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A REVIEW ON FLORISTIC ACCOUNTS OF MONOCOTYLEDONS DIVERSITY OF GUJARAT, INDIA

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Abstract- The world's Biodiversity is the degree of variation of life i.e., species, ecosystem, the biome of the planet. It represents the diversity and abundance of life expressed at the genetic, population, species and ecosystem levels in terrestrial, marine, cultivated and natural habitats. Biodiversity is of great importance for ecological, economic and for ecosystem stability. The information obtained in a few surveys in the field of floristic; also, the taxonomical study gives us knowledge about the past species, which is supportive of presenting studies and research. Floristic diversity studies have acquired great importance in developing countries to enhance their plant wealth. Floristic diversity is enormously important for the maintenance of rare, endangered and threatened plant species. Floristic studies are taxonomic studies of flora or of a significant segment of flora of a given area. This review focuses on the monocot diversity of Gujarat, India.

Keywords: Plants, Taxonomy, Diversity, Floristic, Biodiversity

Introduction

Biodiversity means the biological variety and variability of living organisms on earth. The variation among the species is extremely helpful in the growth of the agriculture industry, medicine industry and for future research purposes (Knopf, 1992). Total Angiospermic plants recorded are 2,205 by different authors from Gujarat, which contributes to about 12.5% of the National Diversity of Angiospermic Plants (Glimpses of Forests in Gujarat, 2011). Taxonomy is a grouping and classifying organisms according to their physical characteristics and homology in a very scientific way. Such that the individuals within the group share identical characteristics and have common ancestors is called as taxonomy. Floristic studies are taxonomic studies of a flora, or of a significant segment of the total flora of a given area. It means preparing a whole list of plants that constitutes a vegetation community (George, 1974). The most important part of any floristic survey is the correct scientific identification of the plant wealth found in that particular area (Jasrai *et al.*, 2014). Floristic studies have acquired great importance in recent times in response to the need of developing and underdeveloped countries to assess their plant wealth. The appearance and existence of any plant community are entirely subject to its floristic composition and, therefore, the organic structure spectrum of its individual components (Thakur, 2012).

GLOBAL WORK ON FLORISTIC/ MONOCOT FAMILY

Floristic research plays an awfully important role in understanding the interaction between the species and provides good knowledge about the species. Several studies have been conducted in this field. A survey was conducted at 50 different kinds of turfgrass, including fields like rugby fields, hockey fields, turf nurseries, lawn areas, landscape areas, recreational park areas, green golf and fairway golf in Malaysia, to spot the most common and prevalent weeds related to turf grass. A total of 79 different weed species belonging to 16 families have been identified, out of which 43 species were annual and 36 were perennials; 30 grassy weeds, 17 sedges and 32 were broadleaf weeds. Some of the frequently occurring species covering over 50% fields included *Cyperus aromaticus* (RIDL.), *Fimbristylis dichotoma* (L.), *Chrysopogon aciculatus* (Retz.) and *Borreria repens* (DC.). From the relative abundance indices, it was found that the perennials were more dominant than annuals (Kamal *et al.*, 2009).

Thomas (1985) conducted a survey on weed species which reported that the relative abundance value clearly indicated an awfully few dominated weed species. This survey system used in Saskatchewan for cereal and oilseed crops.

Furthermore, it indicated that the dominant weed flora in any crop field is typically about ten species, out of which the dominant ones are about 3 to 4. Some species like *Cyperus rotundus* (L.) and *Digitaria sanguinalis* (L.) were more dominant out of 10 most common species (Moody and Drost, 1983).

Some studies about weeds species say that they are an issue in turfgrass areas. Turfgrass areas may be divided into three primary biological categories, which are grasses, sedges and broadleaved in North America, Europe and Australia (Bennet, 2004).

Al-Gohary (2008) found that perennial weeds, especially grasses, were on top of annual weeds in Egypt. A total of 377 species have been recorded in eleven surveyed wadis of Gebel Elba district; there were 43.2% annuals, 56.2% perennials. One-hundred fourteen species are confined and 57 species are recorded for the first time in this district. Most of Gebel Ebla species were plural-regional 34.7%, followed by 30 % tri-regional, 25.7% bi-regional and 9.5% mono-regional.

Xing *et al.*, (2000) also observed a more diversified 74 weed species belonging to 24 families in turfgrass field in Hangzhou, China, Where the monocot family was dominated in that area followed by Poaceae and Cyperaceae family.

In Brazil, a floristic survey of weeds in lawns of *Paspalum notatum* (Flûggë) under sunny and shaded by crowns of trees represented by only 45 weed species distributed in 15 families, of which Asteraceae, Poaceae, Cyperaceae, Euphorbiaceae and Fabaceae represented the greater number of species (Maciel *et al.*, 2008).

It has been said that the weed vegetation of a specific area relies upon several factors like the environment, seraphic and biological factors that include soil structure, pH, nutrients, moisture condition, associated crops, weed management measures and field history, especially in local geographical variations. This study is about Changes in the weed flora in transplanted rice as affected by the introduction of improved rice cultivar and the relationship between weed communities and soil chemical properties. (Kim *et al.*, 1983).

Slingby *et al.*, (2006) worked on Phylogenetic Relatedness Limits and Co-occurrence at Fine Spatial Scales of the Cape Floristic Region, South Africa. The Cape Floristic Region of South Africa accommodates roughly 9,000 species of vascular plants making its floristic richness per unit area resemble that of the foremost diverse equatorial regions. Almost half the species found within these regions are concentrated in precisely 33 lineages; this implies that the majority of the floristic diversity has risen through a variety of huge radiations.

Schoeneae could be a huge about 700 species tribe of sedges comprising mostly species endemic to the hemisphere (Goetghebeur, 1998 and Linder, 2003).

A study using molecular and morphological data indicates that the tribe is monophyletic with regard to the remainder of Cyperaceae. Evidence shows that Tetraria is polyphyletic, with the cape species being included in two distinct and unrelated lineages (Muasya *et al.*, 1998, 2000; Verboom, 2006).

The dominance of therophytes 36% indicated that the investigated area was under heavy biotic pressure thanks to various anthropogenic activities as has been reported phanerophytes 46% because the most dominating body globally as has been found within the present study reported dominance of Cyperaceae followed by Poaceae family this study was carried out at western part of the Mediterranean basin (Barbero *et al*., 1990, Raunkiaer 1934).

Another similar study was conducted showing the link between phylogeny and fine-scale co-occurrence; there are the primary to specialize in a lineage in Cyperaceae and therefore, it was the first of its kind to be performed within the hemisphere. This study was about Biodiversity inventory and informatics in Southeast Asia (Webb, 2000; Losos *et al.*, 2003; Cavender-Bares *et al.*, 2004).

The floristic composition and ecology study of the Jibat forest in Ethiopia, where eight community types were recognized, supported altitude gradient and species richness (Bekele, 1994).

Knight (1975) studied the floristic aspects of the Tropical Forest of Barro Colorado Island, Panama. Over 300 species were encountered and most were identified. The data are evaluated for interpreting late secondary succession, detecting soil-vegetation patterns, and for yielding information. Some data suggest that wind-caused canopy gaps are important for the persistence of several species in the older forest.

A floristic and ecological survey of springs in Trentino, Italy was done by combining both the sector method of the Braun-Blanquet approach with taxonomical analysis. A set of 139 Phytosociological relives' including vascular plants and bryophytes, were classified using cluster analysis. 23 vegetation types were identified and, whenever possible, classified at the association level or as phytoene (Tomaselli *et al.*, 2011).

FLORISTIC WORK OF INDIA/MONOCOT FAMILY

With the assistance of the floristic studies within the Indian subcontinent, the structure, vegetation, and species diversity of various Indian ecosystems were done.

Tiwari *et al*., (2020) studied the weed communities related to paddy fields of Mandakini valley, Uttarakhand. Field data was collected by the quadrat method through field surveys within the year. A total of 57 weed species belonging to 45 genera and about 19 families were recorded from the paddy fields.

Some species like *Cyperus iria* (L.) and *Ageratum conyzoides* (L.) are found to be the major problematic weeds within the paddy fields. Poaceae and Cyperaceae contain maximum number of weed species along with other recorded families (Rao *et al.*, 2007).

A number of similar studies revealed that the foremost destructive weeds belong to monocot family Cyperaceae and these results coincide with earlier reports. Cyperaceae plants which is *Lindernia crustacean* (L.) and *Ageratum conyzoides* (L.) were recorded to be the most dominant weed species in paddy fields of Doon valley, Uttarakhand. *Cyperus difformis* (L.), *Echinochloa colona* (L.), *Digitaria sanguinalis* (L.), *Cyperus iria* (L.), *Leptochloa chinensis* (L.) Nees, *Cynadon dactylon* (L.) Pers and *Fimbristylis miliaceaare* (L.) Vahi the most common weeds of paddy in India. (Rao *et al*., 2012-2013, Ramirez *et al.*, 2015).

Other floristic studies of a grassland community of Devog under Baliapal block of Balasore district in Odisha. The members of the monocot family showed maximum percentage contribution 24% followed by Cyperaceae 20% in the grassland communities of that area (Mohanty *et al.*, 2018).

Angiosperm studies was applied so as to explore the Angiosperm flora within the proposed site of Aranmula international airport Kerala were conducted during the post and pre-Monsoon period to get plants in several phenotypic phases. The survey of Angiosperm plants was applied at the international airport Aranmula shows that out of the 247 plant species observed, 59 were trees, 54 were shrubs, and 134 were herbs. It includes 109 medicinal plants, 14 endemic and eight rare plant species. Among the families, Poaceae and Cyperaceae have 26 and 18 genera, respectively. Over 250 plant species belonging to over 67 families were documented, among them, members of Poaceae and Cyperaceae families were found to be most dominant (Anto *et al*., 2016).

An investigatory study shows macrophytic diversity and the state environment of three lakes of Jammu; there were total 181 species, belonging to 142 genera and 52 families are reported. These families comprise 140 species and 6 families of monocotyledons with 41 species in India. In aquatic ecosystems also, monocot families include Araceae, Cyperaceae, Poaceae and Xanthorrhoeaceae also study about how floristic information reflects the structural and functional complexities of aquatic ecosystems. (Sharma, 2008 and Sulia *et al*., 2017).

Thakur *et al.* (2012) recorded a complete 302 plant species belonging to 99 families were recorded from Darlaghat Wild Life Sanctuary (DWLS), located in district Solan of Himachal Pradesh. These include: 27% trees; 24% shrubs; 35% herbs; 5% climber; 5% fern; 2% grasses and 2% Sedges. They studied 5 species of Cyperaceae plants.

A total of 110 species and 40 families were reported, the best important value index was mango followed by the tamarind tree. The study enumerated 41 woody Angiospermic species (Rao *et al*., 2015).

Naidu and Kumar (2016) studied the variety and community structure of tree species of tropical forests within the Eastern Ghats province by using floristic methods within which a complete of 129 species of plants of 44 families and 98 genera were documented.

FLORISTIC WORK OF GUJRAT/MONOCOT FAMILY

The earliest and most notable floristic study is "Flora of Presidency of Bombay", which denotes a complete of 626 plant species, of which 450 species are documented from Gujarat and around 176 from Sindh (Cooke in 1901-08).

In Gujarat state herbaceous, nearly 4,320 plant species, account for pretty much 9.33% of the full floral wealth of India (Agrawal, 2001).

Patel *et al.*, (2014) had surveyed the taxonomic research work in aquatic habitats of Sabarkantha district, Gujarat, India. During the survey, the floristic account of emergent-aquatic and marshland angiosperms was documented and illustrated. In this survey, 74 species of angiosperms belonging to 27 families and 54 genera were documented. Dominant families were Cyperaceae with 13 species followed by Poaceae 8, and Commelinaceae 4. Four families were represented by 3 species, and 3 families were represented by two species each, whereas fourteen families were monospecific.

In Vadali range forest District Sabarkantha in North Gujarat, 353 plant species belong to 95 Angiospermic families and 276 genera of floral diversity were recorded (Desai and Ant, 2012).

A survey of floristic diversity of Kalol taluka, Panchmahal, Gujarat in this study consists of total 312 plants species where 85 Trees, 62 Shrubs, 109 Herbs, 15 Grasses and41 climbers were documented also found 3 species of cyperaceae family plant which is *Cyperus bulbosus* Vahl H, *Cyperusiria* L H, *Cyperus rotundus* (L.) (Patel *et al*., 2014).

Patel and Saho, (2021) did a floristic account of Macrophytes within the selected wetlands of Valsad District, Gujarat in this study, they discussed the baseline status of the macrophytes within the five selected wetlands. During the study phase total of 52 species of macrophytes belong to 42 genera under the 28 families were recorded, where Cyperaceae family had 5 species, *Cyperus alopecuroides* (Rottb.), *Cyperus articulatus* (L.), *Cyperus compressus* (L.), *Cyperus difformis* (L.), *Cyperus iria* (L.).

Floristic diversity of Kaprada hills located in Valsad was studied, during the survey, a complete of 839 angiosperm plant species belonging to 123 families were reported, 134 plants were of major ethnobotanical interest utilized by aboriginal people was done (Rao, 2012; Rao *et al*., 2013).

Charan *et al*., (2019) had studied angiosperms of Godhra, Panchmahal district, Gujarat. The study is respresented around 36 species belonging to 32 genus and 23 families Out of 35 species, there have been 24 herbs, 4 climbers, 4 shrubs and 4 trees among them. Where Cyperaceae shows maximum number of species 14%, with here Cyperaceae shows maximum 5 genera.

Maitreya (2015) studied angiosperms from Sabarmati riverbed and riverside area in Ahmedabad plants are listed systematically which includes indigenous cultivated and naturalized plants. Monocots were represented by 21 families and 83 species. Monocotyledon families reported are Poaceae and Cyperaceae with 34 and 11 species respectively.

List of tree and shrubs were recorded 78 distinct floral diversity which includes trees and shrubs in Attarsumba Range. Gandhinagar Forest Division at Ahmedabad and Gandhinagar recorded 23 Families with 49 genera and 66 Species (Patel *et al.*, 2013).

Punjani *et al.*, (2018) had worked on wetland for documentation of aquatic and wetland plant diversity, field explorations were undertaken in the Sipu river downstream area near Sipu dam, Banaskantha, Gujarat. This floristic survey showed a great wealth of aquatic and wetland flora of the region under study. A total of 22 species within 18 genera and 12 Angiosperm families were recorded during the primary survey conducted within the area under study. Out of the overall recorded species whereas, Monocotyledons about 42%. The liliopsid family was found to be dominant and monocots are found to be the dominant genus within the present study.

Bhagat *et al*., (2021) did a floristic diversity study of Dhansura taluka, district Aravalli, Gujarat. During his research work, total of 591 species of angiosperm plants belonging to 390 genera under 107 families were reported from Dhansura taluka. Referring to the habit of the plants, out of the 591 species, 111 were tree species, 82 belonged to shrubs and 309 herbs Whereas 21 species of Cyperaceae plants were documented in this area.

Banni Kutch grassland area was studied with the help of the floristic method and reported a total of 219 plant species, belonging to 158 genera out of 51 families, are identified them. The region was dominated by 100 species of herbs, followed by 45 species of grass, 34 species of shrub, and 18 species of trees, which are identified. (Patel, 2013)

Menon (1979) administered floristic and Phyto-Sociological studies on selected areas of Saurashtra, listed about 100 wild species as an addition to the existing flora of Saurashtra, bringing the total to about 800 species. The dominant family was Gramineae 71 species among Monocotyledons.

Species diversity and Phyto-Sociological work on Forests of Dahod area was carried out which reported 65 species plants of 57 genera belonging to 31 families. The dominance of species ranged from 0.08 to 0.52, while the Shannon's index ranged from 0.81 to 2.85, the evenness of species from 0.7 to 0.93, and therefore the richness of species from 2.8 to 30.84 respectively. The Important Value Index (IVI) of the *Prosopis juliflora* (Sw.) DC. Species was the best within the studied forest (Pilania *et al*., 2014).

A survey on the curative plant of Narmada District, listed reported 38 Angiospermic plants which are individually documented with various ethnobotanical usages, belonging to 36 genera and 28 families. (Bansal *et al*., 2016)

Kokni *et al.,* (2016) had worked on chronicled 120 therapeutic plants belonging to 53 families, data was gathered from 10 different traditional healers of Waghai forest, Dang. The dominant family among the medicinal plants was Leguminosae with 16 species and 23 medicinal plant species belonging to 19 families that are potent to cure 9 differing types of body disorders. Many species of monocots family which is Cyperaceae and poaceae were documented in this study for medicinal uses.

A survey on weed infestation was carried out in Valsad district in three different seasons, namely rainy, winter, and summer. A total of about 215 weed taxa growing in different crops in the area under investigation have been listed and descriptions of these 180 taxa belong to dicotyledons and 35 to monocotyledons. 18 species were founded and documented of Poaceae family. A partial list of important plant weeds families' are Poaceae, Amaranthaceae, Cyperaceae, etc. (Patel *et al*., 2015)

Floristic survey of Rani talav wetland was carried out in Idar, Sabarkantha district. The study identified 35 plant species belonging to 33 genus and 20 families. Out of 35 species, there are 33 herbs, 1climber and 1 shrub. Plants were also classified into 28 upper wetland species, 3 facultative species and 4 obligatory wetland species. Cyperaceae family with 3 Genera and 4 species were founded (Charan *et al.,* 2019).

A survey was conducted at Gandhinagar district of weed flora. Phytosociological methods were preferred for analysis of weeds. Weed analysis was done with repeated field trips encompassing all the different seasons. During the field work and collection, special attention was given to record the characters and occurrence of weeds. The 116 species representing the weed flora of Gandhinagar District belong to 34 families and 93 Genera. Out of these 3 families, 20 Genera and 25 species are Monocots. Poaceae family represented the highest number of species around 20 species. (Karlikar *et al*., 2015)

This survey is about flowering plants in Tapi district, Gujarat. The area was surveyed along different topographic gradient and climatic conditions in order to collect maximum plant species occurring in the district. A total of 698 species and 5 varieties belonging to 592 genera and 119 families of flowering plants have been recorded for the district. Monocots represented by 138 species belongs to 102 genera and 24 families. Poaceae and Cyperaceae are largest families among the Monocots with 20 species of Cyperaceae and 41 species of Poaceae. (Gamit *et al.,* 2015)

Qureshimatva *et al.,* (2016) had worked on Panchmahal District, Gujarat of floral diversity. Area was surveyed along different topographic gradient and climatic conditions in order to collect maximum plant species occurring in the district. Study has reported 752 species belonging 3 varieties with 101 genus and 616 species of Monocots. Dominant families in Panchmahal district was Fabaceae 64, Acanthaceae 34, Cyperaceae 20, Poaceae 41. Apart from this study Poaceae and Cyperaceae were poorly represented in this area.

A survey was conducted at Ahmedabad for Palms species throughout in that area. For this study palms which are commonly cultivated in the gardens were covered. There is a wide spectrum of 198 gardens in Ahmedabad that exhilarate the gleam and appeal of Ahmedabad. In this study 71 species of palms were noted belonging to 38 genera and 7 cultivated varieties. 25 genera and 61 species were not reported earlier from Ahmedabad District. This study shows 12 palms were reported as indigenous and endemic to India, which are which are speared over the Eastern Himalaya, Western Ghats and Andaman and Nicobar Islands. (Qureshimatva *et al.,* 2016)

Dabgar *et al.*, (2010) had listed angiosperms at Vishnagar Takuka, North Gujarat of plant diversity. Monocots were almost 5 times less than Dicots. The dominance of shrubby plant species over the grasses was evident. Visnagar taluka with recorded 442 naturalized species of vascular plants belonging to 314 genera and 101 families. In this study Herbs were dominated with 236 species, 76 species of Shrubs, 69 species of Trees, 58 species of Climbers.

CONCLUSION

The floristic composition of a grassland community may vary from place to place and from time to time. It would depend upon the topography, geographical distributions, soil characteristics, climatic condition and biotic interference of the locality. This can help provide guidelines for the long run research workers visible of sustainable use of the Bio-resources of the world. The current study gives inspiration from existing plants within Gujarat state. The habitat changes resulted in changes within the locality. This might have a considerable influence on the floral and faunal population composition. The baseline information within the type of floristic inventory is also highly useful for future ecological work like rehabilitation and conservation of the flora.

FUTURE SCOPE:

- More exploration for a floristic account.
- Reinvestigation of reported plant species in Gujarat.
- Geotagging of rare species for conservation.
- Ecosystem and niche modeling for various species.
- Threats to Biodiversity of Gujarat.

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