

FLORAL DIVERSITY OF MALAKA-HARHAR WETLAND, ALLAHABAD (U.P.) INDIA

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Malaka-harhar wetland, is a relatively a small wetland situated in the north of district near to the National Highway No.96. It is about 11 km away from the city. The wetland is perennial, shallow containing freshwater and is associated with agriculture fields. This wetland provides a good deal of contiguous habitat to various plant communities. The wetland is nearly 102m² in area and shows diverse type of aquatic life of flora and fauna. Monthly data throughout the year have been recorded and the plants were classified according to their habit and habitats. Total of 27 plant species were identified out of which 20 species are strictly found in aquatic habitat, while five found on moist shores and two species slightly in upland habitats.

Keywords: Aquatic, Diversity, Freshwater, Wetland

INTRODUCTION

The Indian wetland in general and that of Allahabad district in more particular have not been subjected to their proper study and therefore the present study has been under taken for the first time to fill up this gap. This is first detailed study from the district of Allahabad. According to Ramsar Convention (1971): "Wetland are areas of marsh, for peat land or water, whether natural or artificial permanent or temporary, with water that is static or flowing fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." Wetlands are defined as lands transitional between terrestrial and aquatic ecosystems where the water table is usually at or near the surface or land is covered by shallow water (Mitsch and Gosselink, 1986).

According to National Environment policy (2006) wetlands are natural and manmade, freshwater or brackish; provide numerous ecological services. They provide habitat to aquatic flora and fauna, as well as numerous species of birds, including migratory species. Wetland ecosystem forms an important environment for aquatic, semi aquatic and moistures loving floral and faunal associations. In tropical and sub-tropical wetlands infestation of aquatic plants is globally know. They act as a "bio-filter", as they intake large amount of organic as well as inorganic nutrients from the eutrophic water bodies / nutrient enriched pollutant through various dynamic processes e.g. water cycle nutrient cycle, and food chain,

therefore known as 'Kidney of the landscape ' or 'Biological super market' by the experts or the areas where the soil, is saturated with water are crucial incubators known for high species diversity (Allen-Diaz et al.2004)

Wetland is a land where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in soil and on its surface with attention has been paid to the systematic study of aquatic and wetlands plant of India. An account of hydrophytes plant of India was published by Biswas and Calder (1937), Subramanyam (1962), Deb (1976) and Islam (1989), Recently, Cook (1996) published a volume on aquatic and wetland plants of India. In Uttar Pradesh Sen and Chatterjee (1959), Trivedi and Sharma (1965), Sahai and Singh (1968), Singh and Singh (1972), Singh and Tomer (1983), Srivastava *et al.* (1987), Maliya and Singh (2004), Singh (2006) and Saini *et al.*(2010) have described aquatic flora of some districts. Still large areas remain unexplored. In this pursuit, this communication presents authors observation on the taxonomic and ecological behavior of aquatic and wetland vegetation of Malaka-harhar wetland of Allahabad district.

Location and habitat

The Malaka-Harhar wetland is situated nearly National Highway No.96, about 11km north-west from the Allahabad city. It lies 25° 28' Lat 81° 50'E (Figs. 1-3). It is deep, fresh water permanent wetland covers the over

Area of 6834 m². The landscape and terrain of the wetland is almost flat having an average height of 98 m from sea level. This is important wetland of N-W region in Allahabad, which provides a good hydrophytic environment for the

richness of flora and fauna as well as anthropogenic activities. The Villagers of the nearby wetland depend on it wetland for their live hood in the form of fishing, agricultural activities and bathing.

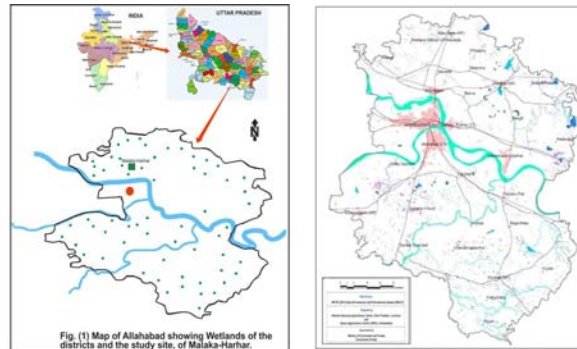


Fig. 1: Wetland map of Allahabad district (MoEF)



Fig. 2: Satellite image of Malaka-Harhar Allahabad, Source: Google Earth



Fig. 3: Overview of Malaka Harhar Wetland

METHODOLOGY

The present study is based on the exploration and study of aquatic and marshy plants in Allahabad District, Uttar Pradesh. During the exploration all areas were explored in all twelve month, so as after making observation on the

habit, habitat, plant communities and frequency of occurrence, Plant species identified using standard systematic key characters (Hooker, 1872-1897; Dassnayake and Fosberg, 1991; Duthie, 1903-1929; Fasset, 1940; Raizada, 1976; Cook, 1996; Misra, D.R. and Mohan, A,2008 ;).

Observation of biotic communities

The biotic communities comprise the classified faunal and floral diversities and are as follows. In the present enumeration, aquatic and marshy plants are classified into following life forms depending upon nature and type of habitat, and in relation to their edaphic factors.

- Free Floating hydrophytes (FF) - Plants are in contact with water and air only. *Eichornia crassipes*, *Pistia stratio*, *Lemna minor*, *Azolla* and *Wolffia*.
- Suspended hydrophytes (SH) - Root is submerged hydrophytes that are contact with water only- *Ceratophyllum demersum*.
- Submerged anchored hydrophytes (SA) - These are entirely or for the most part in contact with soil and water only. *Hydrilla verticellata*
- Floating leaved anchored hydrophytes (FLA)- These are in contact with soil, water as well as air- *Nelumbo nucifera*
- Floating shorts anchored hydrophytes (FSA) - These are rooted in muddy substratum with their shoots floating on the water surface. *Ipomea aquatica*
- Emergent amphibious hydrophytes (EA)- The roots, the lower portion of stem and in some cases, even the lower are usually submerged under water - *Cyperus iria*
- Wetland hydrophytes (WL)- Those are rooted to the soil, saturated with water, eg. - *Typha angustifolia*, *Eleocharis acutangala*
- Aquatic Faunal Communities: Wetland Fauna: *Bubulcus ibis*, (Local Name =Bagula, gai bagula), Gallusa-Gallusa, (Local Name =Van Murgi)

RESULTS AND DISCUSSION

As one of the characteristic feature of wetland vegetation such as *Typha angustifolia*, *Eichhornia crassipes*, *Hydrilla verticellata*, *Eleocharis acutangala* and *Lemna minor* are some of the dominant aquatic plant life present in the wetland. The presence of *Eichhornia crassipes* inside the wetland makes it a unique habitat for

the fishing. Overall 27 species belonging to 21 families were recorded from the wetland area (Table 1). Of these, 15 species were monocot, 10 dicot, and 2 pteridophytes. Seven species were recorded as free floating (FF), five species are emergent amphibious hydrophytes (EA), five species each as wetland hydrophytes (WL) and submerged hydrophytes (SH), five species as floating leaf anchored (FLA).

In the present investigation the wetland with higher transparency absence developed high density of free-floating plants and when water becomes less turbid, submerged plants dominate. *Eichornia crassipes* and *Typha angustifolia* survive till early summer and again rejuvenate after the summer is over (Unni, 1972). The submerged plants were found throughout the year as they were much affected by the changes in the abiotic factor (Bazmi and Ahmad, 1989).

Although Malaka-Harhar wetland exhibited fare amount of biodiversity it is under heavy anthropogenic pressure due to encroachment, agriculture activity and use for animal husbandry around the wetland, which led to habitat loss and its degradation. Some parts of wetland have been drained and transformed into rice field and also in barren land or wasteland. Use of water for agricultural purpose also affects the number of free-floating species like *Trapa natans*, *Eichornia crassipes*, *wolfia*, *Azolla* species. Over exploitations of this wetland to be studied in details in order to preserve the fragile wetland ecosystem.

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Table 1: Composition of macrophyte of Malka-Harhar wetland

Sl. No.	Plant Species	Season	Life form	Family
1.	<i>Azolla pinnata</i> R.Br.FH	R	FF	Azollaceae
2.	<i>Aponogeton natans</i> (L.) Engl.	R,W.	FL	Aponogetonaceae
3.	<i>Ceratophyllum demersum</i> L.	S,W.R.	SA	Ceratophyllaceae
4.	<i>Cyperus iria</i> L.	S,R.	EM	Cyperaceae
5.	<i>Eichornia crassipes</i> (Mart.) Solms	S.W.R.	FF	Pontederiaceae
6.	<i>Hydrilla verticellata</i> (L.f.) Royle	S.W.R	SA	Hydrocharitaceae
7.	<i>Hygroryza aristata</i> (Retj.) Ness exaight and Arhatt	W	FL	Poaceae
8.	<i>Ipomea aquatica</i> Forssk	R.W	FL	Convolvulaceae
9.	<i>Marsilea minauta</i> L.	S.W.R.	FL	Marsileaceae
10.	<i>Najas graminea</i> Delile	S.R.	SA	Najadaceae
11.	<i>Nelumbo nucifera</i> Goerth.	S.R.	FL, EM	Nelumbonaceae
12.	<i>Nymphaea nouchali</i> Burm. f.	R.	FL	Nymphaeaceae
13.	<i>Oryza sativa</i> L.	R.W.	EM	Poaceae
14.	<i>Polygonum borbatum</i> L.	R.W.	EM	Polygonaceae
15.	<i>Potamogeton pectinatus</i> L.	R.W.	SA	Potamogetonaceae
16.	<i>Ranunculees sceleratus</i> L.	R.W.	WL	Ranunculaceae
17.	<i>Typha angustifolia</i> L.	R.W.	WL	Typhaceae
18.	<i>Trapa natans</i> var. <i>bispinosa</i> (Roxb.) Makino	S.W.R.	FF	Trapaceae
19.	<i>Vallisneria spiralis</i> auct.nonL.	W.	CA	Hydrocharitaceae
20.	<i>Wolffia arhiza</i> (L.) Horkel ex Wimm.	R	FF	Lemnaceae
21.	<i>Amaranthus vridis</i> L.	R.W.	WL	Amaranthaceae
22.	<i>Coldenia procumbens</i> L.	R.W.	WL	Boraginaceae
23.	<i>Hygrophila auriculata</i> (Schumach.) Heine	R.W,	F	Acanthaceae
24.	<i>Lemna minor</i> L.	R.W.	FF	Lemnaceae
25.	<i>Eleocharis acutangala</i> (Roxib). Schult	R.W.	W.L.	Cypraceae
26.	<i>Pistia stratioter</i> L.	R.W	F.F	Aracaceae
27.	<i>Rorippa india</i> (L.)Hiern	R.W.	W.L	Brassicaceae

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