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Research Article

FLORISTIC DIVERSITY OF BHANDARIA FOREST AREA DIST- BHAVNAGAR, GUJARAT, INDIA

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ABSTRACT

The present study aimed to study the floristic diversity of Bhandaria Forest Area. Plants were collected from the various forests area including hill and hillocks. In The present study a total angiospermic plant species in the area gives the result that the about 432 species belongs to 282 genera of 91 families. Of these dicots represented by 374 species belonging to 240 genera and 78 families while monocots represented by 58 species belonging to 42 genera and 13 families. The concentration of dominance was recorded highest in the herb species. The dicotyledon was found to be the dominant class in the study area

Key Words:

Floristic, diversity, Bhandaria, forest,
Bhavnagar

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INTRODUCTION

Floristic explorations and the taxonomic study provides resourceful and opportune information about the nomenclature, distribution, ecology, utility of diversities in plant species, and thus consequently about an ecosystem.

Floral Biodiversity of the earth is highly uneven with immense immeasurable immensities. About 7% of the world's total land area is home to half of the world's species. India is one among the 12 mega-biodiversity centers identified in the world having rich biodiversity indices, vast flora and fauna coupled with different topographical, ecological, climatic factors and about 18,664 taxa of vascular plants with 5725 endemics (Nayar, 1997). Amongst Indian state, Gujarat is particularly rich in biodiversity owing to its remarkable diversity in geophysical and climatic conditions.

The flora of Gujarat state is represented with about 2300 species of indigenous and naturalized/more commonly grown vascular seed plants, including four gymnosperms, belonging to 921 genera under 162 families. There exist about 600 scientific contributions in the form of state level Floras (Patel, 1971 and Shah 1978) regional Floras (Bole and Pathak 1988, Santapau 1962, Saxton and Sedgwick 1918, Thaker 1910), research articles published in taxonomic journals and Ph.D. theses submitted to different Universities. In addition,

comprehensive accounts such as checklists (Raghavan *et al.*, 1981), compilations of Biodiversity studies (GEC 1996 and Pandey *et al.*, 2006) accounting the floristic aspects of the state. Based on the geological distribution and the ecological diversity richness of the study, the area contains about total 432 species as per biodiversity survey. Diversities amongst these species have been found to have angiosperm (herbs, shrubs, trees and climbers etc.) Babariya (2004) has recorded total of 370 plant species in Khokhra hills. No gymnosperm has been recorded in this area. Floristic diversity study of Bhandaria forest in Saurashtra region is lacking. Therefore, the present study has been undertaken to assess the plant biodiversity and vegetation analysis of Bhandaria forest area, Dist.- Bhavnagar, Gujarat.

About study area

Bhavnagar is a coastal city on the eastern coast of Saurashtra, also known as Kathiyavar, geographically located at 21.76° N - 72.15° E. Bhavnagar is a City in the Indian State of Gujarat. Bhavnagar has situated 228 km from the state capital Gandhinagar and to the west of Gulf of Khambhat. Bhavnagar is a coastal city on the eastern coast of Saurashtra (Gujarat state, India), also known as Gohilvad and cultural capital of Saurashtra located at 21°46' N 72°09' E and 21.77° N 72.15° E and study area Bhandaria is located at 21° 23' 18" N, 72° 19' 29" E. The total area covered under

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Bhavnagar forest division is 21216.23 hectares. The total area covered under Bhandaria beat is 423.48 hectares.

MATERIALS AND METHODS

The present work is based on the survey of plant distributed in Bhandaria forest area. The study area was surveyed on foot in their various ecozones on monthly bases, with increasing frequency of visit during the monsoon season. The study area was divided into various study zones on the basis of disturbance gradient for studying the status of plant diversity, community structures, soil and herbaceous species of the area.

The field work was carried out within three years from February 2013 to February 2016. During these years specimens of flowering and non-flowering vascular plants have been collected in the flowering and fruiting stages and were analyzed and identified on the spot and the plants could not be identified were brought to the laboratory for detailed studies and identification.

The identification of plants those are unknown for me, were identified by making use of following published regional floras, floristic keys of Flora of British India by J. D. Hooker, (1872-1896); Flora of Bombay Presidency by Cooke. (1901-1908), Flora of Gujarat State by G. L. Shah (1978), Plants of Northern Gujarat by W. T. Saxton & L. J. Sedwick (1918). The photographs of unidentified plants send to experts for identification and by personal communication.

RESULTS AND DISCUSSIONS

A synoptic data of the Bhandaria forest area with respect to total number of family, genera and species are given in following tabular mode (Table-1). The total angiospermic plant species in the area gives the result that the about 432 species belongs to 282 genera of 91 families. Of these dicots represented by 374 species belonging to 240 genera and 78 families while monocots represented by 58 species belonging to 42 genera and 13 families (Table-1).

As mentioned before dicotyledon was found to be the dominant class in the study area. It is comprised of three subclasses polypetalae, gamopetalae and monochlamydae. Subclass polypetalae represented 194 species belonging to 119 genera from 45 families, were subclass gamopetalae represented 126 species belonging to 91 genera from 22 families and 54 species belonging to 30 genera from 11 families were fit in subclass monochlamydae. Thus, subclass polypetalae was found to be dominant amongst three subclasses of class dicotyledonae (Table -1).

Table 1 Showing the number and percentage of Dicotyledons and Monocotyledons families, genera and species

Class	No. of Family	No. of Genera	No. of Species
Dicotyledons			
i. Polypetalae	45	119	194
ii. Gamopetalae	22	91	126
iii. Monochlamydae	11	30	54
Total	78	240	374
Monocotyledons	13	42	58
Grand total	91	282	432

Table 2 Distribution of angiosperm plant species of study area among Families, Genera, Genera / Family (G/F) and Species / Family (S/F)

Angiosperm	Families		Genera		Species		G/F	S/F
	No.	%	No.	%	No.	%		
Dicotyledons	78	85.72	240	85.10	374	86.57	3.076	4.794
Monocotyledons	13	14.28	42	14.90	58	13.43	3.230	4.461
Total	91	100	282	100	432	100	6.306	9.255

A result shows that dicotyledons family, genera and species dominate over monocotyledon family, genera and species. With reference to family, dicotyledons families (85.72%) were more in number compared to monocot families (14.28%). With reference to genera, dicotyledons genera (85.10%) were also higher in number as compare to monocot genera (14.19%). In the same way dicotyledons species (86.57%) were also higher in number as compared to monocot species (13.43%). Hence, it shows that dicots are dominant over the monocot with reference to their numerical strength. Among the dicotyledons, Polypetalae (194 sp.) was the largest group as compared to Gamopetalae (126 sp.) and Monochlamydae (54 sp.) within dicots. Monocots are poorly represented constituting 14.28% out of total families.

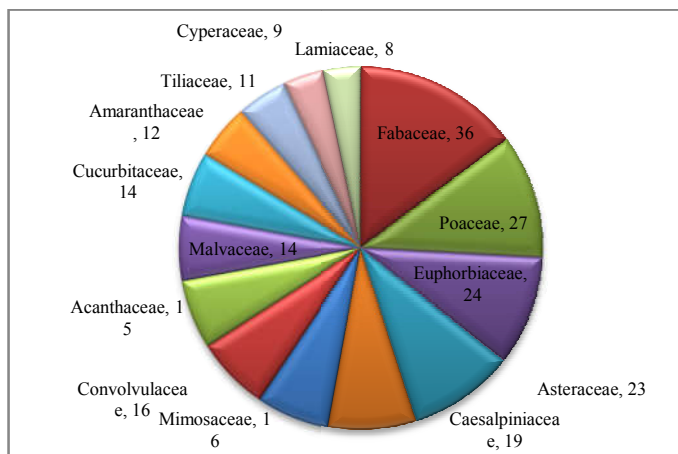


Fig 1 Fourteen largest families with maximum numbers of species

Out of total 432 plant species, 18.98% are small and tall size trees species, 13.19% under shrubs & shrub species, 53.94% herbs, 8.57% climbers and 5.32% twiners. These results were in close agreement with earlier reports of Pandya (1972), Oza (1991) and Pandit (2003). This study shows that herbaceous (ephemeral plants) are dominating in the forest.

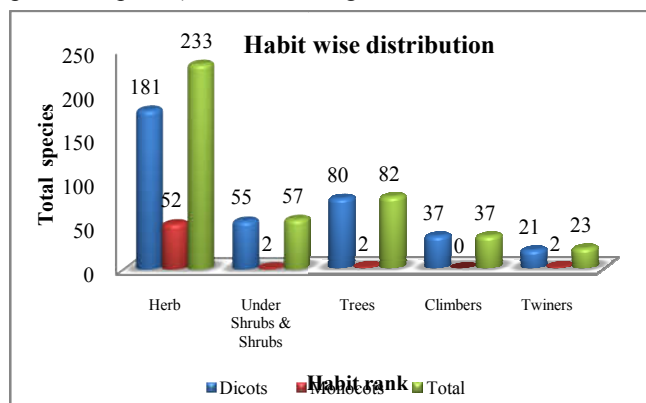


Fig 2 Habit wise distribution

The abundance of herbs and dominance of the mesophytes and xerophytes species indicate the vegetation and its structure. A

good percentage of the herbs and tree species present in the area. This explains one of the unique characteristics of the floristic ecology with some hilly area. This is probably owing to the tropical dry conditions and erratic rainfall (Nagar, 2005 and Tadvi, 2013). The presence of a low number of higher girth class of tree species and a higher number of the saplings and seedlings indicates that the present forest is young exhibiting frequent regeneration (Supriyadevi and Yadava (2006).

However, in the present investigations, Fabaceae has been observed as the dominant family, which in turn is followed by Poaceae, Euphorbiaceae, and Asteraceae (probably on account of the intensive overgrazing in the area). This is an important diversion from the usual dominant list of families with the rest of the country. As regards the genera, the dominant generic group is that of Poaceae followed by Fabaceae and Asteraceae.

The forest area has great natural biodiversity value. Some of the rare trees and shrubs species in the area observed during survey. Such as *Cratevanurvala* Buch-Ham., *Thespeciapopulnea* (L.) Sol. Ex. corr., *Adansonia digitata* L., *Helicteres isora* L., *Commiphora wightii* (Arn.) Bhandari., *Dalbergia sissoo* Roxb., *Prosopis cineraria* (L.) Druce., *Ficus racemosa* L., *Acacia catechu* Willd., *Boswellia serrata* Roxb., *Wrightia tinctoria* R. Br., *Calotropis gigantea* (L.) R. Br. etc.

CONCLUSION

Based on the field observations and present results it may be concluded that the angiosperm diversity of Bhandaria forest area is very rich and the forest area is the home for many threatened plant species of India. Currently plant diversity of this Park is in great risk because of many threats as observed during field works.

A floristic study of the Bhandaria forest area was undertaken in view of the importance of vegetation studies and the purpose to achieve the maintenance and management of the rare species of the selected region. In present study dominant genera like *Cassia*, *Ipomoea*, *Euphorbia*, *Cyperus*, *Acacia*, *Corchorus*, *Alysicarpus*, *Ficus*, *Indigofera*, *Amaranthus*, *Sida*, *Commelina* etc. Along with some trees, shrubs, herbs, and climbers are growing in the area. Some families are dominants with maximum numbers of species in this area, the families like a Fabaceae (36 sp.), Poaceae (27 sp.), Euphorbiaceae (24 sp.), Asteraceae (23 sp.), Caesalpiniaceae (19 sp.), Mimosaceae (16 sp.), Convolvulaceae (16 sp.), Acanthaceae (15 sp.), Cucurbitaceae (14 sp.), etc (Fig.2).

Mining industries and influences within and near the region should be undertaken under strict conservation policies so that majority of the destructions that occurs in the present situation making it as the problematic issue can be curbed and nullified.

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