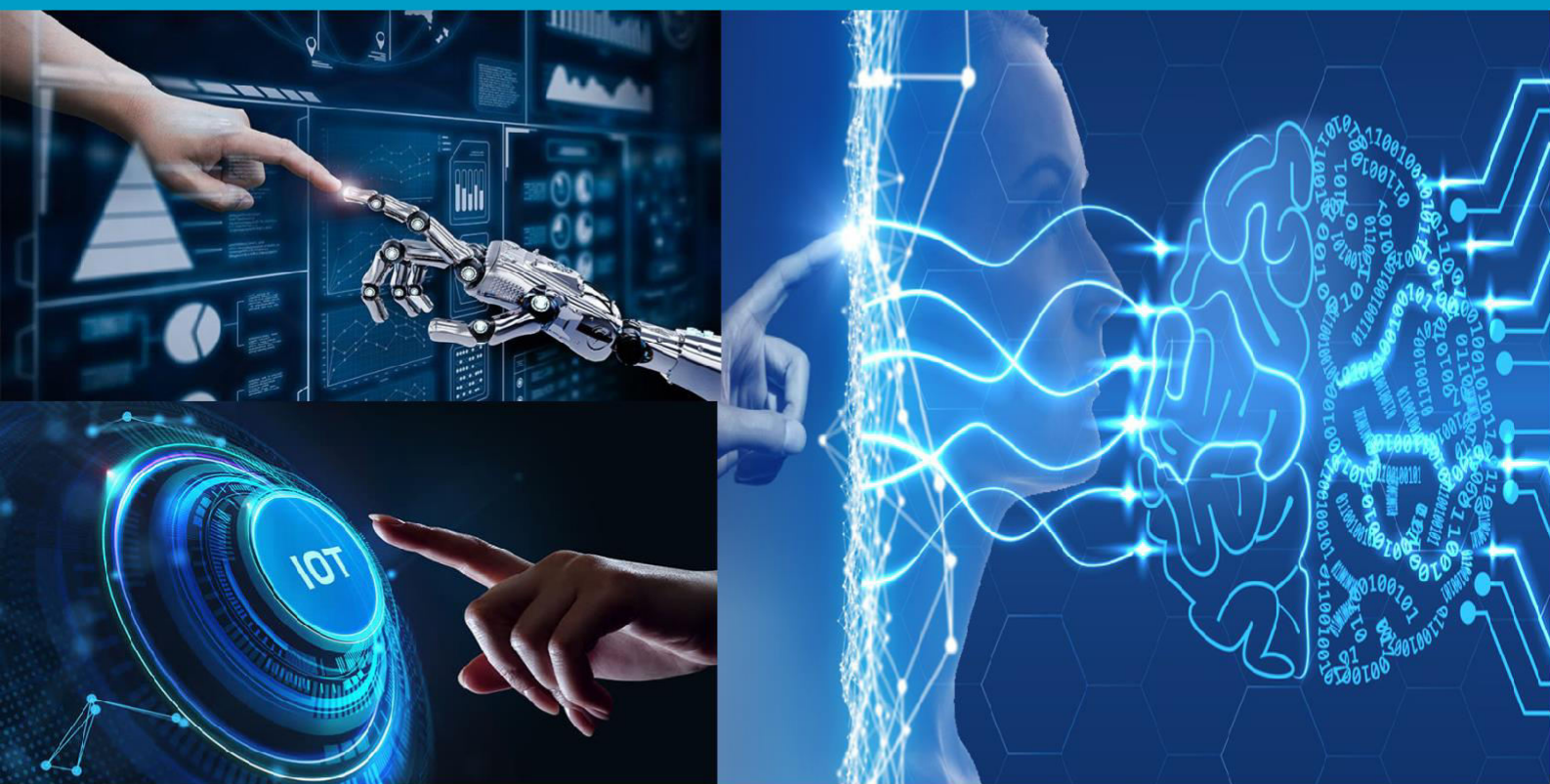




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The Impact of Ecoclimatic Factors on the Distribution of Floral Diversity of Shekhawati Region-A Part of the Indian Thar Desert

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ABSTRACT: Shekhawati region is rich with biodiversity which attract the researchers, scientist and biologist. The fauna and flora found in the study area has highly desertic adaptations and are not evenly and densely spread on the land of study area. The study conducted when data of Nilgai observed. The region has 120 species of migratory and resident birds of the desert. The chief floral elements in the region are *Prosopis cineraria* (Khejri), *Azadirachta indica* (Neem), *Ficus religiosa* (Pepal), *Dalbergia sisso* (Seesam), *Acacia nilotica* (Desi Babul), *Salvadora persica* (Mitha Jal), *Albizzia lebbek* (Sares), *Prosopis juliflora* (Vilayti Babul). The leaves of desert plants are often reduced to spines and thorns to minimize water loss by evaporation. Shekhawati region located in north-eastern of Rajasthan and cover only 8% area of the state. Climatic condition of the area is both extreme – very hot summer and very cool winters. The region lies in semiarid zone with low floral diversity due to scanty and irregular rainfall. Wind velocity in the region is quite high during the summer and sand storms are common feature of the area. Sand dunes are dominant in the entire region especially in northwestern part. The region is part of Indian Thar Desert exhibit little mammalian diversity. During last three decades numbers of large mammals has been drastically decreased in the Shekhawati region due to inference of people in natural habitats of mammals for their beneficiary activities. The mammalian diversity of Shekhawati region is represented by 40 species of mammals belonging to 20 families and 31 genera. The region covers 9% mammalian diversity of India and 58.8% of Thar. During survey of mammalian species both direct methods like line transect method and indirect methods by identification of sign were used. The conversion of desert land into irrigated agriculture is also affecting the biodiversity scenario in the region. Mammals that are adapted to desert environment is rapidly vanishing due to interference and destructive activities of man.

KEYWORDS: Shekhawati, floral, ecoclimatic, Thar, desert, diversity, land, leaves, study, adaptations, rainfall

I. INTRODUCTION

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 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. The Thar, as an ecosystem, is under the process of ecological transformation.[1,2] This transformation has largely been brought about by the mighty Indira Gandhi Canal and partly through global climate changes. Indira Gandhi Canal water in the Churu and Jhunjhunu district is mainly used for drinking purpose. Because of this Canal irrigation, shadow effects on flora had been observed and 42 plant species of irrigated area have expanded their distribution to non-irrigated area. Uncontrolled mining in mountain range of Aravalli and other small hillocks in Jhunjhunu and Sikar districts are also affecting the floral and faunal diversity. Changing floral composition will definitely affect the faunal composition of the region. Many mesic species of small mammals are expanding their distribution towards the Thar many aquatic birds have recently invaded the Thar[3,4]. The present inventory of mammals and birds will help in monitoring the population in future. Shekhawati region is not so rich in carnivores and large mammals' diversity as compared to other districts of the Thar desert. It is vast grassland with sporadic trees here and there. Ziziphus and thorny plants are collected as fire wood. *Prosopis cineraria* and *Acacia nilotica* are the dominant tree species which have their mostly distribution in north - western part of Shekhawati region by covering north-western part of - Sikar district and tehsil of Churu as well as Taranagar of Churu district.[5,6]

The particular type of vegetation has two tree species *Salvadora oleoides* and *Prosopis cineraria* and combination with a shrub species i.e. *Capparis decidua*. The vegetation type covers one dominant tree species i.e. *Anogeissus pendula*,



with combination of two shrub species which are family - *Euphorbia caducifolia* and *Rhus mysorensis*. The particular vegetation type has two dominant tree species namely - *Prosopis cineraria* and *Tecomella undulate*[7,8]

II.DISCUSSION

Many medicinal plants were also observed in this region:-

Withania somnifera- 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. 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 its rainfall distribution (between 25 cm. to 100 cm.) and temperature variations (30o c to 50o 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. Several biologically active elements and compounds are reported. [9,10]

Alkaloides - Withasome, Nicotine, Tropine, Anahygrene, cuscohygrine, Recently a new alkaloid "Visamine" was reported from USSR. ; Glycosides - Withaniol. ; Misc. compounds - Reducing sugars amino acids - Glycine, Aspartic acid Glutamic acid, cystine, proline, Tryptophan, Alanine, Tyrosine are reported. We also reported about "Withanolide D" a steroidal lactone and "Withaferin A" from leaves. They have anti-tumor effects. [29,30] This is 'very common and popular herbal drug' and the expert mentioned it invariably in all prescriptions calling it as a "divine gift". It is used 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.[11,12]

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 technogenic and human activities it has resulted in the degradation of *Withania somnifera* 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[27,28]

The results suggest to take up immediate steps to adopt the improved forest management technologies with people's participation to lack of effects of decrement 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.[13,14]

III.RESULTS

Tribulus terrestris is also found as herbal species. The plant belongs to the family of Zygophyllaceae. It is an annual herb, by thus, belongs to the 'Herb' group from vegetational group classification point of view. It is a trailing and spreading herb, the plant is densely covered by trichomes with minute hairs. Leaves are compound, in opposite pairs, by thus, from leaf-class classification point of view, the plant belongs to the 'Leptophylls.' Its flowers are usually silky, mostly yellow in colour. Fruit's are globose, spinous, each with two pairs of hard sharp spines, in which one pair of spines is longer than another pair. Thus, from xerophytic categorization point of view, the herb falls under the category of 'spiny and thorny.[25,26] The herb species is very common on the habitats of loose sandy plains and also on compact as well as gravel formations, it has also occurrence on sand dunes habitat but comparatively show less occurrence than loose sandy plains areas. It is also found on stony and rocky areas but show, rare or frequent, occurrence. By thus, it is a herb species may be termed as multi habitat species. Plant as a whole is important for the



resion steroidal saponin and diosgenin is isolated from this plant. It is very rich in proteins and calcium. Dried fruit contain semi-drying oil, peroxides, diastose, traces of glucosides, resin, protein and large amount of inorganic matters. From the roots, stem and leaves, sitosterol and stigmasterol were also isolated. Scientists also studied the biologically active principles of this herb species, which are - (a) Alkaloides - Harman and Harmine, (b) Misc. compounds Resin, fixed oils, tannins, reducing sugars, pero-xidase diastase enzymes and nitrates etc. and (d) Saponin - Sapogenin, Chlorogenin, Ruscogenin. This plant is a most important ingredient of an Ayurvedic preparation. The drug is diuretic, tonic, aphrodisiac. The decoction of leaves is useful as a gargle for mouth trouble, painful gum and to reduce inflammation. The leaves in creases the menstrual flow, cure, gonorrhoea.[23,24] The fruit's are useful in urinary complaints painful micturition and impotence. Fruit's are also used to treat coughs, scabies and anememia. The roots are said to be stomachic, appetiser, diuretic and carminative. Besides this some researchers also stated that the plant is very common herbal drug and is a drug of choice for the treatment of urinary diseases specially Haematuria, for which they assert that it is a boon. It has great cooling effect and are also used for promotion of urination and as a nerve tonic. Natural vegetation i.e. *Tribulus terrestris* 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 *Tribulus terrestris* of the region due to in irregular rainfall and wind erosion and high temperature are more serious and widespread. [21,22] 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 biologists, botanists, phytogeographers, naturalists and policy makers to evolve suitable forest management technologies and strategies commensurate to the bio-conditions of the region.[15,16]

IV.CONCLUSIONS

Plant-diversity is under threat from human activities, habitat loss, fragmentation, degradation, overgrazing, pollution and population growth, over-exploitation of natural resources, invasive alien species and environmental degradation.[19,20] Other important threats to biodiversity like overharvesting of selected species, pollution, toxic discharges, habitat alteration, competition, narrow geographical area, disease and parasites, habitat acidification, modification homogenization of ecosystems, natural disasters, deforestation, and soil erosion are the important threats to biodiversity. Plant diversity provides essential goods for human welfare like as food, fibre, that's most important. Plant diversity and the many ecosystem services that it provides are a key factor determining human well-being. Plant diversity is losses has-direct and indirect negative effect on living organism. Over the next few decades, as monoculture yields continue to decelerate or decline for many crops, and as demand for ecosystem services continues to rise, diversification could become an essential tool for sustaining development and ecosystem services.[17,18] Floral diversity provides us much essential welfare like food, fiber. Loss of variety of plants has direct and indirect result as negative impact on organisms. Over the next few decades, as monoculture yields continue to decelerate or decline for many crops, and as demand for ecosystem services continues to increasing, diversification can become an essential tool to sustaining growth and ecosystem services. The stress on floral-diversity is far beyond the levels imposed according to the natural global climate changes occurring in the recent evolutionary past. This includes increased temperature, shift of climatic zones, melting of snow and ice, rise in sea level, drought, floods and other extreme weather events increased invasions[30]

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