

Aquatic Angiosperms of Bor Talav (Gaurishankar Lake) Area of Bhavnagar City, Gujarat-India.



BOTANY

KEYWORDS : Aquatic angiosperms , Bor talav , Gaurishankar lake.

Bharat B. Maitreya

Botany Department, Sir P.P.Institute of Science, Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar.

ABSTRACT

Aquatic plant species having special kind of adaptations and mostly grow in availability of water and these plants are known as hydrophytes. Micro to macro habit structure form the vegetation in pond or lake ecosystem . When water level decrease in periphery of water bodies Helophyte vegetation are found in muddy and marshy area. The present research work elaborates the Angiosperm floral diversity in one of the water bodies or wetlands in Bhavnagar city. There are many natural and seasonal wetlands . The present research work of aquatic angiosperms in Gaurishankar lake known as bortalav in Bhavnagar city. Observation and collection of 91 species of angiosperms grown in aquatic and marshy wetland areas of Bortalav. There are habitat like Free Floating, Floating rooted, submerged, muddy ,marshy and moist soil. 39 sp. of collected plant species found as moist place, whereas 19 sp in marshy area. The floral diversity showed 79 Genera and 91 species belonging to 40 families. The total plant species with their botanical name, family, adaptation , Habit and Habitat is presented . Poaceae with 14 species was the most dominant family followed by, Cyperaceae (08 species) and Asteraceae (07 species).

INTRODUCTION:

Freshwater ecosystems importance for consumers like, zooplanktons , fishes ,aquatic animals ,aquatic avifauna ,domestic animals and human being. These ecosystems are also important in nature .^[10] it considered aquatic plants as those species which normally stand in water ,either completely submersed or immersed. Water plants as those whose seeds germinate either the water phase or substrate of a body of water ^[11]. The present study of aquatic angiosperm found in fresh water body . Wetland flora are the contributors for the biodiversity and the most productive economic ecosystems in the world. Research works have been done on the aquatic plants in different freshwater bodies of India and the comprehensive work on the wetland flora was produced by ^[2]. Aquatic angiosperms are dominant and grow in Free Floating, Floating rooted, submerged, muddy ,marshy area. Emergent species dominated in number over floating and submerged species in all the water bodies. The classification of aquatics which forms I. Plants rooted in the soil. A. Plants which are essentially terrestrial, but which are capable of living as submerged water plants, though sometimes produce submerged leaves differing markedly from the air type. The air leaves are associated with the flowering stage. C. Plants which produce three types of leaf, submerged (b) floating and (c) aerial.^[10]

STUDY AREA:

Bortalav known as Gaurishankar lake situated near Victoria park in central part of Bhavnagar city of Gujarat state . Bhavnagar city is located between 21°28' N 72°05' E to 21°46' N 72°09' E in the west of gulf of khambhat and It is fifth largest city of Gujarat state. The huge lake dispersing over an area of 381 hectares is also locally renowned by the title of Bor Talav after the illustrious Dewan Shri Gaurishankar Oza. Conceived and built in 1872 as a water reservoir for drinking water, today is one of the most preferred tourist as well as picnic location in the city. Bhavnagar has a semi arid climate with hot, dry summers from March to mid-June, the wet monsoon season from mid-June to October where the city receives around 550 mm of rain on average. Due to proximity to the sea, the climate remains a bit humid throughout the year.^[9]

MATERIALS AND METHODS :

The present study is the outcome of several years survey with critical observation and collection. Identification was done with the help of flora^{[1]-[7]} & ^{[12]-[15]} and subject experts. The field study were organized during the year 2010-15 each Month survey carried out and collect the aquatic plants . The seasonal variation of plant species in wetland have been studied and find out that the species richness in the year . The plant list categorized ac-

ording to their systematic positions following Bentham & Hookers classification system.^[7]

RESULT & DISCUSSION :

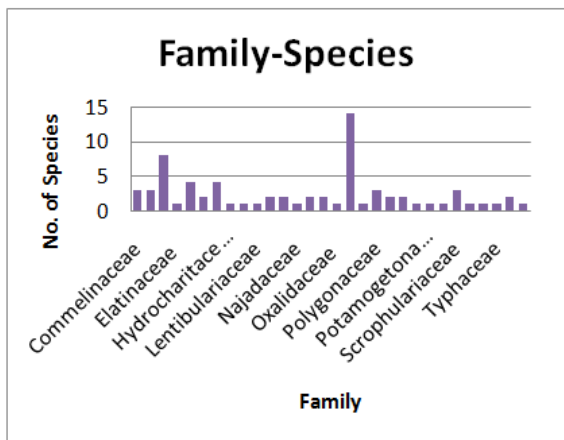
Aquatic angiosperm plant species of Bortalav in Bhavnagar city including indigenous and naturalized plants. The study area shows a plant diversity comprise of **79** genera and **91** species belong to **40** angiosperm families.

Dicots were represented by 23 families and Monocots were represented by 17 families . The following table no. 1 gives the name of families , genera and species belong to Dicotyledons and Monocotyledons. The dominant families are **Poaceae** (14 species) , **Cyperaceae** (08 species), **Asteraceae** (07 species) , **Hydrocharitaceae** (**04 species**) **Fabaceae** (04 species). Aquatic angiosperms plant species found in habitat as floating tauge 07 species , Amphibious species 03, , Submerged species 06, Mid marsh 04 species , Marsh species 18, reed swamp species 04 and Moist Soil area found 39 species. As per species richness concern Poaceae and Cyperace family mostly cover the moist soil area and also reed swamp area. In most of the season **Eichhornia** sp. Cover the water surface, **Pistia** and **Lemna** also cover on water surface, **Typha** sp. Seen tallest among the all aquatic species. In winter and starting of summer new emergent plant species grown in moist soil , where water level decrease in periphery. During Summer season this area found very poor in vegetation. After Summer and in rainy season when water logged , plant species grows and aquatic vegetation shows dense species richness.

ACKNOWLEDGEMENT:

I am very thankful to my Ph.D Guide Dr.D.C.Bhatt for constant approach for research investigation . I am also thankful to my Principal and head of department of my Institute for giving me opportunity to done my work.

GRAPH-1 FAMILY AND SPECIES No.



GRAPH-1 FAMILY AND SPECIES No.

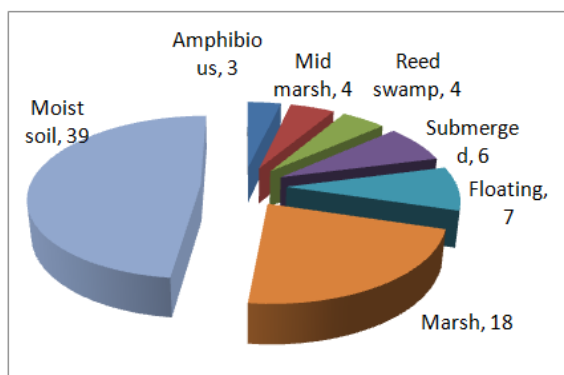


TABLE :1 PLANT LIST WITH BOTANICAL NAME ,FAMILY AND HABITAT

Sr.No.	Plant species	Family	Habitat
1	<i>Hygrophila spinosa</i> T.Anders	Acanthaceae	Moist soil
2	<i>Sagittaria guyanensis</i> Kunth.	Alismataceae	Amphibious
3	<i>Alternanthera sessilis</i> (L.) DC.	Amaranthaceae	Moist soil
4	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Moist soil
5	<i>Aponogeton appendiculatus</i> H.	Aponogetonaceae	Submerged
6	<i>Acorus calamus</i> L.	Araceae	Sedge meadow
7	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Moist soil
8	<i>Pistia stratiotes</i> L.	Araceae	Floating
9	<i>Caesulia axillaris</i> Roxb.	Asteraceae	Moist soil
10	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Moist soil
11	<i>Grangea maderaspatana</i> (L.) Poiret	Asteraceae	Moist soil
12	<i>Sphaeranthus indicus</i> L.	Asteraceae	Moist soil
13	<i>Ageratum conyzoides</i> L.	Astreceae	Moist soil
14	<i>Amberboa ramosa</i> (Roxb.) Jeffry.	Astreceae	Moist soil
15	<i>Acanthospermum hispidum</i> DC.	Astreceae	Moist soil
16	<i>Nasturtium officinalae</i> R.Br	Brassicaceae	Marsh
17	<i>Polycarpea corymbosa</i> (L.) Lam.	Caryophyllaceae	Moist soil

18	<i>Spergula arvensis</i> L.	Caryophyllaceae	Moist soil
19	<i>Ceratophyllum demersum</i> L.	Ceratophyllaceae	Floating
20	<i>Commelina benghalensis</i> L	Commelinaceae	Moist soil
21	<i>Murdania nudiflora</i> (L.) Brenan	Commelinaceae	Moist soil
22	<i>Commelina forskelii</i> L.	Commelinaceae	Moist soil
23	<i>Evolvulus alsinoides</i> L.	Convolvulaceae	Moist soil
24	<i>Ipomoea aquatica</i> Forssk	Convolvulaceae	Marsh
25	<i>Ipomoea carnea</i> Jacq.	Convolvulaceae	Marsh
26	<i>Cyperus compressus</i> L.	Cyperaceae	Reed swamp
27	<i>Cyperus corymbosus</i> Rottb.	Cyperaceae	Moist soil
28	<i>Cyperus difformis</i> L.	Cyperaceae	Moist soil
29	<i>Cyperus esculentus</i> L.	Cyperaceae	Moist soil
30	<i>Carex nubigana</i> D. Don	Cyperaceae	Reed swamp
31	<i>Eleocharis atropurpurea</i> (Retz.) Kunth	Cyperaceae	Moist soil
32	<i>Fimbristylis dichotoma</i> (L.) Vahl	Cyperaceae	Moist soil
33	<i>Scirpus mucronatus</i> (L.) Palla	Cyperaceae	Reed swamp
34	<i>Bergia odorata</i> Edgew.	Elatinaceae	Moist soil
35	<i>Smithia ciliata</i> Royle.	Fabaceae	Moist soil
36	<i>Alysicarpus monilifer</i> (L.) DC.	Fabaceae	Moist soil
37	<i>Desmodium triflorum</i> L.	Fabaceae	Moist soil
38	<i>Sesbania bispinosa</i> Jacq) W.F.Wight	Fabaceae	Moist soil
39	<i>Nymphoides indica</i> (L.) O. Kuntze	Gentianaceae	Mid marsh
40	<i>Nymphoides hydrophyllum</i> (Lour.) O. Kuntze	Gentianaceae	Mid marsh
41	<i>Hydrilla verticillata</i> (L. f.) Royle	Hydrocharitaceae	Submerged
42	<i>Hydrocharis morsus-ranae</i> L.	Hydrocharitaceae	Floating
43	<i>Ottelia alismoides</i> (L.) Pers	Hydrocharitaceae	Submerged
44	<i>Vallisneria natans</i> (Lour.) Hara	Hydrocharitaceae	Submerged
45	<i>Juncus bufonius</i> L.	Juncaceae	Reed swamp
46	<i>Lemna minor</i> L.	Lemnaceae	Floating
47	<i>Utricularia aurea</i> Lour.Vit	Lentibulariaceae	Floating
48	<i>Ammania baccifera</i> L.	Lythraceae	Moist soil
49	<i>Ammannia multiflora</i> Roxb.	Lythraceae	Marsh
50	<i>Mollugo pentaphylla</i> L.	Molluginaceae	Moist soil
51	<i>Glinus lotoides</i> L.	Molluginaceae	Moist soil
52	<i>Najas graminea</i> Dulile	Najadaceae	Submerged
53	<i>Nelumbo nucifera</i> Gaertn.	Nymphaeaceae	Mid marsh
54	<i>Nymphaea pubescence</i> Willd.	Nymphaeaceae	Mid marsh
55	<i>Ludwigia adscendens</i> (L.) Hara	Onagraceae	Marsh
56	<i>Ludwigia octovalvis</i> (Jacq.) Raven	Onagraceae	Marsh
57	<i>Oxalis corniculata</i> L.	Oxalidaceae	Moist soil
58	<i>Aristida adscensionis</i> L.	Poaceae	Moist soil
59	<i>Aristida funiculata</i> Trin. & Rupr.	Poaceae	Moist soil

60	<i>Arundinella bengalensis</i> (Sprengel) Druce	Poaceae	Moist soil
61	<i>Brachiaria mutica</i> (Forsskal) Stapf	Poaceae	Moist soil
62	<i>Coix lacryma-jobi</i> L.	Poaceae	Moist soil
63	<i>Echinochloa colona</i> (L.) Link	Poaceae	Moist soil
64	<i>Eragrostis unioides</i> (Retz.) Nees ex Steudel	Poaceae	Moist soil
65	<i>Panicum paludosum</i> Roxb.	Poaceae	Moist soil
66	<i>Panicum psilopodium</i> Trin.	Poaceae	Moist soil
67	<i>Paspalidium punctatum</i> (Brum.) A. Camus	Poaceae	Marsh
68	<i>Paspalum distichum</i> L.	Poaceae	Marsh
69	<i>Phragmites karka</i> (Retz.) Trin. ex Steudel	Poaceae	Moist soil
70	<i>Saccharum spontaneum</i> L.	Poaceae	Moist soil
71	<i>Apluda mutica</i> L.	Poaceae	Moist soil
72	<i>Polygala erioptera</i> DC.	Polygalaceae	Moist soil
73	<i>Polygonum glabrum</i> Willd.	Polygonaceae	Marsh
74	<i>Polygonum plebegium</i> R. Br.	Polygonaceae	Marsh
75	<i>Rumex dentatus</i> L.	Polygonaceae	Marsh
76	<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae	Floating
77	<i>Monocharia vaginalis</i> (Brum.) Kunth	Pontederiaceae	Marsh
78	<i>Portulaca olearacea</i> L.	Portulacaceae	Moist soil
79	<i>Portulaca quadrifida</i> L.	Portulacaceae	Moist soil
80	<i>Potamogeton crispus</i> L.	Potamogetonaceae	Submerged
81	<i>Ranunculus scleratus</i> L.	Ranunculaceae	Amphibious
82	<i>Oldenlandia corymbosa</i> L.	Rubiaceae	Moist soil
83	<i>Limnophila indica</i> (L.) Druce	Scrophulariaceae	Amphibious
84	<i>Lindernia ciliata</i> (Colsm.) Pennell	Scrophulariaceae	Marsh
85	<i>Bacopa monnieri</i> (L.) Pennell.	Scrophulariaceae	Marsh
86	<i>Corchorus olitorius</i> L.	Tiliaceae	Moist soil
87	<i>Trapa natans</i> var. <i>bispinosa</i> (Roxb.)	Trapaceae	Floating
88	<i>Typha angustifolia</i> L.	Typhaceae	Marsh
89	<i>Lippia nodiflora</i> (L.) Rich.	Verbenaceae	Marsh
90	<i>Phyla nodiflora</i> (L.) Greene.	Verbenaceae	Marsh
91	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Moist soil

REFERENCE

- [1] Bhatt , D.C. & Mitaliya , K. D. (2004) : Text book of Angiosperm taxonomy ,Tripada publication ,Bhavnagar | [2] Biswas K. and Calder C.(1984). Handbook of common water and marsh plants of India, XVI + 216, B. S. Mahendrapal Singh (Dehradun). | [3] Blatter , S. J. & McCann 1935 : The Bombay grasses scientific monograph No – 5. The imperial council of agricultural research. Delhi. | [4] Bole, P. V. and Pathak, J. M. (1988) : Flora of Saurashtra, Vols. II & III, Botanical survey of India, Calcutta. | [5] Cooke, Th. (1958) : The flora of Bombay Presidency, Calcutta (reprinted), Vol. I-III. | [6] Gupta, R. S. (1996) . A Study of hydrophytes and marsh plants of Kota & environs (India). Tropical Ecology 7:153-160. | [7] Hooker , J. D. (1872-1896) : The flora of British India. Vol 1 – VII Reeve 7 Co. Kent .England. | [8] Maitreya ,Bharat B.(2006) : Floristic study of Sabarmati river Ph.D. Thesis, Bhavnagar University, Bhavnagar | [9] Mitaliya, K. D. (1998) : Ethnomedicinal study of Angiosperms of Bhavnagar, Ph.D. Thesis, Bhavnagar University, Bhavnagar. | [10] Muencher(1944) W.C.(1944) :Aquatic plants of United states, Comstock publishing company,New York , | [11] Reid,G.K. (1961) :Ecology of Inland waters and Estuaries,Reinhold publishing corporation,Newyork | [12] Santapau, H. (1962): Flora of Saurashtra, Part-I, Saurashtra Research Society, Rajkot. | [13] Shah, G. L. (1978) : The flora of Gujarat State. Part I and II, Sardar Patel University, p. –1074. | [14] Subramanyam ,K.(1962) : Aquatic angiosperms botanical monograph No. 3 Council of scientific & Industrial Research , New Delhi | [15] Sutaria,R.N.(1969) : A Textbook of Systematic Botany ,Khadayata Book Depot,Ahmedabad |