International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
ISSN Online: 2349-4182 ISSN Print: 2349-5979
Received: 13-01-2025, Accepted: 12-02-2025, Published: 28-02-2025
Volume 12, Issue 2, 2025, Page No. 128-133

Documentation of tree diversity found in Chirawa tehsil Rajasthan

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Abstract
Taxonomic studies of a particular area's flora, or a subset thereof, are known as floral studies. Floristic diversity is the total number of plant species spread within the boundaries of a particular region, regardless of whether they are native or farmed. It is a representation of flora and plant assets. Extensive species diversity is a sign of abundant flora. The diversity of plants in a region defines and reflects its ecology. The state of the world's climate and other elements control it. One of the most often recorded families in the floristic area was the family Fabaceae, which dominates in the forest. The floristic analysis showed that five primary species families accounted for 53.53% of the total flora assessed in the research area, with three families—Asteraceae, Fabaceae, and Poaceae being classified as dominant in the floristic structure of the River Nile and other parts of Egypt. Several species of plants are important and tribes reside in the forest area are dependent for many purposes and used them as food and fodder and for cure of various disease.

Keywords: Floristic diversity, species diversity, economically, ecology, boundaries

Introduction

Flora is the simplest list of plants occurring within a given region and they are the living organisms lacking power of locomotion which resides its whole life in any circumstances at a single spot (Ramachandran *et al.*, 1988) Floristic catalogues are the source of botanical details for a particular field and it serves as a useful point for numerous detailed learning (Keith, 1988) [19]. The listing of species is easy and comparatively less time consuming and it provides important public outreach and fundamental information to use in addressing the biodiversity crisis (Funk *et al.*, 2007) [13].

Owing to its topographical variations and habitat heterogeneity with a broad altitudinal gradient, the valley supports a rich floristic diversity (Mir *et al.*, 2020) [21]. Despite of representing only 0.4% of the total geo graphic area of India, Botanical assessments involving structural studies of vegetation zones and floristic composition are essential for determining significant elements of plant biodiversity, protecting threatened and economically important species and monitoring protected areas (Melese & Ayele, 2017; Pukkala, 2018; Ramachandran & Swarupanandan, 2013) [22, 26, 27]. the region encompasses 12% of total angiosperms of India (G. H. Dar & Khuroo, 2013**)**

The floristic composition and phytosociological interrelationships are quite dynamic in nature and tend to change with respect to biotic and abiotic components of any ecological system. The plant community of a region is a function of time and climate (Harrison *et al.*, 2020) [16]. however, a complex of factors, namely, vegetation type, slope, aspect, precipitation, edaphic factors, and altitude determines the community composition, structure, and distribution pattern of diversity in tree vegetation.

One of the world's twelve mega biodiversity countries is India. Its unique geographic location contributes to the diversity of its flora, animals, soil, and climate. Despite making up only 2.4% of the world's total territory, the country is home to 47513 plant species, or 11.4% of all plant species worldwide (Singh and Dash, 2014). According to Anonymous (1999), India is home to over 17,500 angiosperms, 64 gymnosperms, 1100 pteridophytes, 2850 bryophytes, 6500 algae, 14500 fungi, and 2000 lichens. This figure demonstrates the variety of plants in our country. Rajasthan is the largest state in the country by area and is distinguished by a wide variety of physiographic and meteorological characteristics. It has an exceptionally wide range of plant species. Numerous workers have previously reviewed and reported floral diversity of Rajasthan (Sharma, 2002; Tiagi and Aery, 2007; Charan and Sharma, 2016; Sharma and Aggarwal, 2008).

There are between five and thirty million distinct species of living creatures on the earth, according to estimates. Along with a vast number of vertebrates and invertebrates, there are also a lot of green plants (3,000,000 species), fungi (8,000,000 species), insects (40,00,000 species), and microbes (360,000 types) (Singh *et.al.*, 2004) [28].

Botanical assessments involving structural studies of vegetation zones and floristic composition are essential for determining significant elements of plant biodiversity, protecting threatened and economically important species and monitoring protected areas. The climate system, as well as natural and anthropogenic-influenced ecosystems, have been modified and altered by global change, which includes changes in atmospheric composition, climate, and land use. These changes
will eventually have an impact on the world's ecosystems, particularly altering plant distribution and growth. Diversity of plants generally refers to the diversity and variability of plants in the given area.

The district is almost half the national average due to its 13% forest acreage. The "Jant" tree, also known as the Khejri (*Prosopis specigera*), is the main species present in the woodland. It is widely distributed and used for a variety of things, including giving fuel for residential use, preventing soil erosion, and feeding the fauna when its leaves have dried up. “Babul (*Acacia nilotiea*), Shisham (*Dalbergia sisso*), Neem (*Azadirachta indica*), Pipal (*Ficus religiosa*), Jal (*Salvadora oleoides*), and Bargad (*Ficus bengalensis*)” are other species that have been discovered.

Additionally, mango trees (*Mangifera indica*) can be found in the mountainous regions of the Khetri and Udaipurwati tehsils. There is also the beri tree (*Zizyphus mauritiana*), which gives the fauna "Pala" as fodder. At Jhjunjhunu, there is a forest nursery. Several different kinds of grasses also develop there. The most common shrub is called Phog (*Calligonum polygonoides*) (Kumar, 2015) [20].

The analysis of vegetation aids in the development of a comprehensive map of the plant communities found in a given area. In a more deliberate sense, vegetation is the manifestation of all plant cover in a given region. This can consist of a complex or mosaic of plants, or it can be made up of one or more plant communities. Every forest has a different structure of tree species variety depending on factors including altitude, slope orientation, soil type, and disturbance kind and intensity. The overall expression of numerous environmental elements that act gradually or cyclically creates the type of vegetation in particular area. Different type of plants are found in vegetation are varies in different area in different ratio. Vegetation can maintain the proper balance of nutrients in an ecosystem and provide insight into the physical and chemical properties of the soil. It's also worth noting that the frequency of dicotyledon species (78.18%) and genera (80.22%) is almost equivalent. The monocotyledonous genera (19.42%) and species (21.59%) share this similarity as well.

According to a study, the Jhunjhunu Conservation Reserve has a wide variety of medicinal plants and high plant diversity. At a number of the study sites, it has also been possible to find some uncommon and endangered plants, including "*Enicostema hyssopifolium, Ephedrafoliata, Peganum harmala, Ceropegia bulbosa, Leptadaenia reticulata, Indigo feracaerulea, Abutilon fruticosum,* and *Tecomella undulata"*. Most of the species that were reported were local, although a few exotic plants were also found in the area (Chaudhary and Shringi, 2017) [7].

The most vital commodities for human welfare that are provided by floral diversity are food and fiber. The variety of plants and the many habitats have produced a wealth of materials that are beneficial to human well-being. Plant species serve as a "safety net" to guarantee our access to food. Plant diversity gives us a wide range of foods to choose from for a healthy, balanced diet. The variety of plants gives us wood fuel, an inexpensive and alternative energy source that we can use to heat our houses, prepare meals, and boil water. We can breathe clean air because of the photosynthesis response caused by floral diversity. People can obtain traditional treatments from ethnomedicinal herbs. By emitting moisture through their leaves and offering shade to other living things as well as to us, plants preserve the natural world. These preserve an individual organism, a group of organisms, or entire ecosystems. Floral diversity contributes nutrients, nitrogen fixation, the hydrological cycle, and the biogeochemical cycle to the preservation of soil quality. Diverse plant life contributes to erosion prevention and mitigation. Plants take in CO2 and continue to supply humans with oxygen. The diversity of flowers offers us many benefits, including raw materials for apparel production, building materials, decorative items, ecotourism, cosmetics, medications, and personal care products. Similar to a botanical garden, conservation area, or natural habitat for research and instruction, plant diversity offers research value **(**Jeph, 2019) [18].

floral diversity is determined by the total number of wild or domesticated species found there, which is typically represented by the area's vegetation and plant resources. Natural calamities, excessive grazing, agriculture, and above all anthropogenic interaction have all contributed to the ongoing suffering of floral diversity. It gives an improved measure of blooms, variety, and plant gene pools in every region.

There are only a few groups of plants that put a attraction and influence on human beings as trees, it is because of their utility, scientific value, beauty, longevity, or due of their dimensions. Trees are the most important landscape architects of our planet, not only in forests but also in countless other habitats, from savannahs and semideserts to boreal taiga (Fazan, et.al,2020) [11]. It is astonishing since plants, especially trees and other woody species, are the backbone of life on Earth (BGCI,2021) [5]. Trees have changed not only the appearance but also the dynamics of terrestrial habitats (Meyer *et al* 1999& Stein *et al*,2007) [24, 30]. Moreover, the number of tree species worldwide is estimated to be between 60,000 (Beech *et al*,2017) [3]. and 73,000 (Cazzolla Gatti *et al*,2022). Trees and other woody plants constitute more than 70% of the total biomass on Earth (Fitz John *et al*,2014& Bar-On *et al,* 2018) [2]. Due to this importance and domination of most terrestrial ecosystems, trees play an important role in maintaining biodiversity, providing food and habitat for countless microorganisms, fungi, climbers, invertebrates, and vertebrates (Mitchell *et al*,2019, Fazan *et al* 2022, Gwiazdowicz, *et al* 2022) [12, 15, 23]. Furthermore, trees were also indispensable for the development of our own species and are important for our survival today and in the future. Billions of people depend on trees and shrubs for fuel, medicine, food, tools, fodder for livestock, shade, watershed maintenance, and climate regulation (Beech *et al* 2017) [3]. So, trees have a great scientific, economic, social, cultural, and aesthetic values.

Some tress was also reported for their medicinal attributes in previous studies of Uprety *et al.,* (2012) [31]. Everybody needs to know that why Biodiversity is important for mankind. Several species of plants are economically important and tribes reside in the forest area are dependent for many purposes and used them as food and fodder and for cure of various disease.

Trees are among the most important organisms that shape the Earth's biosphere. They are not only the backbone of global biodiversity but also vital for the long-term flourishing of human civilization. Not only their number but also their diversity, particularly their genetic diversity, is of high importance (Bezemer, N *et al*,2019& Exposito-Alonso et.al,2022) [4, 10].

Now, more attention is paid to biodiversity because on the one hand there is growing awareness about its importance and on the other hand there is a depletion [Singh, P., and Dash, S.S. (2013] [29]. Knowledge of floristic composition is important to know about the overall structure and function of the ecosystem and the diversity of plants of an area helps in assessing wealth and potentiality of that area. (Panda, *et al.* 2014) [25].

Material and Methods

The present study will be conducted at Narhar conservation forest region of Chirawa tehsil. It is declared as a conservation forest area by Rajasthan government in 17 June, 1985. It covers about 0.83 km^2area of the Chirawa tehsil. It is located 31 km towards east from district

headquarters Jhunjhunu, 9 km from Chirawa and 180 km from state capital Jaipur. Rajasthan second largest Dargah Hajrat Haji Shakarvar Baba is also located in this region. Mainly *Prosopis cineraria* (Khejri), *Salvadora persica* (Jal), *Prosopis juliflora* (Vilayati kikar), *Acacia nilotica* (Babul) are the dominant trees in Narhar conservation forest region. The plants were documented by efforts such as surveys, field trips, observation, and interview with experiences people. Data were also collected by filling of questionnaires both scientific and their local language also. Photography also done during the survey, interaction with local people and data collection during the study. Plant collection was done to identify the taxonomic and medicinal properties of plants. So, intensive exploration trips were also conducted to document plants and to know prevailing biodiversity of the selected area. The portion of specimen were collected in clear phyllotaxy and branching system. All the specimens collected will be serially numbered and will be identified with the help of floras.

Result and Discussion

In the present study, survey was conducted at "Narhar conservation forest region" to identify floral diversity. Study shows data pertaining to 53 different trees growing in studied location, where in the table shows Scientific name common name and family of the plants. The plants shown in Table 1.1 belong to 24 different families (total 24), which includes Anacardiaceae, Annonaceae, Arecaceae, Bignoiaceae, Bombacaceae, Burseraceae, Capparaceae, Celastraceae, Combretaceae, Moringaceae, Poaceae, Rhamnaceae, Tamariaceae (1 each), Apocynaceae, Meliaceae, Myrtaceae, Rutaceae, Salvadoraceae, Simaroubaceae and Ulmaceae (2 each), Boraginaceae, Euphorbiaceae and Moraceae (3 each) while maximum number of trees belonged to Fabaceae (17 species). The Fabaceae family, also known as the legume family, exhibits remarkable adaptations for survival and ecological success. The adaptations are nitrogen fixation by root nodules, physical dormancy in seeds, hard seed coat and diverse growth habits, enable them to thrive in various challeging environments. Trees exhibit significant role in nature where trees are located, they represent an interdependent part of complex ecosystems capable of providing a wide range of economic, social and environmental benefits. Trees conserve energy, reduce carbon dioxide in the atmosphere, improve air quality, reduce storm flow, and enhance the beauty of our nature by adding colour, texture, and form to our planet.

Table1 1

S.No.	Botanical Name	Common Name	Family
1.	Mangifera indica L.	Aam	Anacardiaceae
2	Polyalthia longifolia (Sonn.)	Ashoka	Annonaceae
3	Alstonia scholaris (L.) R.Br.	Saptparni	Apocynaceae
4	Plumeria rubra	Champa	Apocynaceae
5	Phoenix sylvestris (L.) Roxb.	Khajoor	Arecaceae
6	Tecomella undulataL.	Rohida	Bignoniaceae
7	Bombax ceiba L.	Semal	Bombacaceae
8	Cordia dichotoma G. Forst.	Lasora	Boraginaceae
9	Cordia gharaf (Lam.)	Goondi	Boraginaceae
10	Ehretia laevis (Rottler ex G. Don) Roxb	Brown Cedar	Boraginaceae
11	Boswellia serrata Roxb. ex Coleb	Salar	Burseraceae
12	Capparis decidua (Forsk.) Edgew	Ker	Capparaceae
13	Maytenus emarginata (Wild.)	Kankero	Celastraceae
14	Anogeissus pendula Edgew.	Dhok tree	Combretaceae
15	Emblica officinalis (Gaertn)	Amla	Euphorbiaceae
16	Jatropha curcus L.	Ratanjot	Euphorbiaceae
17	Ricinus communis L.	Arandi	Euphorbiaceae
18	Acacia catechu (L.f.)	Khairi	Fabaceae
19	Acacia leucophloa (Roxb.) Willd.	Ronz	Fabaceae
20	Acacia nilotica (L.) Willd. ex Delile	Kikar	Fabaceae
21	Acacia Senegal (L.) Willd.	Kumta	Fabaceae
22	Albizzia lebbek (L.) Benth.	Siris	Fabaceae
23	Bauhinia variegata L.	Kachnar	Fabaceae
24	Butea monosperma (Lam.) Taub	Palas	Fabaceae
25	Cassia fistula Linn.	Amaltas	Fabaceae
26	Cassia siamea (Lam.)	Shyam amaltash	Fabaceae
27	Dalbergia sissoo Roxb ex DC	Shisham	Fabaceae
28	Delonix regia (Hook.) Raf.	Gulmohar	Fabaceae
29	Leucaena leucocephala (Lam.)	Subabool	Fabaceae
30	Parkinsonia aculeata L.	Keshu	Fabaceae
31	Pithecellobium dulce (Roxb.)	Jungle Jalebi	Fabaceae
32	Prosopis cineraria Linn.	Khejri	Fabaceae
33	Prosopis juliflora Sw.	Vilayati babool	Fabaceae
34	Tamarindus indica L.	Imli	Fabaceae
35	Azadiracta indica A Juss.	Neem	Meliaceae
36	Melia azadirach L.	Bakayan	Meliaceae
37	Ficus benghalensis L.	Bargad	Moraceae
38	Ficus religiosa L.	Peepal	Moraceae

39	Morus alba L.	Shahtoot	Moraceae
40	Moringa oleifera Lin.	Sahjan	Moringaceae
41	Eucalyptus camaldulensisDehnh.	Safeda	Myrtaceae
42	Eugenia jambolnaLam.	Jamun	Myrtaceae
43	Dendrocalamus strictus (Roxb.)	bans	Poaceae
44	Zizyphus mauritiana (Lam)	Bordi Beri	Rhamnaceae
45	Aegle marmelos (L.) Correa	Bel patar	Rutaceae
46	Murraya koenigii L.	Meetha Neem	Rutaceae
47	Salvadora oleiodes L.	Meetha jal	Salvadoraceae
48	Salvadora persica L.	Khara jal	Salvadoraceae
49	Ailanthus excelsa Roxb.	Ardu	Simaroubaceae
50	Balanites aegyptica (L.) Del.	Hingota	Simaroubaceae
51	Tamarix aphylla L	Farash	Tamariaceae
52	Holoptelea integrifolia Roxb.	Churel	Ulmaceae
53	Pongamia pinnata L	Papadi	Ulmaceae

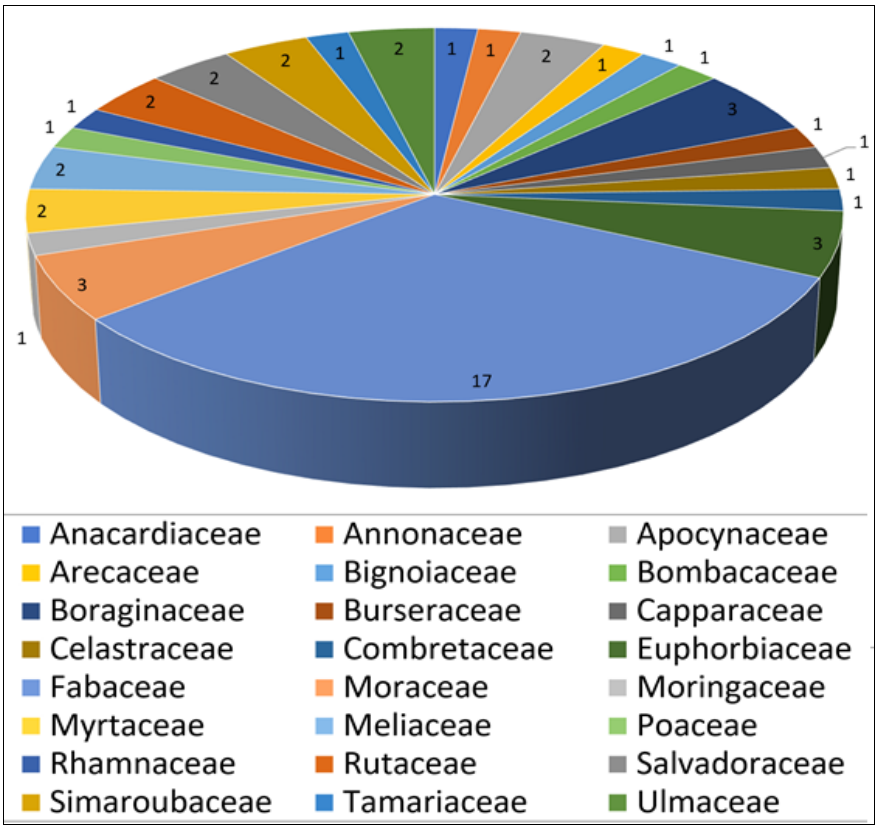

Fig 1: Family-wise distribution of trees

Melia azadirach

Aegle marmelos

Acacia Senegal

Tecomella undulata *Prosopis cineraria* *Ficus religiose*

Polyalthia longifolia *Ficus benghalensis* *Cordia dichotoma*

Conclusion

The results revealed 53 different trees growing in this region belongs to 24 different families but maximum number of trees belonged to Fabaceae (17) Most of the trees enlisted in the study, flower in summer season (March-June) (19) followed by Rainy season (July-October) (9), winter season (November-February) (17) while 3 trees flowered throughout the year. The diversity and structure of these plant communities can be influenced by various abiotic and biotic factors, and some species and/or families may not be as able to inhabit particular habitats as others (Rahman *et al.*, 2018). Certain species and/or families rarely have the same ability to occupy specific habitats as others, where varied abiotic and biotic effects can alter the diversity and organization of these plant communities (Haq *et al.*, 2021b; Nafeesa *et al.*, 2021). The knowledge of tree diversity in a particular area play an important role for basic research as the data generated through these studies is highly helpful in ecological, biogeographic, taxonomic and evolutionary studies.

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