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Documentation of Wetland Floral Diversity from Three Perennial Lakes in Bramhapuri Town, Dist. Chandrapur Maharashtra, India

Pramesh A. Dani
Department of Botany
Shri Govindrao Munghate Arts & Science College, Kurkheda, Gadchiroli, Maharashtra, India
dani.pramesh@gmail.com

Abstract: *The present study was conducted to document the floral diversity of three perennial lakes of Bramhapuri town from Chandrapur district, Maharashtra, India for a period of one year from July 2023 to June 2024. During the present investigation total of 48 plant species belonging to 40 genera and 24 families were recorded from the wetland of study sites. Pistia stratiotes L., Spiorodela polyrhiza (L.) Schleid., Lemna perpusilla Torr., Marsilea minuta L. Mant. & Ipomoea aquatica Forssk are common floating macrophytes observed during the visit from all 03 study sites. These floating forms make dominance on the water surface and restrict the growth of submerged macrophytes, regarded as pollution tolerant aquatic macrophytes and be used as a biological indicator for eutrophication. The present findings revealed that the quality of the all the three lakes is productive and eutrophic. Conservation of this wetland bodies needs urgent attention to protect its diversity.*

Keywords: Wetland, Macrophytes, Perennial, Bramhapuri

I. INTRODUCTION

Wetlands constitute a subject of prime global importance. It covers only six percent of total earth surface [11] but they support about twenty percent of earth's total biological diversity [6]. Wetlands are transitional zone between aquatic and terrestrial environment, in which the soil is seasonally or permanently covered by shallow water and the water table is close to or near the surface [10, 16]. The lotic freshwater water bodies are commonly known as 'Talav or Boli' in Vidarbha region of Maharashtra. Macrophytes comprises a diverse group of macrophytic community including angiosperms, ferns, mosses, liverworts and some fresh water macro algae that occur in seasonally or permanently wet environment [7].The aquatic macrophytes play important role by providing a rich source of food, fodder, herbal medicine and domestic household materials.

Diversity in Indian wetlands as estimated by Alfred and Nandi [1]. It includes 34 groups of living organisms, comprising nearly 17,853 species. The Indian subcontinents accommodates not less than 470 aquatic species of flowering plants which is about half of the world's known aquatic Angiosperms & the number of endemic species is also very high (13%) being second to South America. A total of 2,167 natural & 65,253 manmade wetlands covering an area of 14,50,861 & 25,89,266 hector respectively have been recorded for India.

Macrophytes, as a component of freshwater ecosystems play important roles in the structure and functioning of the aquatic ecosystems [15, 23]. Water plants, including macrophytes are universally recognized as important participants in the natural processes of water self-purification [4]. Macrophytes are considered as important component of the aquatic ecosystem not only as food source for aquatic invertebrates, but also act as an efficient accumulator of heavy metals [4]. Wetlands maintain ecological balance by nutrient recycling also some aquatic macrophytes designated as pollution indicators [14].

On a large scale, anthropogenic activities like untreated sewage and garbage disposal, siltation through surface runoff, encroachment within the lake area, that make shrinking of water bodies to great extent maximize a burden and influence physical, chemical and biological processes of aquatic ecosystem and thereby causing decline and

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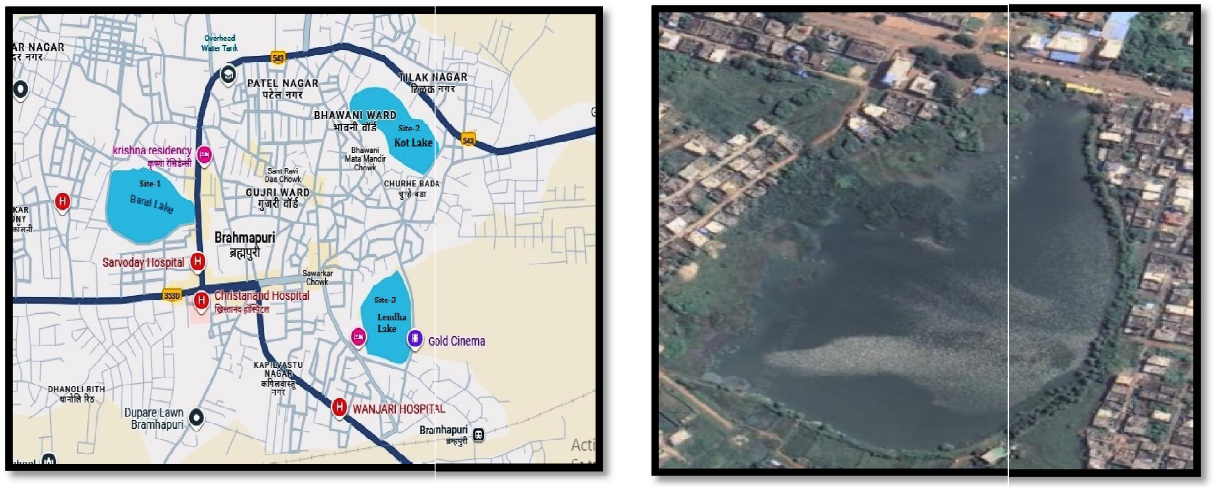
degradation of biodiversity, ecosystem services and also economic value of the wetland [3]. Kshirsagar and Gunale [9] reported that untreated sewage significantly alters the physico-chemical parameters of water.

In the present study, the documentation of floral diversity from three fresh water lakes of Bramhapuri town have been undertaken as these lakes have significant burden of anthropogenic activities.

II. METHODOLOGY

2.1 Study site

Bramhapuri is a town & tehsil place of Chandrapur District, Maharashtra, India, situated at 20°36 N 79°52 E . This town located on bank of Wainganga River known for its medical, educational and sport facility. There are 03 perennial water bodies namely Barai lake , Kot lake & Lendha lake located at heart of the town, previously used for irrigation and fishing practices. Now a day, due to increasing anthropogenic burden from all over sides, these lakes are unsuitable for its primary aim & remain as dumping site having dominant exotic flora with unwanted odor.



Site- I

Site- II Site- III

Fig. 1. Location & aerial view of 03 study sites.

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2.2 Floristic survey & Data collection

Present study were done through seasonal visits to the study sites throughout a period of one year (July 2023 to June 2024), the aquatic floral diversity found in the sites was documented. Macrophytes that were present in the study sites and seepage area were identified, photographed and plant specimens were gathered throughout the current survey. The survey was carried out to gather plant specimens and photograph data on floral diversity.

2.3 Identification of Wetland flora

The collected plant specimens were identified and confirmed with the help of available literature of K. Subramanyam[19], C. D. K. Cook [5], N. R. Ugemuge[20], B. D. Sharma et al. [17], N. P. Singh et al. [18], S. R. Yadav et. Al. [24], Moghe R. P. [12], Mukherjee A. K. et al. [13], Verma D. M. et al. [22] and available published regional literature in form of research articles published in various journals.

In present study, the identified plant species are described according to the Bentham & Hooker classification system.

2.4 Ecological classification of Macrophytes

There are various classification systems of aquatic vegetation given by different workers time to time. In present study the aquatic vegetation can be broadly classified into the following five growth forms adopted with modification after Maheshwari (1960).

i. **Free floating hydrophytes (FFH):** These are plants that are in contact with water & air.

ii. **Suspended hydrophytes (SH):** These are rootless, submerged hydrophytes that are in contact with water only.

iii. **Attached submerged hydrophytes (ASH):** These are entirely or at least to the most part, in contact with soil & water.

iv. **Attached hydrophytes with floating leaves (AFH):** These are in contact with soil, water as well as air.

v. **Wetland hydrophytes (WH):** These are rooted in soil that is usually saturated with water, at least in early part of their life.

III. OBSERVATION

Table-1. List of macrophytes from 03 study sites.

S. N.	Scientific Name	Family	Flowering & Fruiting season	Growth form	Name of site/lakes		
					Barai	Kot	Lendha
1.	*Alternanthera sessilis* (L.) R. Br. ex DC.	Amaranthaceae	Jan- Dec	WH	+	+	+
2.	*Alternanthera philoxeroides (Martius) Grisebach*	Amaranthaceae	June- Sep	WH	-	+	-
3.	*Ammania baccifera L.*	Lythraceae	Dec- March	WH	+	+	+
4.	*Bergia ammannioides*Roxb.	Elatinaceae	Nov- Feb	WH	+	+	-
5.	*Caesulia axillaris*Roxb.	Asteraceae	Sep- Feb	WH	+	+	+
6.	*Coldenia procumbens* L.	Boraginaceae	June- July	WH	+	+	+
7.	*Commelina benghalensis* L.	Commelinaceae	June- Dec	WH	+	+	+
8.	*Commelina diffusa*Burm.	Commelinaceae	July- Feb	WH	+	+	-
9.	*Cyperus alulatus* Kern	Cyperaceae	July- Sep	WH	+	+	-
10.	*Cyperus difformis* L.	Cyperaceae	Aug- Jan	WH	+	+	+
11.	*Cyperus iria* L.	Cyperaceae	Aug- Jan	WH	+	+	-
12.	*Echinochloacolona* (L.) Link.	Poaceae	July- Feb	WH	+	+	+
13.	*Eclipta prostrata* (L.) Mant.	Asteraceae	July- Feb	WH	+	+	+
14.	*Eriocaulon quinquangulare*L.	Eriocaulaceae	Nov- Jan	WH	+	+	+
15.	*Fimbristylismiliacea* (L.) Vahl.	Cyperaceae	Oct- Nov	WH	+	-	-
16.	*Gnaphalium polycaulon*Pers.	Asteraceae	Dec- May	WH	+	+	+

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17.	*Grangeamaderaspatana*(L.) Poir	Asteraceae	Dec- May	WH	+	+	+
18.	*Heliotropium indicum* L.	Boraginaceae	July- June	WH	+	+	+
19.	*Hygrophilapolysperma*(Roxb.)	Acanthaceae	Sep- Dec	WH	+	-	-
20.	*Hygrophilaschulli*(Buch- Ham) Almeida	Acanthaceae	Nov- June	WH	+	+	+
21.	*Ipomoea aquatica* Forssk	Convolvulaceae	Jan- Dec	AFH	+	+	+
22.	*Ipomoea carnea*Jacq. Austin	Convolvulaceae	Jan- Dec	WH	+	-	+
23.	*Kyllinga tenuifolia* Stend.	Cyperaceae	July- Oct	WH	+	+	+
24.	*Lemna perpusilla* Torr.	Lemnaceae	May- Jan	FFH	+	+	+
25.	*Limnophyton obtusifolium* (L.) Miq.	Alismataceae	Oct- Jan	ASH	+	-	-
26.	*Lindernia rotundifolia* (L.) Mukherjee	Scrophulariaceae	Aug- Nov	WH	+	+	+
27.	*Ludwigia adscendens* (L.) Hara	Onagraceae	June- Jan	WH	+	+	-
28.	*Ludwigia perennis* L.	Onagraceae	July- Aug	WH	+	-	-
29.	*Marsilea minuta*L. Mant.	Marsileaceae		WH	+	+	+
30.	*Monochoria vaginalis* (Burm. f.) K. B. Presl	Pontederiaceae	May- Sep	WH	+	-	-
31.	*Murdannianudiflora* (L.) Brenan.	Commelinaceae	July- Nov	WH	+	+	+
32.	*Nymphaea nouchali*Burm	Nymphaeaceae	Jan- Dec	AFH	-	+	-
33.	*Nymphaea pubescens*Willd	Nymphaeaceae	Jan- Dec	AFH	-	+	-
34.	*Nymphoides hydrophylla* (Lour) O. Ktze.	Menyanthaceae	Dec- Apr	AFH	+	-	-
35.	*Oryza rufipogon*Griff.	Poaceae	Aug- Dec	WH	+	-	-
36.	*Persicariabarbata*(L.) Hara	Polygonaceae	Oct- Apr	WH	-	+	-
37.	*Pistia stratiotes* L.	Araceae	Apr- June	FFH	+	+	+
38.	*Polygonum plebeium*R. Br.	Polygonaceae	Jan- Dec	WH	+	+	+
39.	*Pontederia crassipes Mart.*	Pontederiaceae		FFH	-	-	+
40.	*Smithiaconferta*Ait.	Fabaceae	Oct- Jan	WH	+	+	+
41.	*Rotala indica (*Willd.) Koehne	Lythraceae	Nov- Feb	WH	+	+	+
42.	*Rumex crispus L.*	Polygonaceae	Feb-Mar	WH	+	+	+
43.	*Sphaeranthus indicus* L.	Asteraceae	Nov- May	WH	+	+	+
44.	*Spilanthus calva* DC	Asteraceae	Sep- Jan	WH	+	+	+
45.	*Spiorodela polyrhiza* (L.) Schleid.	Lemnaceae	Sep- Apr	FFH	+	+	+
46.	*Tonningiaaxillaris* (L.) O. Ktze.	Commelinaceae	July- Dec	WH	+	+	+
47.	*Typha angustifolia* L.	Typhaceae	Mar- Dec	WH	+	+	+
48.	*Utricularia aurea* Lour.	Lentibulariaceae	Nov- Mar	SH	-	+	-

IV. RESULT & DISCUSSION

In present study, a total 48 species of macrophytes were recorded from 03 study sites represented by 40 genera and 24 families. Among them Family Asteraceae make dominance over the others, represented by 06 species followed by family Cyperaceae, Commelinaceae & Polygonaceae.

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Wetland hydrophytes are the dominant growth form represented by 38 species, followed by Attached floating & free floating hydrophytes represented by 04 species each. During present study, only one species represented by Attached & submerged hydrophytes.

All the 03 sites harbor their floral diversity maximally from seepage areas while main water body harbor very less diversity mainly due to regular removal of plants by the fisherman's.

Pistia stratiotes L., ***Spiorodela polyrhiza*** (L.) Schleid., ***Lemna perpusilla*** Torr., ***Marsilea minuta***L. Mant. & ***Ipomoea aquatica*** Forssk are common floating macrophytes observed during the visit from all 03 study sites indicating wetland transformation towards eutrophication. These floating forms make dominance on the water surface and restrict the growth of submerged macrophytes. During the survey, only one submerged macrophytes namely ***Utricularia aurea*** Lour. were observed from seepage area of Kot Lake.

Several fishes were observed dead from Kot & Lendha lake that indicates severity of wetland pollution & unsuitableness of habitat for native inhabitants. The original catchment area of all 03 sites was reduced due to heavy encroachment by the marginal land holders

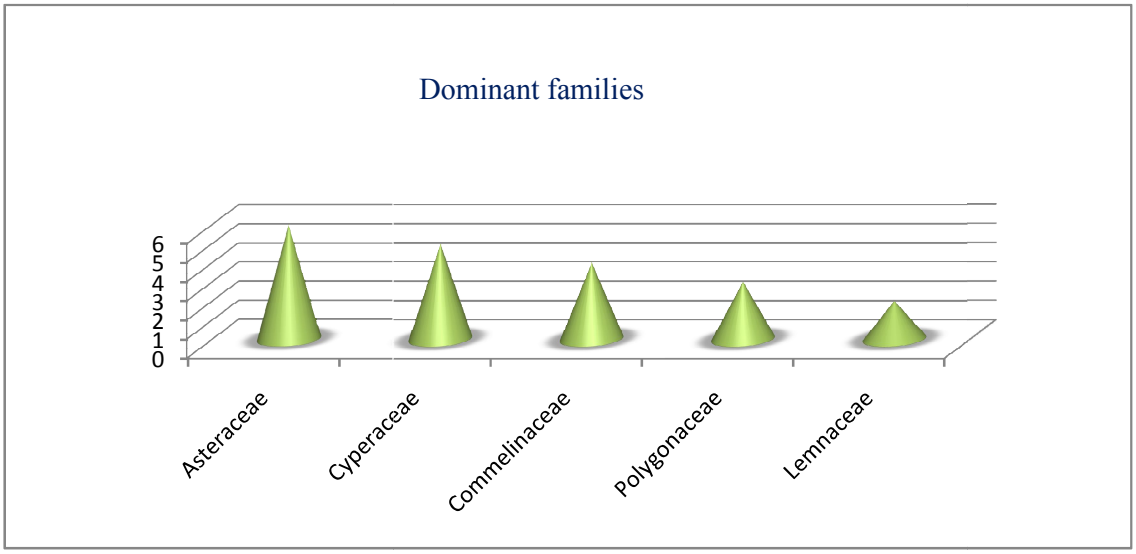

Fig. 2. Dominant families from study sites.

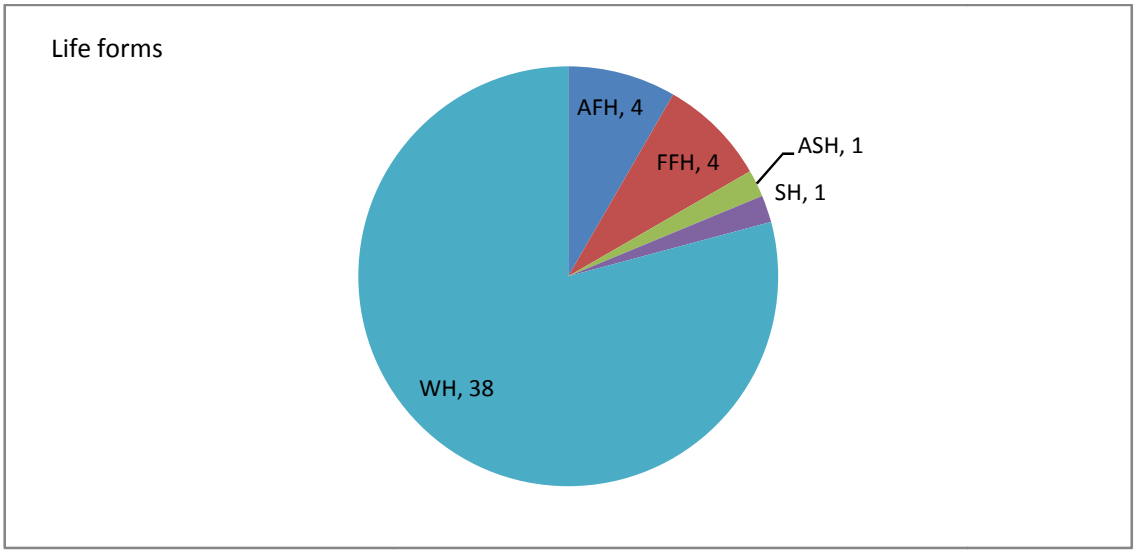

Fig. 3. Dominant life forms from study sites

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Fig. 4. Dominance of pollutant indicators (Pistia stratiotes, Monochoria vaginalis, Ludwigia adscendens with dead fishes) from study sites.

V. CONCLUSION

Improper planning & maintenance of township has led to increased anthropogenic pressure on all the wetland bodies. The ones unpolluted lakes are now rapidly becoming unsuitable for native inhabitants. Heavy dumping of solid waste, discharge of untreated sewage & encroachment detiorated them to a great extent. It causes variety of health problems to humans as well as to others inhabitants depend either directly or indirectly on this ecosystem.

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A Sustainable Conservation of lakes require community involvement through educating peoples by raising awareness about the importance of wetlands, lake restoration projects to initiate regular cleanliness drives that remove silt and exotic species from the lakes also a strict legal actions should be taken to control waste disposal and prevent encroachment on the lake lands.

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