

Phytogeographical Distribution of *tinospora cordifolia* in Shekhawati Region, Rajasthan

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Abstract - The present paper discusses the potentiality of natural vegetation i.e. *Tinospora cordifolia*. 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.

I INTRODUCTION

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.

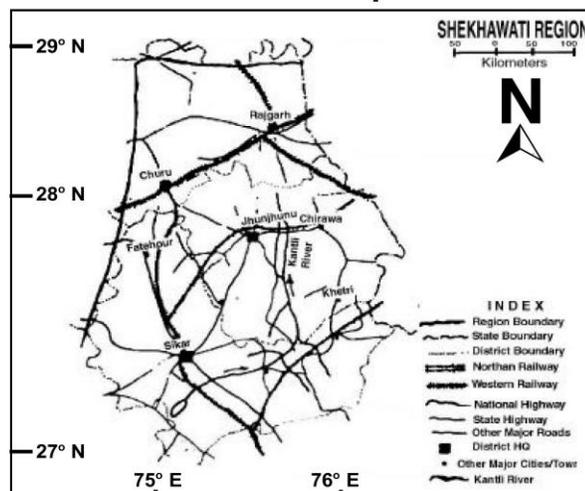
By thus, one can visualize Multi-purpose Medicinal Plant Species (MPMPS) i.e. *Tinospora cordifolia* has their varied applied values in the cure of different kind of diseases for the welfare of human beings which naturally show their importance that MPMPS is really may be termed as "Medicinal Plant Wealth"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

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 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.

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 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.

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 : *Tinospora cordifolia*

LOCAL NAME : Neem-giloy, Giloy, Amrita, Gilo
(Photoplate)

(A) VEGETATIONAL CHARACTERISTICS :

It is a vigorous, perennial climber. It belongs to the *Menispermaceae* plant family. Thus, from vegetational group point of view, it falls under the group of 'climbers'. Stems are succulent which are generally 2 cm. in diam. and produces aerial roots. Leaves are ovate or roundish which are generally equal from length and width point of view, They are generally 10 cm. long (8-20 length x 8-20 cm. in width). Flowers are small (5-10 mm. Long), yellow in colour, Female flowers are usually solitary, while male flowers are grouped in axils. Thus, male and female flowers are separate. It's fruit's are drupes in appearance, red in colour, thus, in size of a large pea.

From life - forms point of view the plant falls under the group of "Climbing Phanerophytes". From leaf-class classification point of view it falls under the class of 'Microphylls'. From xerophytic categorization point of view, it bears more sunken stomata on leaf surface and stems are succulent in nature.

(B) ECO-CLIMATIC CONDITIONS AND HABITAT:

Generally, the climber prefers rocky habitat, in other words to say the stony and rocky habitat is one of the most suitable habitat from it's occurrence point of view, where the plant is found in truly wild state. The climber is also found on the habitat at gravel formations. Thus in brief, it competitively requires dense vegetation or forest area which bears more moisture as well as shaded of canopy coverage.

It is hardly observed over sand dunes habitat as well as sandy plains habitat. It is also rarely found in riverine habitat but in aquatic habitat it may be observed if it has topography of hilly formations. Humid and Sub-humid climate favours it's occurrence, Semi-arid climate with stony and rocky habitat is also suitable for it's occurrence, respectively. It's annual rainfall limit ranges from 40 to 100 cm., temperatures conditions ranges from 10°C (mean monthly minimum) to 40°C (mean monthly maximum). It requires at least 30% relative humidity in atmospheric conditions.

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

Dried stem with in tack bark i.e. dried stem and bark of this climber are medicinally useful. It's roots are

also reported medicinally useful (in native medicine) by some researchers. At the part of morphology of applied parts and portion, the climber has found greenish white to brown stems, cut into 3 to 4 cm. long pieces and 1 to 2 cm. thick with distinct rings of anomalous vascular bundles at the cut ends. It's dried stems and bark is antiperiodic and aphrodisiac by nature.

At the part of phytochemicals of the parts and portion of this climber which have applied values - some researchers worked, are as mentioned here - Pandse and Dutt (1932-33), Chopra et. al. (1956-58), and Basu and Kirtikar (1984) reported on the phytochemistry of *Tinospora cordifolia*.

The chief alkaloid reported is Berberine and the chief Glycoside is Giloin. The Non-glycosidic bitter is Giloinin. Other bitter principles reported are Columbin, Chasmonthin, Palmarin, Tinosporic acid and Tinosporal. The steroid reported is Gilo-sterol.

(D) MEDICINAL APPLIED ASPECT :

The starch of roots and a stems are nutritious by nature, hence, it is used as tonic, and are used to cure diarrhoea. Besides this all above mentioned medicinally uses for the cure of different diseases, the herbal vendors use it very commonly in several combinations. Hence many botanists as well as Vedhs call it as a great "gift of nature" because it can be conveniently used against several diseases.

They use it against all kinds of fever and for urinary diseases specially to promote urination and for the treatment of dyspepsia and flatulence. They also prescribe it in the treatment of general debility, sexual impotency, syphilis, gonorrhoea, Jaundice, piles and intestinal worms. Several of them indicated about it's important role in the treatment of diabetes next only to Gurmar buti (*Gymnema sylvestre*).

(E) PHYTO-GEOGRAPHICAL DISTRIBUTION :

A. At Global Level :

The climber species is restricted up to Indian sub continent by excluding Himalayan Region. Thus, the species is distributed in the Tropical parts of India, specially in the north-western Region, respectively.

B. At Regional Level :

From phytogeographic pattern of occurrence point of view, it is quit obvious from the **figure** that there is no abundant locality in this aspect but the Region under study shows many scattered areas of common occurrence from phytogeographic pattern of distribution point of view - Khetri and Udaipurwati tehsil (Jhunjhunu district); and tehsil of Sikar district - Neem ka thana, Shri Madhopur

northern part of Shri Madhopur and Sikar, respectively. These are all hilly patches with stony and rocky habitat areas.

Frequent occurrence had been observed during the course of field surveys in the localities which are surroundings of the hilly patches, mostly these are located in south-eastern part of the area under study.

The climber rarely observed in middle part of Shekhawati Region only where it is probably it has been introduced, but not found in wild state as it was observed in hilly patches, respectively.

Rajgarh and Taranagar tehsil (Churu district); and northern part of Jhunjhunu tehsil i.e. Malsisar locality and north eastern part of Chirawa tehsil (Jhunjhunu district) are free from its occurrence from phytogeographic pattern of distribution point of view, as shown in **Figure**.

VIII 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. *Tinospora cordifolia* 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 *Tinospora cordifolia* of the region due to 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, phytogeographers, naturalists and policy makers to evolve

suitable forest management technologies and strategies commensurate to the bio-conditions of the region.

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