



## Documentation of wetland flora from Visora (Bardi) Lake Desaiganj (Wadsa) in Gadchiroli district, Maharashtra, India

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### Abstract

Visora (Bardi) lake is a large, perennial rural freshwater reservoir having a catchment area is around 26 acres situated 2 km away from town Desaiganj (Wadsa) towards east side. Documentation of wetland flora was done by frequent seasonal visits to the study area for a period of two years (2016 to 2018). In present study, 84 plant species were recorded of which 02 species are Pteridophytes while 83 species belonging to Angiosperms represented by 58 genera & 28 families. Cyperaceae are most dominant family represented by 17 species followed by Scrophulariaceae & Poaceae. Among the Growth forms, 77% species belongs to Wetland hydrophytes which are dominant growth form while free floating hydrophytes (FFH) were not recorded at all from study site.

**Keywords:** Visora (Bardi), wetland flora, growth forms

### Introduction

Wetlands constitute a subject of prime global importance. It covers only six percent of total earth surface [6] but they support about twenty percent of earth's total biological diversity [4]. India has a total of 105, 64,899 hector of wetlands, the total annual ecosystem services value of wetlands is estimated to be 75.04 lacks carores [17].

Wetlands generally support diverse aquatic vegetation, also called hydrophytes, and are plants those have adapted to live in aquatic environments. Hydrophytes comprises diverse group of Algae, Bryophytes, Pteridophytes and Angiospermic vegetations. Those hydrophytes which are large enough to see by naked eyes termed as Macrophytes. It is important component of aquatic ecosystem. It plays a major role in primary productivity of Lake Ecosystem. Wetlands not only provide natural habitats for aquatic flora & fauna but also it provides socioeconomic benefits too.

It is very difficult to define 'aquatic' plants exactly because aquatic habitats cannot be sharply distinguished from terrestrial ones [10]. According to Muenschar (1944) hydrophytes are those species 'which normally stand in water and must grow for at least a part of their life cycle in water, either completely submerged or immersed'. Wetland provides a natural habitat for diverse ecosystem which comprises flora & fauna. International Biological Program (IBP) states that "A wetland is an area dominated by specific herbaceous macrophytes, the production of which takes place predominantly in the aerial environment above the water level while the plants are supplied with amounts

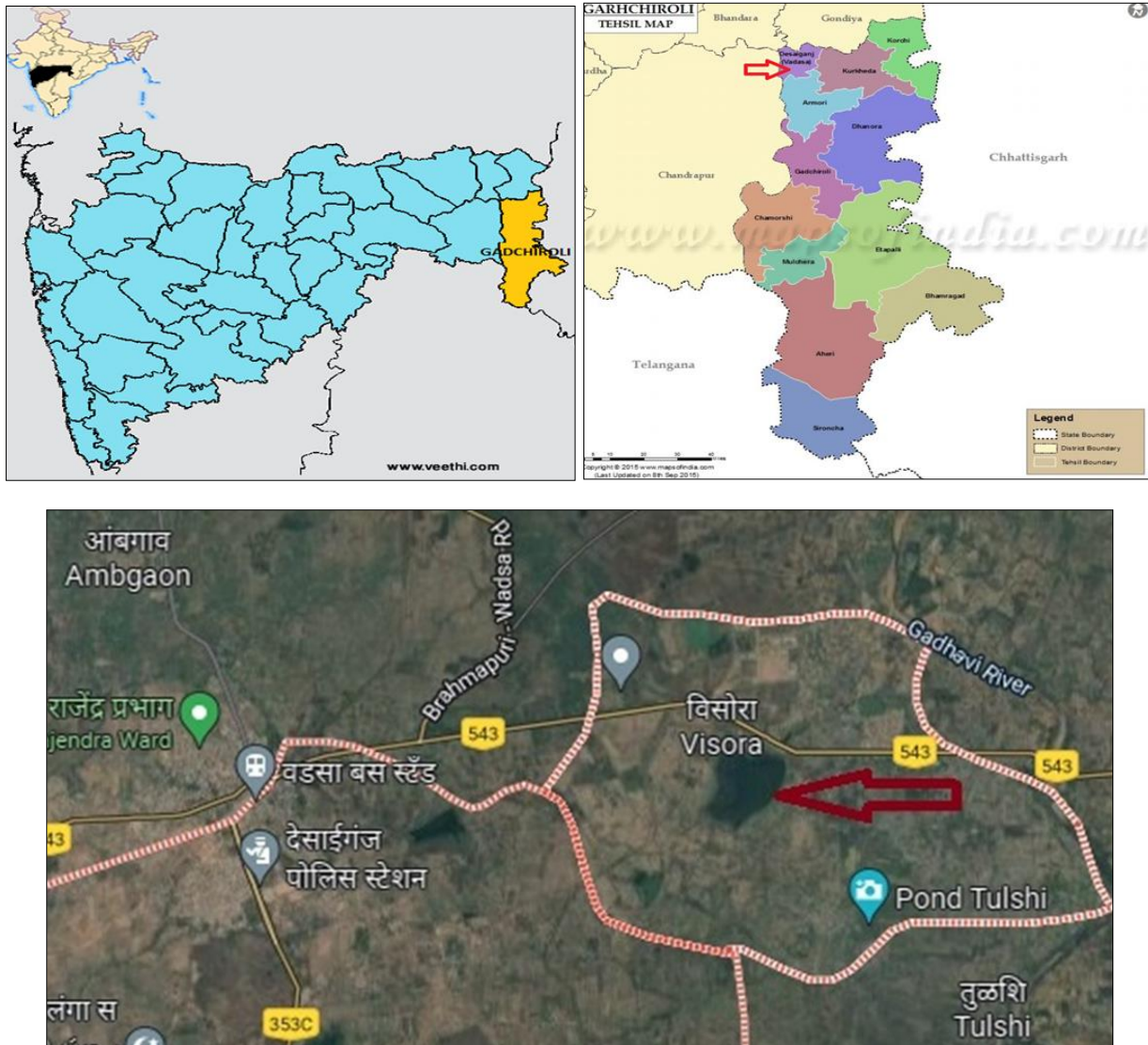
of water that would be excessive for most other higher plants bearing aerial shoots". Diversity in Indian wetlands as estimated by Alfred and Nandi [1]. It includes 34 groups of living organisms, comprising nearly 17,853 species. The Indian subcontinents accommodates not less than 470 aquatic species 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 [5]. 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 [2].

Studies on aquatic flora of Gadchiroli district are in its juvenile phase & not yet to be rich any conclusive data. Only few workers made their contribution, some of them are Tijare, R. V. [14] studied macrophyte vegetation in three lentic water bodies namely Bothali, Gadchiroli & Murkhala from Gadchiroli district & they documented 15 species. Another contributor is Rohankar, L. S. *et al.* [9]. They concentrate their work in rural lake from Aheri & documented 15 macrophytes of which free floating life form are dominant represented by 11 species.

A study on wetland plant and their diversity especially of perennial wetland bodies from Desaiganj (Wadsa) Tehsil has not yet started. Present study deals with the documentation & compilation of data on wetland flora of Visora (Bardi) lake which will become a new and firm base for researchers for developing conservation strategies.

## Methodology

### 1. Study site



**Fig 1:** Location map of Visora (Bardi) lake

Gadchiroli is tribal dominant district located in the southeastern part of the state Maharashtra lies between 18° 18' to 20° 20' north latitude and 79° 45' to 80° 54' east longitude covering an area of about 14412 Km<sup>2</sup>. Desaiganj (Wadsa) is one of the administrative block & town of Gadchiroli District located at 20.62542 latitude & 80.01104 longitudes located along the bank of river Wainganga. Visora (Bardi) lake is a large, perennial rural freshwater reservoir having a catchment area is around 26 acres situated 2 km away from town Desaiganj (Wadsa) towards east side. It harbors variety of faunal & floral diversity as well as it is a site where number of migrant water birds regularly visited throughout the year.

### 2. Floristic survey & Data collection

Present study were done through frequent seasonal visits to the study area throughout a period of two years (2016 to 2018), the aquatic floral diversity found in the area was documented. Macrophytes that were present in the study site and seepage area were identified, photographed and plant specimens were gathered throughout the current survey. Seasonally, the survey was carried out to gather plant

specimens and photograph data on free-floating, submerged, and marginal vegetation.

### 3. Identification of wetland flora

The collected plant specimens were identified and confirmed with the help of available literature of K. Subramanyam [13], C. D. K. Cook [3], N. R. Ugemuge [16], B. D. Sharma *et al.* [11], N. P. Singh *et al.* [12], S. R. Yadav *et al.* [20], Moghe R. P. [7], Mukherjee A. K. *et al.* [8], Verma D. M. *et al.* [19], Tiwari S. D. N. [15] 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.

### 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).

- 1. Free floating hydrophytes (FFH):** These are plants that are in contact with water & air.
- 2. Suspended hydrophytes (SH):** These are rootless, submerged hydrophytes that are in contact with water only.
- 3. Attached submerged hydrophytes (ASH):** These are entirely or at least to the most part, in contact with soil & water.
- 4. Attached hydrophytes with floating leaves (AFH):** These are in contact with soil, water as well as air.
- 5. Wetland hydrophytes (WH):** These are rooted in soil that is usually saturated with water, at least in early part of their life.

### Observation

**Table 1:** Seasonal wetland plant diversity with life forms documented from study site.

S. N.	Scientific Name	Family	Flowering & Fruiting season	Growth form	Seasons		
					R	W	S
1.	<i>Aponogeton natans</i> (L.) Engl. & Krause	Aponogetonaceae	July- Oct	AFH	+	+	-
2.	<i>Aeschynomene aspera</i> L.	Fabaceae	Aug- Sep	WH	+	+	-
3.	<i>Aeschynomene indica</i> L.	Fabaceae	July- Dec	WH	+	+	-
4.	<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	Amaranthaceae	Jan- Dec	WH	+	+	+
5.	<i>Ammania baccifera</i> L.	Lythraceae	Dec- March	WH	+	+	-
6.	<i>Bacopa monnieri</i> (L) Penn.	Scrophulariaceae	Jan- Dec	WH	+	+	-
7.	<i>Bergia ammannioides</i> Roxb.	Elatinaceae	Nov- Feb	WH	+	+	-
8.	<i>Blyxa aubertii</i> Rich.	Hydrocharitaceae	Aug- Feb	ASH	+	+	-
9.	<i>Butomopsis latifolia</i> (D. Don.) Kunth.	Butomaceae	Sep- Mar	ASH	-	+	-
10.	<i>Caesulia axillaris</i> Roxb.	Asteraceae	Sep- Feb	WH	+	+	-
11.	<i>Ceratophyllum demersum</i> L.	Ceratophyllaceae	Jan- April	SH	+	+	+
12.	<i>Ceratopteris thalictroides</i> (L.) Brongniart	Pteridaceae		WH	+	+	-
13.	<i>Coix lacryma-jobi</i> L.	Poaceae	Aug- Jan	WH	+	+	-
14.	<i>Coldenia procumbens</i> L.	Boraginaceae	June- July	WH	+	+	+
15.	<i>Commelina benghalensis</i> L.	Commelinaceae	June- Dec	WH	+	+	-
16.	<i>Commelina diffusa</i> Burm.	Commelinaceae	July- Feb	WH	+	+	-
17.	<i>Crinum viviparum</i> (Lam.) R. Ansari	Amaryllidaceae	June- Oct	WH	+	+	-
18.	<i>Cyperus alulatus</i> Kern	Cyperaceae	July- Sep	WH	+	+	-
19.	<i>Cyperus difformis</i> L.	Cyperaceae	Aug- Jan	WH	+	+	-
20.	<i>Cyperus iria</i> L.	Cyperaceae	Aug- Jan	WH	+	+	-
21.	<i>Echinochloa colona</i> (L.) Link.	Poaceae	July- Feb	WH	+	+	-
22.	<i>Eclipta prostrata</i> (L.) Mant.	Asteraceae	July- Feb	WH	+	+	-
23.	<i>Eleocharis acutangula</i> (Roxb.) J. A. Schult.	Cyperaceae	June- Nov	WH	+	+	-
24.	<i>Eleocharis dulcis</i> (Burm. f.) Trin ex. Henschel	Cyperaceae	June- Sep	WH	+	+	-
25.	<i>Eleocharis geniculata</i> (L.) R. & S.	Cyperaceae	June- Oct	WH	+	+	-
26.	<i>Eragostris gangetica</i> (Roxb.) Steud	Poaceae		WH	+	+	-
27.	<i>Eriocaulon quinquangulare</i> L.	Eriocaulaceae	Nov- Jan	WH	+	+	-
28.	<i>Fimbristylis dichotoma</i> (L.) Vahl.	Cyperaceae	June- Nov	WH	+	+	-
29.	<i>Fimbristylis miliacea</i> (L.) Vahl.	Cyperaceae	Oct- Nov	WH	+	+	-
30.	<i>Fimbristylis ovata</i> (Burm. f.) J. Kern.	Cyperaceae	Aug.- Dec.	WH	+	+	-
31.	<i>Fimbristylis tetragona</i> R. Br. Prodr.	Cyperaceae	Sep- Nov	WH	+	+	-
32.	<i>Fimbristylis tomentosa</i> Vahl.	Cyperaceae	Sep- Oct	WH	+	+	-
33.	<i>Fuirena ciliaris</i> (L.) Roxb.	Cyperaceae	Sep- June	WH	+	+	-
34.	<i>Glinus oppositifolius</i> (L.) DC	Molluginaceae	July- Feb	WH	+	+	-
35.	<i>Gnaphalium polycaulon</i> Pers.	Asteraceae	Dec- May	WH	-	-	+
36.	<i>Grangea maderaspatana</i> (L.) Poir	Asteraceae	Dec- May	WH	-	+	+
37.	<i>Hedyotis corymbosa</i> (L.) L. Mant	Rubiaceae	July- Feb	WH	+	+	-
38.	<i>Heliotropium indicum</i> L.	Boraginaceae	July- June	WH	-	+	+
39.	<i>Heliotropium ovalifolium</i> Forssk	Boraginaceae	June- Mar	WH	-	+	+
40.	<i>Hydrilla verticillata</i> (L. f.) Royle.	Hydrocharitaceae	Aug- Feb	SH	+	+	+
41.	<i>Hydrolea zeylanica</i> (L.) Vahl	Hydrophyllaceae	Nov- Feb	WH	-	+	-
42.	<i>Hygrophila polysperma</i> (Roxb.)	Acanthaceae	Sep- Dec	WH	+	+	-
43.	<i>Hygrophila schulli</i> (Buch- Ham) Almeida	Acanthaceae	Nov- June	WH	+	+	+
44.	<i>Indocourtoisia cyperoides</i> (Roxb.) Bennet & Reizada	Cyperaceae		WH	+	+	-
45.	<i>Ipomoea aquatica</i> Forssk	Convolvulaceae	Jan- Dec	AFH	+	+	-
46.	<i>Ipomoea carnea</i> Jacq. Austin	Convolvulaceae	Jan- Dec	WH	+	+	+
47.	<i>Kyllinga tenuifolia</i> Stend.	Cyperaceae	July- Oct	WH	+	+	+
48.	<i>Lagerosiphon alternifolia</i> (Roxb.) Druce.	Hydrocharitaceae	Aug- Feb	SH	+	+	-
49.	<i>Limnophila aromatic</i> (Lam.) Merr.	Scrophulariaceae	Dec- Mar	ASH	+	+	-
50.	<i>Limnophila heterophylla</i> (Roxb.) Benth	Scrophulariaceae	Sep- Dec	ASH	+	+	-
51.	<i>Lindernia antipoda</i> (L.) Alston	Scrophulariaceae	Aug- Nov	WH	+	+	-
52.	<i>Lindernia ciliate</i> (Colsm) Penn	Scrophulariaceae	Aug- Sep	WH	+	+	-
53.	<i>Lindernia crustacea</i> (L.) F. v. Muell	Scrophulariaceae	July- Nov	WH	+	+	-
54.	<i>Lindernia parviflora</i> (Roxb.) Haines	Scrophulariaceae	June- Mar	WH	+	+	-

55.	<i>Lindernia rotundifolia</i> (L.) Mukherjee	Scrophulariaceae	Aug- Nov	WH	+	+	-
56.	<i>Lobelia alsinoides</i> Lam.	Lobeliaceae	Aug- Feb	WH	+	+	-
57.	<i>Ludwigia perennis</i> L.	Onagraceae	July- Aug	WH	+	+	-
58.	<i>Marsilea minuta</i> L. Mant.	Marsileaceae		WH	+	+	-
59.	<i>Murdannia nudiflora</i> (L.) Brenan.	Commelinaceae	July- Nov	WH	+	+	-
60.	<i>Najas indica</i> (Willd.) Cham.	Najadaceae	Aug- Jan	SH	+	+	-
61.	<i>Nelumbo nucifera</i> Adans	Nelumbonaceae	July- Oct	AFH	+	+	+
62.	<i>Nymphaea nouchali</i> Burm	Nymphaeaceae	Jan- Dec	AFH	+	+	+
63.	<i>Nymphaea pubescens</i> Willd	Nymphaeaceae	Jan- Dec	AFH	+	+	+
64.	<i>Nymphaea rubra</i>	Nymphaeaceae	Jan- Dec	AFH	+	+	+
65.	<i>Nymphoides aurantiaca</i> (Dalz.) O. Ktze.	Menyanthaceae	Nov- Dec	AFH	+	+	-
66.	<i>Nymphoides hydrophylla</i> (Lour) O. Ktze.	Menyanthaceae	Dec- Apr	AFH	+	+	+
67.	<i>Nymphoides indicum</i> (L.) Ktze	Menyanthaceae	Aug- Apr	AFH	+	+	+
68.	<i>Oryza rufipogon</i> Griff.	Poaceae	Aug- Dec	WH	+	+	-
69.	<i>Ottelia alismoides</i> (L.) Pers.	Hydrocharitaceae	Sep- April	ASH	+	+	-
70.	<i>Paspalum scrobiculatum</i> L.	Poaceae	Oct- Dec	WH	+	+	-
71.	<i>Persicaria barbata</i> (L.) Hara	Polygonaceae	Oct- Apr	WH	+	+	+
72.	<i>Persicaria glabra</i> (Willd.) Gornez	Polygonaceae	Jan- Dec	WH	+	+	+
73.	<i>Phyla nodiflora</i> (L.) Greene	Verbenaceae	Aug- Dec	WH	+	+	+
74.	<i>Polygonum plebeium</i> R. Br.	Polygonaceae	Jan- Dec	WH	+	+	+
75.	<i>Rhynchospora corymbosa</i> (L.) Britton	Cyperaceae	Aug- Jan.	WH	+	+	-
76.	<i>Rotala indica</i> (Willd.) Koehne	Lythraceae	Nov- Feb	WH	+	+	-
77.	<i>Rotala verticillaris</i> L.	Lythraceae	Oct- Dec	WH	-	+	-
78.	<i>Sacciolepis interrupta</i> (Willd.) Stapf.	Poaceae	Throughout years	WH	+	+	-
79.	<i>Schoenoplectus articulatus</i> (L.) Palla.	Cyperaceae	Sep- Dec	WH	+	+	-
80.	<i>Schoenoplectus grossus</i> (L. f.) Palla.	Cyperaceae	Sep- Dec	WH	+	+	-
81.	<i>Smithia conferta</i> Ait.	Fabaceae	Oct- Jan	WH	+	+	-
82.	<i>Sphaeranthus indicus</i> L.	Asteraceae	Nov- May	WH	-	-	+
83.	<i>Tonningia axillaris</i> (L.) O. Ktze.	Commelinaceae	July- Dec	WH	+	+	-
84.	<i>Utricularia aurea</i> Lour.	Lentibulariaceae	Nov- Mar	SH	+	+	-
85.	<i>Vallisneria spiralis</i> L.	Hydrocharitaceae	Oct- Apr	ASH	+	+	-

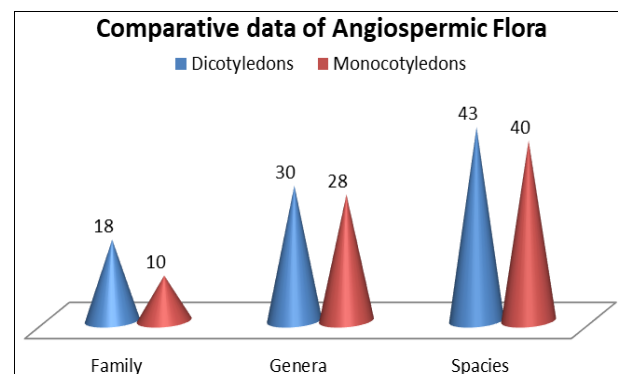
+ Present, - Absent, FFH- Free floating hydrophytes, ASH- Attached submerged hydrophytes, AFH- Attached hydrophytes with floating leaves, SH- Suspended hydrophytes, WH- Wetland hydrophytes, R- Rainy W- Winter S- Summer

**Growth forms**

Growth forms	No. of species
AFH	09
ASH	06
SH	05
FFH	00
WH	65

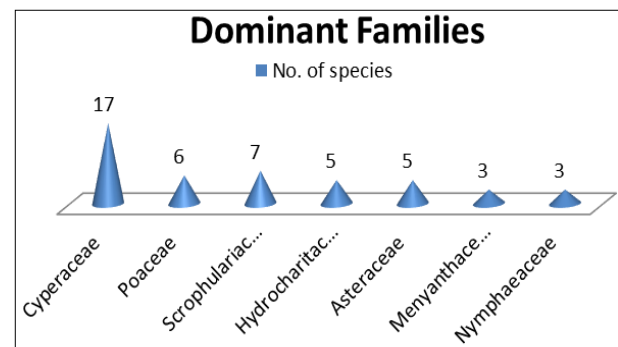
**Discussion**

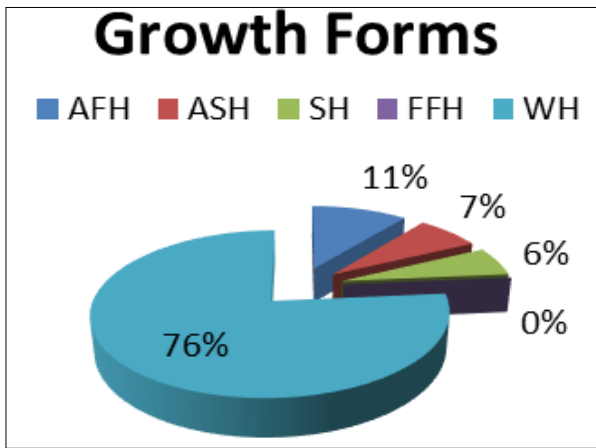
species	<b>Pteridophytes</b>		02
	Angiosperms	Dicot	43
		Monocot	40
<b>Total</b>			<b>85</b>
Genera	<b>Pteridophytes</b>		02
	Angiosperms	Dicot	30
		Monocot	28
<b>Total</b>			<b>60</b>
Family	<b>Pteridophytes</b>		02
	Angiosperms	Dicot	18
		Monocot	10
<b>Total</b>			<b>30</b>



**Dominant Families**

Family	No. of species
Cyperaceae	17
Poaceae	06
Scrophulariaceae	07
Hydrocharitaceae	05
Asteraceae	05
Menyanthaceae	03
Nymphaeaceae	03





**Result & discussion**

During the present study, 85 plant species were recorded of which 02 species are Pteridophytes while 83 species belonging to Angiosperms. Angiosperms are dominant plant group represented by 58 genera & 28 families documented from the study sites. Study site were dominated by

Angiospermic flora belonging to Family Cyperaceae representing 17 species followed by family Scrophulariaceae represented by 07 species. The some other families like Poaceae, Asteraceae, Hydrocharitaceae, Menyanthaceae & Nymphaeaceae also make their dominance in study site represented by 6, 5, 5, 3 & 3 species respectively.

Among the Growth forms, 77% species belongs to Wetland hydrophytes which are dominant growth form while free floating hydrophytes (FFH) were not recorded at all from study site.

During present study, a close phyto-sociological association were recorded in between the members of family Menyanthaceae, Nymphaeaceae & Hydrocharitaceae.

Present study also deals with a seasonal availability of wetland flora in three different seasons namely rainy, winter & summer. It was observed that maximum diversity occur in winter season followed by rainy & summer season.

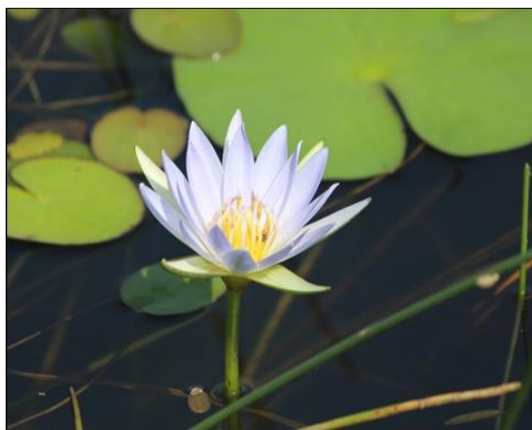
During seasonal field survey of study site, A variety of avian fauna, particularly in the winter and summer seasons, have been observed at the study location.



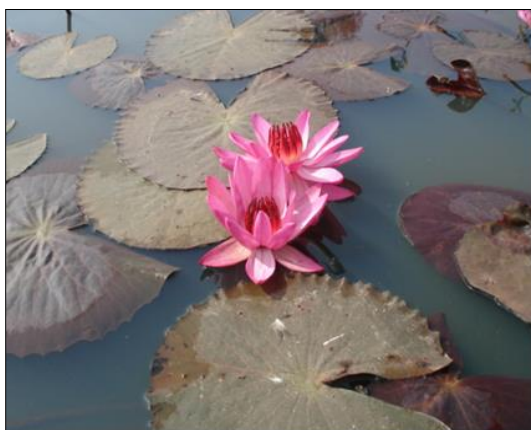
a. *Blyxa aubertii*



b. *Hydrilla verticillate*



c. *Nymphaea nouchali*



d. *Nymphaea rubra*



e. *Nymphoides indica*



f. *Nymphoides cristata*

g. *Bergia ammannioides*h. *Hygrophila polysperma*i. *Persicaria glabra*j. *Commelina benghalensis*k. *Schoenoplectus articulatus*l. *Fimbristylis ovata*

### Conclusion

The study site is situated close to the village where it used for obtaining NTFP's for livelihood. On the other side, it also suffers from the burden of habitat degradation at an alarming rate due to harmful human activities that brings the changes in water quality leads to species dominance & ultimately loss of floral diversity that may result into complete disappearance of some wetland flora from the habitat in near future.

It is urgent need to conserve the highly rich study site by reducing human disturbance which are going to degrade the wetland ecosystem for betterment of health and wealth of Visora (Bardi) lake.

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