Phytogeographical Distribution of *boerhavia diffusa* in Shekhawati Region, Rajasthan

Dr. Mukesh Kumar Sharma 'Bhatt'

Abstract- The present paper discusses the potentiality of natural vegetation i.e. *Boerhavia diffusa*. 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.

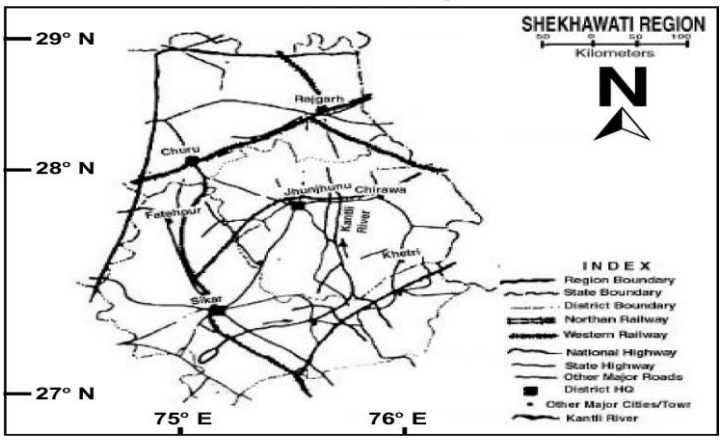
By thus, one can visualize Multi-purpose Medicinal Plant Species (MPMPS) i.e. ***Boerhavia diffusa*** has their varied applied values in the cure of different kind of diseases for the welfare of human beings which naturally show their importance that MPMPS is really may be termed as "Medicinal Plant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

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 : ***Boerhavia diffusa***
LOCAL NAME : Punerva, Punarnava, Chihawari, Santti **(Photoplate)**.

(A) VEGETATIONAL CHARACTERISTICS :

It is a deep rooted perennial spreading herb and by thus it falls under the group of life-forms of 'Crytophytes'. It belongs to the family - *Nyctaginaceae*. Two leaves are appear at one node in which one smaller than other, and upper surface green while lower surface whitish. Flowers sproute in short clusters which are very small in size and reddish in colour and upper part pink. Fruit's are glandular with fine ridges. It's stem is greenish - purple in colour. The plant is odourless with bitter taste. Leaves size are 25 to 30 mm long belt smaller leaves are 12 to 20 cm in length, by thus, from leaf-class classification point of view it falls under 'Nanophylls'. Stems of the plant are cylindrical, stiff and thick at the nodes. The plant spreads by it's branches which are generally one meter in length. It's roots are elongated, topering and somewhat tuberous. Roots grow vertically downwards deep into the soil, they are cream or light brownish-yellow in colour. From vegetational group point of view, the plant falls in the group of 'Herbs'**.**

(B) ECO-CLIMATIC CONDITIONS AND HABITAT:

The herbs is widely distributed in all types of habitat in the area under study except the saline soil areas and top of the hills. Sandy plains habitat is one of the most favourable for it's occurrence, although it is generally observed throughout the other habitats like sand dunes topography, gravel and compact soil formations, stony and rocky habitat, riverine and aquatic habitat also.

The herb has wide range of climatic conditions, it is observed in arid climate, semi-arid climate, sub-humid climate and also in humid climate. It shows it's occurrence from 10 to 150 cm average annual rainfall amount but during summer season when temperature reaches above 42^{o}C it disappears from the surface, by thus, it's temperature range lies between 10^{o}C mean monthly minimum temperature to 42^{o} C mean monthly maximum, respectively. It survives very well in very low moisture condition i.e. relatively humidity even below 10 percent.

(C) PHYTO-CHEMICALS OF PARTS AND PORTION :

The plant as a whole is useful at the name of applied parts and portion i.e. it's leaves, stem, roots, flowers and fruit's. All parts of the plant constitute the drug which contain alkaloids. Punarnava contains about 6.04 alkaloids known as punarnavine. It also contains about 6% of potassium nitrate, an only substance and ursolic acid.

Srivastava, et al. In 1980 and Venkataraghavan, et al.In 1980 studied on the phyto-chemicals of this plant whereas the later worker presented the comparative study on effect of milk fortified with Ashwagandha and Punarnava.

(D) MEDICINAL APPLIED ASPECT :

The herb is useful as medicine for the cure of certain diseases. Due to it's nature as diuretic and laxative, it is also used to treat asthma, dropsy, jaundice, intestinal inflammation and gonorrhoea. Tender shoots are eaten as potherb. The root powder preparation is used in eye diseases. The plain juice of the herb is antidote to rat-poisoning. The herb is used as diuretic and as an expectorant, punarnava is stomachic and is prescribed in the treatment of Jaundice. It is also given in the loss of digestive power, enlargement of spleen and for abdominal pains.

(E) PHYTO-GEOGRAPHICAL DISTRIBUTION :

A. At Global Level :

The plant has wide distribution in the world. It covers the countries fall under Tropical and Sub-tropical belt, specially in Asia, Africa and America. It is found throughout in Indian Sub-continent except the Himalayan Region.

B. At Regional Level :

More or less in Shekhawati Region it has wide as well as thorough out distribution. If we go through the map of Shekhawati Region as shown in **Figure** then one can visualize that plant has been observed in each and every type of habitat. From phytogeographic pattern of spatial distribution then it covers abundant area of it's distribution in which following tehsils are covered - Nawalgarh, Jhunjhunu and northern part of Udaipurwati (Jhunjhunu district), Fatehpur, Lacchmangarh and Sikar tehsils (Sikar district). It has been observed as common pattern of phytogeographic spatial distribution by covering Churu tehsil (Churu district), Malsisar locality, Chirawa and Buhana tehsil (Jhunjhunu district). It is observed frequent phytogeographic pattern of spatial distribution by covering following areas - Taranagar and Rajgarh tehsil (Churu district), sandy plains habitat of Khetri and Udaipurwati tehsils (Jhunjhunu district) and sandy plains of Neem ka thana Shri Madhopur and Danta Ramgarh tehsils (Sikar district). The plant shows it's rare distribution on the stony and rocky habitats through out the area under study, specially located as hilly topography specially in Khetri and Udaipurwati tehsil (Jhunjhunu district), and Neem ka thana, Shri Madhopur and Danta Ramgarh tehsil (Sikar district) as

shown in the above mentioned figure respectively. It shows rare or no occurrence in pure to aquatic habitat but it shows rare common occurrence on riverine habitat, all three rivers (Kantli River, Lohargarl ki Nadi and Chandrawati river) are seasonal rivers, hence, most of the period of the year the river beds remain dry respectively. Among human settlements here, the author has not shown any kind of interpretation from phytogeographic study point of view.

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. ***Boerhavia diffusa*** 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 ***Boerhavia diffusa*** 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.

REFERENCES

[1] Anonymous (1991) Nature and Extent of Biodiversity in Arid and Semi arid Region of India.-CAZRI Jodhpur.
[2] Bachketi, N.D. (1984) Social Forestry in India, Problems and prospects, Published by Birla Institute of Scientific Research, New Delhi.
[3] Bhandari M.M. (1990) Flora of the Indian Desert (Revised) MPS Report Jodhpur.
[4] Cain, S.A. and Castro, G.M.de O.(1959) Manual of vegetation Analysis. Arper and Row, U.S.A.
[5] Charan, A. K. (1992) Plant Geography, Rawat Publication, Jaipur
[6] Clements, F.E. (1916) Plants succession - An analysis of the development of vegetation. Washington, D.C.
[7] Eyre, S.R. (1963) Vegetation and soils : A world Picture, Ed ward Arhold.
[8] Hills, E.S. (1966) (ed.), Arid Lands, UNESCO and Methuen.
[9] Hooker, J.D. (1906) A Sketch of the flora of British India, London.
[10] Koppen, W.P. (1900) Versuch einer Klassification for Klimate, uorzugsweise nachihren beziehurgen zur planzenwett. Geogr. Z. 6:593-611..
[11] Krebs, C.J. (1978) Ecology - The Experimental Analysis of distribution and abundance. Harper and Raw.
[12] Levin, D.A. (1979) The nature of plant species, Sci 204. 381-4.
[13] Linneaus S.C. (1753) Species Plantarum.
[14] Mani, M.S. (1974) Ecology and Biogeography in India. Dr. W. Junk. B.V. Publishers, The Hague.
[15] Money, D.C. (1965) Climate, Soil and vegetation. University of Tutorial Press, U.K.
[16] Sharma, M.K. (2007) Medical Plant Geography, Rachana Publications, Jaipur.
[17] Polunin, (1967) Introducing of Plant Geography and some related Science. London.
[18] Rathore, N.S. (1992) Application of Remote Sensing in Forest Cover Mapping of North Aravlli's Mountains Ranges. XIV-Indian Geography Congress, Jaipur, Abstract Publication, pp. -31.
[19] Raunkiaer, C. (1934) The Life-forms of the plant and statistical plant geography. Clarendon Press. Oxford.
[20] Robinson, H. (1978) Biogeography. MacDonald and Evan,London.
[21] Shankar V. and Kumar S. (1988) Vegetation ecology of the Indian Thar desert. International Journal of Ecology Environmental Sciences 14: 131-155. Sciences 14:131-155.
[22] Shivshwami, N and Shriniwasan, V. (1977) The role of trees in the control of environmental pollution. Expl. News : 21(52) pp-52, New Delhi.
[23] Srivastava, K. et al. 1980. Effect of *Boerhavia diffusa* and aminocaproic acid on fibrinolytic activity. In: IUD pathology and management, Vol. III (ecls.) E.S.E. Hafez and W.A.A. Van os, M.T.P. Press Ltd. Lancaster, England, P. 121.
[24] Vietmeyer, N.D. (1986) Lesser-known Plant of Potential use in Agricultural and Forestry Sci., 232, 1379-84.
[25] Venkataraghavan, S. et al. 1980. The comparative effect of milk fortified with Ashwagandha and punarnava. Res. Ayur. Siddha. I, 370.Watts, D. (1971) Principles of Biogeography. McGraw Hill, London.
[26] Wegner, P.L. (1965) Vegetation and Soils. Mc Graw Hill, New York.
[27] World Resource Institute, (1992) World Resources. Oxford University Press, New York.