on the map of Rajasthan (Figure-1.1).

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).

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.

III. 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 ajit sagar dam by Nair and Kanodia (1959); Nair, Kandodia and Thomas (1961) studied the vegetation of Khetri town and neghbourhood areas and vegetation of Lohargal and it's 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 publcation 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 autheontic contribution through the publication of a book on Handbook of Medicinal Plants in which he presented the medicinal plants of Indian Sub-continental back ground with their coloured photographs also and Sharma (2007) gave a very valuable autheontic contribution through the publication of a book on Medical Plant Geography.

IV. 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 than 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.

V. 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 appled 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 the nature of the existing applied plant species for the area under investigation.

VI. 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.

VII. OBSERVATIONS

BOTANICAL NAME : *Withania somnifera*

LOCAL NAME : Asgandh, Aswagandha **(Photoplate-1.1)**

(A) VEGETATIONAL CHARACTERISTICS :

It belongs to the family - *Solanaceae.* A much branched, erect, perennial under shrub, 9-12 dm high, plant with more or less tuberous root. Leaves 5-10x3-6 cm, ovate, obviate or oblong, sub acute or rarely obtuse, entire rounded or

somewhat produced at base and thus, it belongs to the leaf - class of 'Nanophylls'.

Flowering and Fruiting - It is that under shrub in which flowering and fruiting period remains almost throughout the year, hence, there is no specific period in this aspect**.**

PHOTOPLATE -1.1 WITHANIA SOMNIFERA

(B) ECO-CLIMATIC CONDITIONS AND HABITAT:

The under shrub shows 'poly-climax' nature in phytogeographic distribution by covering different habitats like sand dunes, sandy plains, riverine habitat etc. It has wide range of it's rainfall distribution (between 25 cm. to 100 cm.) and temperature variations (30^{o}c to 50^{o}c monthly average). It is common in waste places and in dry soils near garden but throughout the area under study, it show wide distribution and at certain places form a dense association. Mostly, these under shrubs prefer the waste sandy plains with surface of compact soil formation. The observations based on field study sites revealed that the plant community also prefer the areas fall under the land use under human settlement. Thus, the under shrub shows unique as well as specific nature of habitat occurrence point of view i.e. within villages, towns and cities.

(C) PHYTO-CHEMICALS OF APPLIED PARTS AND PORTION:

Several biologically active elements and compounds are reported-

1. Alkaloides - Withasome, Nicotine, Tropine, Anahygrene, cuscohygrine, Recently a new alkaloid "Visamine" was reported from USSR.

2. Glycosides - Withaniol.

3. Misc. compounds - Reducing sugars amino acides - Glycine, Aspartic acid Glutamic acid, cystine, proline, Tryptophan, Alanine, Tyrosine are reported. Recently J.R. Chowdhary (1988) reported about "Withanolide D" a steroidal lactona and "Withaferin A" from leaves. They have anti-tumor effects.

Some workers have carried out their research study on effect of Aswagandha on the process of ageing factor in human volunteers (Kuppura Jan, 1980). The under shrub also studied as a rejuvenating herbal drug (Singh, 1982). The effect of Aswagandha in mice also studied by Verma in 1983. Further in this context a comparative study of Aswagandha and Punarnava was done by Venkataraghavan 1980.

(D) MEDICINAL APPLIED ASPECT :

Out of five categories of applied categorisation of the useful plant species of the area under study, it covers three categories viz; fuel, fodder and medicinal. We are here concerned with the details of the under shrub as a medicinal plant.

It is a very useful under shrub for Medicinal purpose. The plant is reported in the "Vaidic" books as an ancient Indian Medicine. It's dried roots after grinding and bruised leaves are applied to painful swellings.

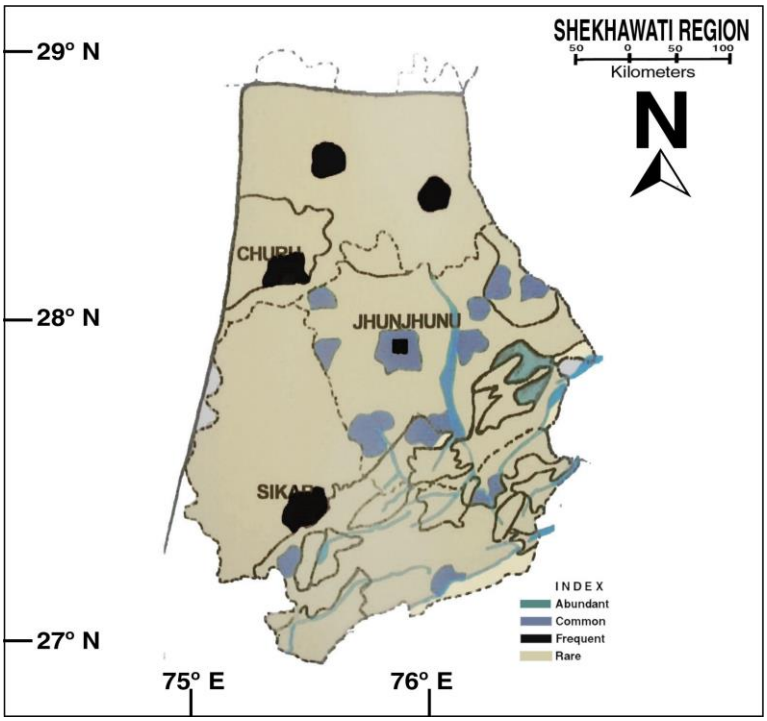
Further in this context, at the part of medicinal uses of the particular plant species for the cure of some diseases is mentioned here that this is 'very common and popular herbal drug' and the expert mentioned it invariably in all prescriptions calling it as a "divine gift". They use it in several combinations, for the treatment of several diseases such as sexual impotency, general debility, male sterility, respiratory and urino-genital disorders, leucoderma, promotion of urination and for purification of blood. They assert that all parts of the plant is useful and it has the capacity to combat many human ailments. Some of them have also been prescribing it for the removal of general tumours from body. They also claim that if Asvangadha root powder is taken regularly with milk it can promote growth in children and retard again the process in older people.

(E) PHYTO-GEOGRAPHICAL DISTRIBUTION :

A. At Global Level :

At global level distribution the plant covers a wide range of occurrence that is Mediterranean Region, Cape of Good Hope, Canaries, Ceylone, Pakistan (Sindh) India (throughout the drier regions).

FIGURE-1.2 PHYTO-GEOGRAPHICAL DISTRIBUTION OF WITHANIA SOMNIFERA



B. At Regional Level :

Although, the under shrub plant species observed at rare distribution through out the area under study. At four places, it is observed with frequent distribution in which three localities are situated in Churu district and one in Sikar, respectively. At several places the shrub community shows common occurrence i.e. on twelve places in which three are situated in Sikar district and nine places are located in Jhunjhunu, respectively.

There are two abundant patches observed as pure association in middle eastern part of Shekhawati Region, these two abundant patches are observed in between Singhana to Khetri locality as shown in **Figure-1.2.**

VIII. RESULTS

Being a phyto-geographer, the best efforts has been made in this research paper to conserve and analyse of decreasement 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 aforestation and plantation programmes.

Natural vegetation i.e. ***Withania somnifera*** 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 technologenic and human activities it has resulted in the degradation of ***Withania somnifera*** 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 resuted 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 decreasement 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, phytogeoraphers, naturalists and policy makers to evolve suitable forest managment technologies and strategies commensurate to the bio-conditions of the region.

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