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Plant diversity of Ghogha coastal area, dist. Bhavnagar

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Abstract

This paper focuses on the advances made in taxonomical distribution and environmental studies on plant diversity in Ghogha Coastal area of district Bhavnagar in state of Gujarat. The plant diversity of Gujarat is quantitatively and qualitatively rich as it has large number of families, genera and species. Total number of 54 plant species recorded in selected area under study is comprised of three subclasses polypetalae, gamopetalae and monochlamydae. Subclass polypetalae represented 23 species belonging to 18 genera from 13 families, were subclass gamopetalae represented 08 species belonging to 06 genera from 06 families and 08 species belonging to 07 genera from 05 families were fit in subclass monochlamydae. Dicots were dominating over monocot in all levels and the ratio of Monocot and Dicots are 1:6, 1:2.8, 1: 2.6 at family, genus and species level respectively. Studies on distribution, abundance of plants, and the factors governing them are few and need to be taken up on priority to have a baseline data.

Keywords: Plant Diversity; Ghogha; Coastal area; Bhavnagar

1. Introduction

Coastal ecosystems, found along continental margins, are regions of remarkable biological productivity and high accessibility. This has made them centre of human activity for millennia. Coastal ecosystems provide a wide array of goods and services: they host the world's primary ports of commerce; they are the primary producers of fish, shellfish, and seaweed for both human and animal consumption; and they are also a considerable source of fertilizer, pharmaceuticals, cosmetics, household products, and construction materials.[1] Terrestrial coastal habitats and ecosystems lie above the limit of the tides but are influenced by coastal processes. They include cliffs, islands, sand dunes, shingle (boulder/pebble) banks and other habitats in close proximity to the sea. Coastal zone is a dynamic natural environment area with many cyclic processes owing to a variety of resources and habitats. It is widely accepted now that among the various biodiversity regions, the marine and coastal zone ecosystems are of particular importance in terms of their utility to the human livelihood security. They are extremely important, both for the natural resources and ecological communities they contain and as areas of concentrated human activities. Similarly, while reviewing status and trends of global biodiversity, UNEP (1995) had also emphasized for developing research programs on biodiversity of inland, coastal and marine waters.

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 Ghogha coast is located at 21°40'15"N, 72°11'04"E, Bhavnagar district covers an area of over 8334 sq. km. This study is basically to monitor and provide scientific data on diversity of flora of with respect to its habitat in selected sites at coastal area of 'Ghogha' region

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situated in Bhavnagar district of Gujarat, India. Moreover, negligible work is done on the quantitative study of different plant species in this area.

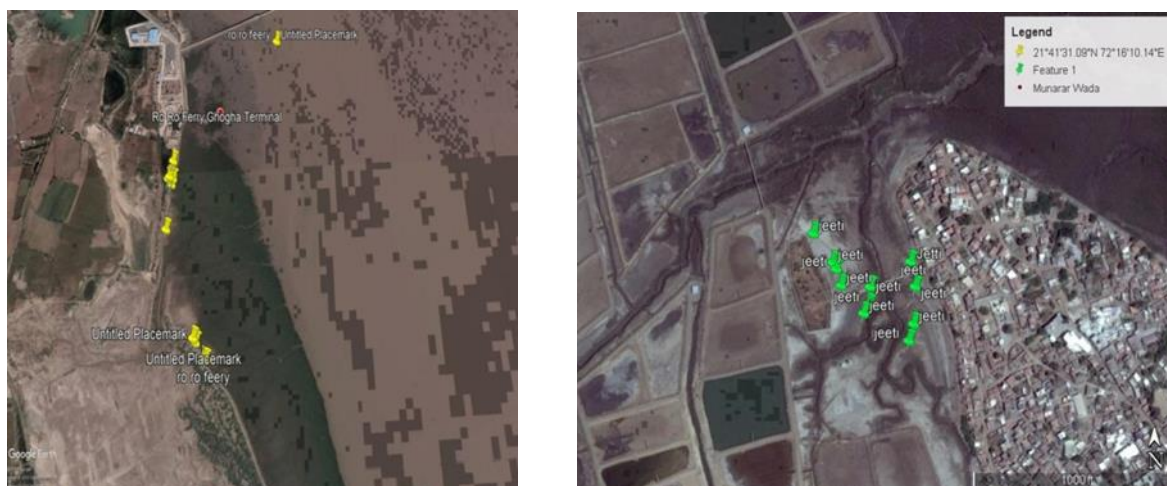


Figure 1 Ghogha coast study area Site-1 and Site-2

2. Material and methods

The present work is based on the survey of plant distributed in Ghogha coast area. The study area was surveyed on foot in their various locations 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 years from August to February. During these months 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 [2]; Flora of Bombay Presidency [3], Flora of Gujarat State [4], Plants of Northern Gujarat [5]. The photographs of unidentified plants send to experts for identification and by personal communication. During the specimen collection, field notebooks were carried along for noting down plant-related descriptions. All details related to each plant species were recorded in the field notebooks including the date of collection, local name of species, family, locality of the collection, altitude, habit and habitat, scientific name, vegetation, local use, and collector's name. Such characteristics are recorded for developing proper herbaria.

3. Results and discussion

A synoptic data of the Ghogha coast 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 54 species belongs to 42 genera of 28 families. Of these dicots represented by 39 species belonging to 31 genera and 24 families while monocots represented by 15 species belonging to 11 genera and 04 families (Table-1).

As mentioned before dicotyledons were found to be the dominant class in the study area. It is comprised of three subclasses polypetalae, gamopetalae and monochlamydae. Subclass polypetalae represented 23 species belonging to 18 genera from 13 families, were subclass gamopetalae represented 08 species belonging to 06 genera from 06 families and 08 species belonging to 07 genera from 05 families were fit in subclass monochlamydae. Thus, subclass polypetalae was found to be dominant amongst three subclasses of class dicotyledonae (Table -1).

The dicot families, genera and species dominate over monocot families, genera and species. With reference to families, dicot families (85.71%) were high in no. compared to monocot families (14.28%). with reference to genera, dicot family (73.8%) dominates over monocot families (26.19%). Also, when compared at species level, dicots (72.22%) were dominant over monocots (27.77%). Hence, it shows that dicots are dominant over monocots with reference to their numerical strength (Table: 2)

Table 1 Diversity of dicotyledonous and monocotyledonous families, genera and species

Class	No. of Families	No. of Genera	No. of Species
Dicotyledons			
Polypetalae	13	18	23
Gamopetalae	6	6	8
Monochlamydae	5	7	8
Total	24	31	39
%	85.71	73.8	72.22
Monocotyledons	4	11	15
%	14.28	26.19	27.77
Grand total	28	42	54

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

Angiosperms	Families		Genera		Species		G/F	S/F
	No.	%	No.	%	No.	%		
Dicotyledons	24	85.71	31	73.8	39	72.22	1.291	1.625
Monocotyledons	04	14.28	11	26.19	15	27.77	2.75	3.75
Total	28	100	42	100	54	100	4.041	5.375

3.1. Ratio of Monocot to Dicots:

In the selected region, dicots were dominating over monocot in all levels and the ratio of Monocot and Dicots are 1:6, 1:2.8, 1: 2.6 at family, genus and species level respectively (Table no. 3).

Table 3 Ratio of Monocot to Dicots

Rank	Monocot	Dicots	Total	Ratio (Monocot : Dicot)
Families	4	24	28	1:6
Genera	11	31	42	1:2.8
Species	15	39	54	1:2.6

Table 4 Ratio of Family – Genus - Species

Rank	Family : Genera	Genera : Species	Family : Species
Monocot	1:2.75	1:1.36	1:3.75
Dicots	1:1.29	1:1.25	1:1.62
Total	1:4.04	1:2.61	1:5.37

The total ratio between monocot and dicot in terms of family: Genus, genus: species and family: species were reported 1:4.04, 1:2.61 and 1:5.37 respectively. The ratio of monocot in terms of family: Genus, genus: species and family: species

were reported 1:2.75, 1:1.36 and 1:3.75 respectively. In the same way the ratio of dicot in terms of family: Genus, genus: species and family: species were reported 1:1.29, 1:1.25 and 1:1.62 respectively (Table 4).

3.2. Number of species per family

Total 54 sp. were found to present at study site. The *Poaceae* family was found to be dominant with Total no. of 08 sp. and their respective family is shown in following graph.

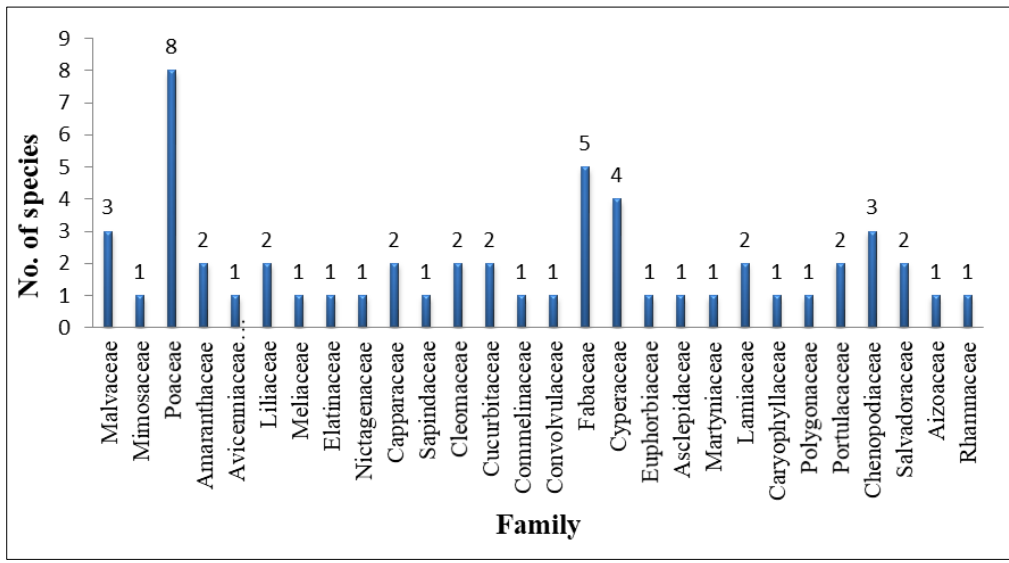


Figure 1 Number of species per family

Graph -2 Shows that some families are dominants with maximum numbers of species in this area, the families like a *Poaceae* (08 sp.), *Fabaceae* (05 sp.), *Cyperaceae* (04 sp.), *Malvaceae* (03 sp.), *Chenopodiaceae* (03 sp.) etc.

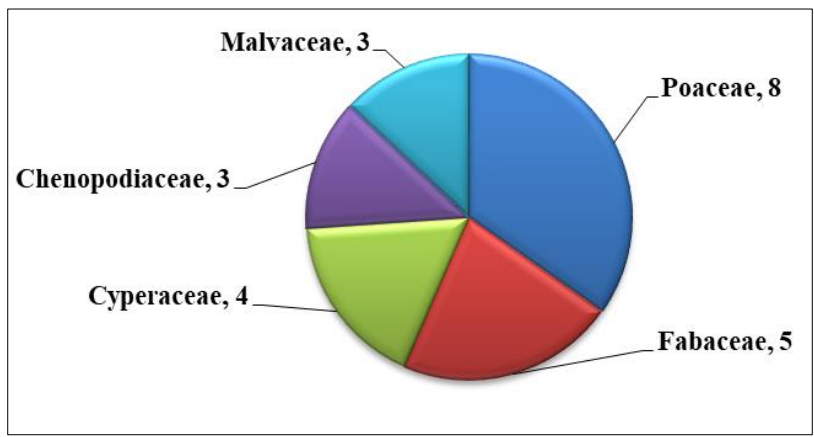


Figure 2 Dominant Families

3.3. Biodiversity Loss within Area

Processes of climatic change and habitat loss which concurrently are an important example, where synergistic effects may occur. Yet most studies reporting effects of climate change [6] or habitat loss and fragmentation on biodiversity [7, 8] have examined each in isolation. In 2002, the 188 countries that are signatories to the Convention on Biological Diversity committed themselves to “Achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level” (CBD, 2003). Unfortunately, this laudable target is very vague as regards practicalities. It presents both a challenge and an opportunity for biodiversity scientists [9]; a challenge because biodiversity is not a simple concept, and coming up with measures that encompass all its aspects will be difficult; an opportunity because when such measures are in place, it will be possible to guide and manage biodiversity better, and so make progress towards a more sustainable world. In the study area, major drivers of biodiversity loss are recreational boating and traffic by medium sized ferryboats and many other anthropogenic human activities. Not only

has this, but small scale industries, mainly ship breaking industries in past times had major effect on diversity of Ghogha coast.

3.4. Effect of boating on vegetation diversity of Ghogha

The introduction of ferry services on Ghogha coast has its effects on vegetation over there. The mass construction over there has resulted into vegetation loss and habitat loss. The human interference has its effect on biodiversity of Ghogha.

Boating can be assumed to affect vegetation directly by increased water movement and physical effects or indirectly by related activities. Increased water movement has several consequences such as increased wave action enhances drag and tear on plant tissue, elevated turbidity due to resuspension reduces light availability and removal of sediment from bottom substrata and vegetation can alter habitat and uproot plants. Direct physical effects include impact of boat hulls, propellers and shading. Indirect effects include pollution by boat motors and human waste.

4. Conclusion

The high plant diversity of Ghogha coastal regions has attracted much attention over the past few years. This diversity study discusses patterns and determinants of local, differential and regional plant diversity in this region. Local diversity shows great variation within and between regions and explanations for these patterns invoke a wide range of hypotheses. Also, it provide suitable habitat to mangroves. *Avicennia marina* is found to be uniformly distributed in that area and is found in abundance. Patterns of regional diversity are the result of differential speciation and extinction rates due to anthropogenic influence. This region has a high number of rare and locally endemic taxa that survive as small populations, many of which are threatened by habitat transformation.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The Authors have no conflict of interest.

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