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STUDY OF AQUATIC WEEDS IN TWO PONDS OF VADODARA, GUJARAT

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ABSTRACT - A study was conducted for the aquatic weeds and its ecological attributes of district Vadodara of Gujarat. In the district, there are many natural and manmade seasonal wetlands that serve as important gateways for the migratory waterfowl. The current research reports biodiversity of two wetlands viz. Harani and Gotri ponds during 2012- 2013. Total 41 different aquatic species were recorded from the wetlands, that include marshy, emergent, free floating and submerged hydrophytes. Significantly most common species belong to families like Poaceae, Araceae, Cyperaceae, Asteraceae. Species such as *Eichhornia crassipes*, *Ipomoea aquatica*, *Typha angustifolia*, *Lemna triscula*, *Spirodella polyrrhiza*, *Chloris barbata*, *Hydrilla Verticillata L.* and *Cyperus* have been found to occur throughout the year in both the wetlands.

Key Words: *Aquatic Weeds; Wetlands; Vadodara; Gujarat; India;*

I. INTRODUCTION

Wetland is among the most productive ecosystems in the world [6]. Several works have been done on the aquatic macrophytes and phytosociology in different freshwater bodies of India [2] [5] [7] [8][9][10]. In India the first comprehensive work on the wetland flora was produced [4]. Aquatic plants are key components for the well functioning of wetland ecosystem for biological productivity and support diverse organisms and there by provide lots of goods and services for the dependent people. The aquatic plants are the most important component of the aquatic ecosystem. Wetlands are important for biodiversity conservation as some of the most endangered species survive on them, especially migratory birds. Wetlands are also vital for the maintenance of ground water at an optimum level. Also, if not properly conserved, the catchments area of the wetlands gets blocked upstream, causing water-logging in nearby residential and commercial societies. This has severe economic and health repercussions.

Vadodara is located at 22° 20' 16.5" N latitude, 73° 13' 07.8" E longitude. Majority of the water sources of the district are polluted by the sewage output. Also, degradation of wetlands in the district has been reported which is due to presence of oil refineries, fertiliser plants, alkali plants, cyanide plants and Nandesari Industrial Estate with more than 200 small-scale industries. Anthropogenic activities in the area rapidly alter natural habitat giving almost no time to local biota to develop adaptations. This results in irreversible variation in existing vegetal cover.

Hence, an effort has been made in this study to investigate the overall biodiversity of two main wetlands situated in Vadodara during the year 2012-13.

Study Area

Harni pond, situated north east of Baroda district, Gujarat state (22° 20' 23.3" north latitude and 73° 13' 12.8" east longitude). The pond is perennial and the water level recedes considerably during summer. The bed is composed of clay and silica. Initially, the pond area comprised of ~19 hectares, which is now reduced to ~14 hectares.(Fig.1).

Gotri Pond, situated of Baroda district, Gujarat State (22° 20' 16.6" north latitude and 73° 13' 07.8" east longitude).(Fig. 2)

II. MATERIAL AND METHODS

The present study is the outcome of 6 months intensive survey with critical examination and standard quantitative assessment. In addition, species were documented by simple survey method to make a checklist of entire surveyed and samples areas. Moreover, this survey was attempted to categorize aquatic vegetation into Marshy, emergent, submerged, free floating hydrophytes. The nomenclature of the plant species are used in this paper on based on available floras "The Flora of the Presidency of Bombay" [11], "Aquatic and Wetland Plants of India" [12] and "The Flora of Gujarat State" [3]. Once plants were identified, they were poisoned with 1% mercury chloride solution which was followed by drying under blotting paper. The dried, treated specimens were numbered and mounted on standard herbarium sheet.

III. RESULTS AND DISCUSSION

The flora of Harani and Gotri ponds of Vadodara showed 41 genera belonging to 26 families. The check list of plant species with their botanical name, family, local name and habitat is presented in Table 1. Amaranthaceae and poaceae each with 5 plant species were found to be most dominated families. As shown in pie chart 59 % of total plant species that were recorded fall into the category of marshy land, followed by 23% emergent hydrophytes, 10% submerged Hydrophytes and 8% free floating hydrophytes.

Free floating hydrophytes viz. *Eichhornia*, *Lemna* and *Pistia* and Rooted with floating viz. *Nelumbo*, *Nymphaea*, Rooted submerged viz. *Hydrillia*, *Ceratophyllum* and rooted emergent viz. *Typha* and *Cyperus* were recorded throughout the year. *Sagittaria* and *scirpus* were found to be dominant during dry season of the year only. Some pteridophytes viz. *Azolla pinnata*, *Marsellia* were also found to be abundant in these wetlands. There was a number of plants association of which the following were frequently noticeable in both the wetlands:

A) Aquatic Habitat Association:

1. *Ludwigia-Ammania - Commelina*
2. *Hydrilla-Ceratophyllum - Lymnophyton*
3. *Nymphaea-Hydrilla-Nelumbo*

B) Marshy Habitat Association:

1. *Ipomoea -Typha- Scirpus*
2. *Ammania-Phyla-Commelina*

Biodiversity survey for terrestrial ecosystem of Vadodara district was done by many researches but biodiversity survey of ponds in Vadodara especially Harani and Gotri remained neglected. Current study was aimed at identification of aquatic plants growing in these ponds. Similar study was conducted [8] who reported 73 genera from Wadhvana land near Vadodara district. The plant species in our study were found to influence flood control, aquifer recharge, nutrient absorption and erosion control.

SR. NO.	SCIENTIFIC NAME	FAMILY	LOCAL NAME	HABITAT
1	<i>Solanum surattense</i> Burm. f.	Solanaceae	yellow-fruit nightshade	Marshy Land
3	<i>Ludwigia perrium</i> L.	Onagraceae	water-primrose	Marshy Land
4	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Ironweed	Marshy Land
5	<i>Phyllanthus amarus</i> Schumach. & Thonn.	Phyllanthaceae	carry-me seed	Marshy Land
6	<i>Pistia stratiotes</i> L.	Araceae	shellflower (water Lettuce)	Free Floating
7	<i>Ceratophyllum demersum</i> L.	Ceratophyllaceae	Hornwort	Submurged Hydrophyte
8	<i>Hydrilla verticillata</i> (L.f.) Royle	Hydrocharitaceae	waterweed	Submurged Hydrophyte
9	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	amaranthaceae	sanguinarea	Marshy Land
10	<i>Paspalum vaginatum</i> Sw.	Poaceae	biscuit grass	Marshy Land
11	<i>Ludwigia octovalvis</i>	Onagraceae	Willow prime rose	Marshy Land
12	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Water spinach	Emergent
13	<i>Hygrophila auriculata</i> (Schumach.) Heine	Acanthaceae	gokulakanta	Marshy Land
14	<i>Ammania baccifera</i> L.	Lythraceae	Monarch redstem	Marshy Land
15	<i>Alternanthera pungens</i> kunth.	Amaranthaceae	Khaki weed	Marshy Land
16	<i>Commelina forsskalii</i> Vahl		Asiatic Dayflower	Marshy Land
17	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	Indian lotus	Free Floating
18	<i>Chloris barbata</i> Sw.	Poaceae	windmill grass or finger grass.	Marshy Land
19	<i>Hygroryza aristata</i> (Retz.) Nees ex Wight & Arn.	Poaceae	Great duckweed	Emergent
20	<i>Spirodela polyrrhiza</i> (L.) Schleid.	Araceae	Water velvet	Free Floating
21	<i>Azolla pinnata</i> var. <i>imbricata</i> (Roxb. ex Griff.) Bonap	Azollaceae	Blunt Arrowhead	Free Floating
22	<i>Limnophyton obtusifolium</i> (L.) Miq.	Alismataceae	elephant's ear	Emergent
23	<i>Dactyloctenium aegyptium</i> (L.) Willd	Poaceae	Egyptian grass	Marshy Land
24	<i>Limnophila gratioloides</i> R. Br.	Schrophulariaceae		Marshy Land
25	<i>Marsilea quadrifolia</i> L.	Marsiliaceae	Four Leaf Clover	Marshy Land

26	<i>Utricularia vulgaris</i> L.	Lentibulariaceae	Common Bladderworts	Submurged Hydrophyte
27	<i>Gomphrena celosioides</i> Mart.	Amaranthaceae	Gomphrena Weed	Marshy Land
28	<i>Bergia ammannioides</i>	Elatinaceae	Jerry Water fire	Marshy Land
29	<i>cressa cretica</i> L.	Convolvulaceae	European water clover	Marshy Land
30	<i>Phyla nodiflora</i> (L.) Greene	Verbenaceae	Turkey tangle fogfruit	Marshy Land
31	<i>Elaeocarpus variabilis</i> Zmarzty	Elaeocarpaceae	Chorphone	Marshy Land
32	<i>Aeschynomene indica</i> L.	Fabaceae	curly indigo	Marshy Land
33	<i>Eliocharis dulcis</i>	Cyperaceae	Wrinkle duck-beak	Marshy Land
34	<i>Ischaemum rugosum</i> Salisb.	Poaceae	Wrinkle duck-beak	Marshy Land
35	<i>cyperus difformis</i> L.	Cyperaceae	Flat sedge	Marshy Land
36	<i>Alternanthera philoxeroides</i>	Amaranthaceae	Alligator weed	Marshy Land
37	<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae	water hyacinth	Emergent
38	<i>Amaranthus spinosus</i> L.	Amaranthaceae	spiny amaranth	Marshy Land
39	<i>Sphaeranthus indicus</i> L.	Asteraceae	gorkhmundi	Marshy Land
40	<i>Peristrophe paniculata</i> (Forssk.) Brummitt	Acanthaceae	Panicled Foldwing	Marshy Land
41	<i>Colocasia esculenta</i> (L.) Schott	Araceae	elephant's ear	Emergent

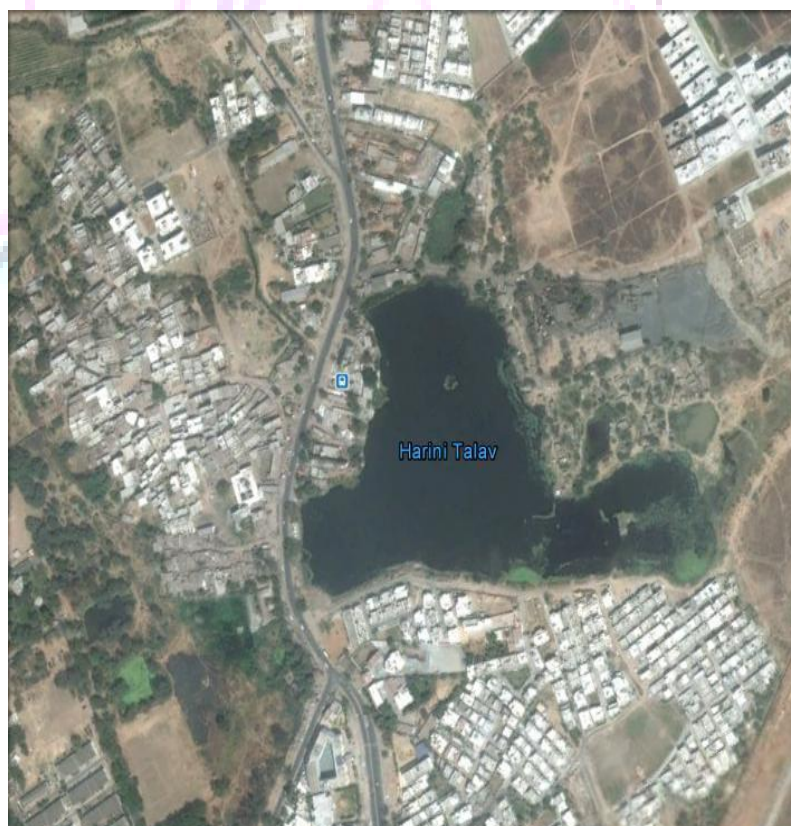
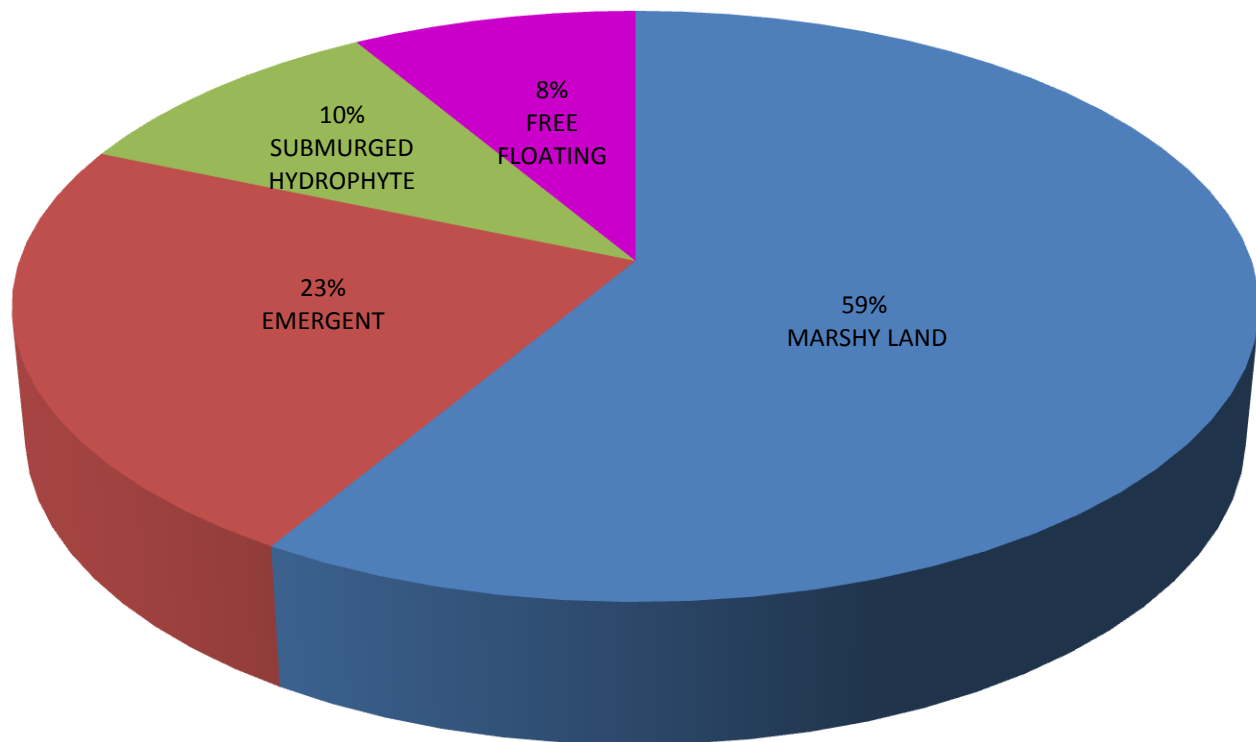


Fig 1 : Harani Pond



Fig 2: Gotri Pond



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