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Aquatic Macrophytic Diversity of Urpod Beel, Goalpara District of Assam, India

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Abstract

An investigation was carried out to evaluate the present status of Macrophytic diversity of Urpod beel, Goalpara, Assam, situated in between 25° 33' to 26° 12' N latitude and 90° 7' to 91° 5' E longitude. The study was carried out during Dec, 2014 to Nov, 2015. Total 74 species belonging to 54 genera and 30 families were observed in present macrophytic diversity. Out of 74 species, 3 species were from Pteridophytes belonging to the families Marsiliaceae and Salviniaceae and others from Angiosperms among which 36 species were Dicotyledons under 17 families and 35 species were from Monocotyledons under 11 families. The study reveals that the macrophytic vegetation of the Urpod beel appears to be relatively high with respect to the diversity of Marshy Amphibious (MA) 22.97%, Submerged Aquatic (SA) 25.67%, Emergent Aquatic (EA) 24.32%, Floating Aquatic (FA) 18.91% and Free Floating (FF) 8.1%. The finding of this study is expected to provide baseline information on biodiversity of this beel.

Keywords: Macrophytic Diversity, Urpod Beel

Introduction

The wetlands provide habitat for a large variety of flora and fauna. It maintains the ecosystem of an area by sheltering many species of aquatic plants, fishes, insects etc. Wetlands are potentially rich in aquatic resources, which play a significant role in maintaining biodiversity. They offer habitat suitable for support growth of a variety of aquatic life forms. The term aquatic macrophyte refers to macroscopic vegetation including angiosperms, ferns, mosses, liverworts and some freshwater macro-algae that occur in seasonally or permanently in wet environments (Chambers *et al*., 2008). The macorphytic vegetations may be classify in to Submerged aquatic (SA), Floating aquatic (FA), Emergent aquatic (EA), Free-floating (FF) and Marshy amphibious (MA) (Sculthorpe, 1985; Padial *et al*., 2008).

The aquatic macrophytes are the important source of food, fodder, herbal medicine and domestic household materials for the people residing in its vicinities. Aquatic macrophytic diversity and its role in understanding the beel ecosystem have tremendous significance. Aquatic macrophytes represent as an important habitat for fish. Many young fish need aquatic macrophytes as shelter and protection from predation or to avoid cannibalism. Aquatic macrophytes also serve some fish as a spawning habitat, for the attachment of eggs, and some fish form nesting sites among the macrophytes (Cowx and Welcomme, 1998).

Aim of the Study

The present investigation was designed to monitor the aquatic macrophytic diversity of Urpod beel, Goalpara district of Assam during December, 2014 to November, 2015.

Review of Literature

Aquatic macrophytes diversity and its role in understanding the beel ecosystem have tremendous significance. Some notable works available on macrophytes are Dey and Kar, 1989; Goswami,1997; Mcfarland and Rogers, 1998; Sarma and Devi, 1999; Goswami *et al*., 1999; Baruah and Baruah, 2000; Lacoul and Freedman, 2006; Chambers *et al.,* 2008; Deka *et al.,* 2010; Baruah *et al.*, 2011; Harkal *et al.,* 2011; Borah and Sarma, 2012; Bordoloi, 2014; Sarma and Deka, 2014; Dutta *et al.*, 2014; Mili and Acharjee, 2014; Deka and Sarma, 2015 etc.

Materials and Method

Description of the Study Area

Urpod Beel is situated at Agia in Goalpara district of Assam. The geographical location of the district is approximately in between the latitude of 25° 33' to 26° 12' N and longitude of 90° 7' to 91° 5' E. The climate of the

district is hot and humid in summer and dry and cool in winter. The Urpod Beel is surrounded by 10 villages and the some villagers earned their livelihood by fishing in the Beel. This beel is connected with Pataka Beel by a small drain located in the eastern side. Perennially, the Beel is fed by Jinziram and Jinari, both are the tributaries of river Brahmaputra.

Analysis of Macrophytes

During the present study, monthly surveys to record, collect and identify the aquatic macrophytes were carried out from December, 2014 to November, 2015. The aquatic plants were collected and they were photographed, packed in the plastic bags for making dry herbarium or kept in the bottles filled with 70% formalin aceto alcohol (FAA) and taken to the laboratory for further identification.

The macrophytes were identified with the help of standard key and literature like Flora of British India (Hooker, 1872-1897); Flora of Assam (Kanjilal *et al.,* 1940, Bor, 1940); Aquatic and Wetland Plants of India (Cook, 1996); Illustrated Aquatic and wetland Plants in Harmony with Mankind (Ghosh, 2005); Floristic Diversity of Assam (Bora and Kumar, 2003) and consulting the herbaria of Department of Botany, Gauhati University and Kanjilal Herbarium, Shillong, Meghalaya, India.

Results of the Study

Macrophytic Diversity

During the present study 74 species belonging to 54 different genera, 30 families were recorded from Urpod beel, Goalpara, Assam are shown in tabular form (Table 1 & Fig. 2) with their reproductive phases. Out of 74 species 3 species were from Pteridophytes belonging to 2 families and others were Angiosperms. Among Angiosperms 36 species were Dicotyledons under 17 families and 35 species from Monocotyledons under 11 families.

Among the observed Macrophytes, 17 species were belonging to Marshy amphibious (MA), 14 species were Floating aquatic (FA), 19 species were Submerged aquatic (SA), 18 species were Emergent aquatic (EA) and six species were found as Free floating (FF). Family Poaceae and Hydrocharitaceae are dominated with 6 species followed by Nymphaceae, Onagraceae, Polygonaceae, Lamnaceae and Cyperaceae with of 4 species each; Menyanthaceae, Convolvulaceae, Commelinaceae, Potamogetonaceae are of with 3 species each; Hologaceae, Apiaceae, Astaraceae, Scrophulaceae Amaranthaceae, Caratophyllaceae, Pontederiaceae, Alismataceae, Salvinaceae are of with 2 species each and other 14 families are monospecific. Habitat of Submerged Aquatic (SA) was most dominant constituting 25.67%, followed by Emergent Aquatic 24.32% and Marshy Amphibious 22.97%, Floating Aquatic constituting 18.91%, Free floating constituting 8.1% each of the total macrophytic species (Fig. 1).

Table 1: - List of Aquatic Macrophytes Along with their Habitat and Reproductive Phases

S. No.	Name of species	Family	Habit	Reproductive Phase
1	*Euryale ferox* Salish	Nymphaeaceae	FA	May – Jul.
2	*Nymphaea pubescens* Willd.	Nymphaeaceae	FA	June – Nov.
3	*N. nouchali* Burm f	Nymphaeaceae	FA	Jul. – Oct.
4	*N. rubra* Roxb. ex. Salisb,	Nymphaeaceae	FA	Aug. – Dec.
5	*Nelumbo nucifera* Gaetrn.	Nelumbonaceae	FA	July.-Oct.
6	*Oxalis corniculata* L.	Oxalidaceae	MA	May – Dec.
7	*Myriophyllum tetrandrum* Roxb.	Haloragaceae	FA	May – Nov.
8	*M. tuberculatum* Roxb.	Haloragaceae	FA	Jan. – Dec.
9	*Ludwigia adscandans* (L.) Hara.	Onagraceae	FA	Jun – Oct.
10	*L. parviflora* Roxb.	Onagraceae	EA	June – Oct.
11	*L. perennis* L.	Onagraceae	EA	Aug. – Dec.
12	*Jussiea repens* L.	Onagraceae	EA	Mar. – Dec.
13	*Trapa natans* L.	Trapaceae	FA	Jul. – Dec.
14	*Centela asiatica* L.	Apiaceae	MA	Jan. – Dec.
15	*Oenanthe javanica* (Bl.) DC	Apiaceae	EA	Mar. – May
16	*Enhydra fluctuans* Lour.	Asteraceae	EA	Mar. – Dec.
17	*Grangea maderaspatana* Poir.	Asteraceae	MA	Apr. – Nov.
18	*Nymphoides cristatum* Roxb.	Menyanthaceae	FA	Sept.-Oct.
19	*N. indica* (L.) Kunze	Menyanthaceae	FA	Sept.-Oct.
20	*N. parvifolium* Kuentz.	Menyanthaceae	FA	Mar.-Nov.
21	*Heliotropium indicum* L.	Boraginaceae	MA	May – Aug.
22	*Ipomoea aquatica* Forsk.	Convolvulaceae	EA	Sept. – Feb.
23	*I. carnea* Jaeq.	Convolvulaceae	EA	Sept. – Feb.
24	*I. obscura* L.	Convolvulaceae	EA	Aug. – Sept.
25	*Limnophilla indica* L.	Scrophulariaceae	SA	July – Dec.
26	*L. heterophylla*	Scrophulariaceae	SA	Aug. – Jan.
27	*Utriculara scandens* Ben.	Lentibularaceae	SA	July – Nov.
28	*Alternanthera philoxeroides* L.	Amaranthaceae	EA	Oct. – Feb.
29	*A. sessilis* L.	Amaranthaceae	MA	Jan. – Dec.

30	*Polygonum . barbata* L	Polygonaceae	MA	Oct. – Mar.
31	*P. hydropiper* L.	Polygonaceae	MA	Oct. – Mar.
32	*P. orientalis* L.	Polygonaceae	MA	Apr. – Sept.
33	*Rumex nepalensis* Spreng.	Polygonaceae	MA	Apr. – Jul.
34	*Podostemon subulatus* Gardn.	Podostemaceae	SA	Jun. – Oct.
35	*Ceratophylum demersum* L.	Ceratophyllaceae	SA	Jan. - June
36	*C. tuberculatum* Chan.	Ceratophyllaceae	SA	Jan. – Mar.
37	*Hydrilla verticillata (Lf.) Royle*	*Hydrocharitaceae*	SA	*Oct. – Mar.*
38	*Hydrocharis dubia (Bl) Back.*	*Hydrocharitaceae*	SA	*Mar. – Nov.*
39	*Blyza auberti Rich.*	*Hydrocharitaceae*	SA	*Jan. – Nov.*
40	*B. echinosperma (Clarke) Hook*	*Hydrocharitaceae*	SA	*Jan. – Nov.*
41	*Ottelia alismoids (L.) Pers.*	*Hydrocharitaceae*	SA	*Aug.- Nov.*
42	*Valisneria spiralis* L.	*Hydrocharitaceae*	SA	Mar.-Nov.
43	*Eichhornia crassipes* Solms.	Pontederiaecae	FF	Jan. – Dec.
44	*Monochoria hastata* (L.) Solms.	Pontederiaecae	EA	Feb. – Nov.
45	*Commelina benghalensis* L.	Commelinaceae	MA	Jan. – May
46	*Floscopa scandens* Lour.	Commelinaceae	EA	Jan. – Jun
47	*Murdannia nudiflora* L.	Commelinaceae	MA	Jul. – Jan.
48	*Alocasia fornicata* (Roxb.) Schott	Araceae	MA	May – Sept.
49	*Colocassia esculanta* L.	Araceae	MA	May – Sept.
50	*Pistia stratiotes* L	Araceae	FF	Jun – Sept.
51	*Lemna perpusilla* Torr.	Lamnaceae	FF	May – Aug.
52	*L. paucicostata* Hegelm	Lamnaceae	FF	May – Aug.
53	*Spirodela polyrhiza* L.	Lamnaceae	SA	Jan. – May.
54	*Wolffia globosa* Hartog & Plas.	Lamnaceae	FA	Jun. – Sept.
55	*Sagittaria sagittifolia* L,	Alismataceae	EA	Feb. – Apr.
56	*Alisma plantago-aquatica* L.	Alismataceae	SA	Feb. – Apr.
57	*Najas minor* Al.	Najadaceae	SA	Jan. – Dec.
58	*Potamogeton crispus* L.	Potamogetonaceae	SA	Mar. – Dec.
59	*P. peclinatus* L.	Potamogetonaceae	SA	Mar. – Dec.
60	*P. perfoliatus* L.	Potamogetonaceae	SA	Jan. – Dec.
61	*Eriocaulon setaceum* L.	Eriocaulaceae	SA	Jun. – Aug.
62	*Cyperus compressus* L.	Cyperaceae	MA	July – Nov.
63	*C. iria* L.	Cyperaceae	MA	Aug. - Dec.
64	*C. rotundus* L.	Cyperaceae	MA	Mar. – Nov.
65	*Eleocharis congesta* D. Don.	Cyperaceae	MA	Sept. – Dec.
66	*Arundo donax* L.	Poaceae	EA	Aug. – Jan.
67	*Hygroryza aristata* Nees.	Poaceae	EA	Sept. – Mar.
68	*Leersia hexandra* Swartz	Poaceae	EA	Jan. Dec.
69	*Oryza rufipogon* Griffith, Notul	Poaceae	EA	Oct. – Jan.
70	*Phragmites karka* (Retz.) Trin	Poaceae	EA	Sept. – Jan.
71	*Setaria gluca* Beauv	Poaceae	EA	Mar. –Nov.
72	*Marsilea quadrifolia* L.	Marsiliaceae	FA	May. – Sep.
73	*Azolla pinnata* R.Br	Salviniaceae	FF	Mar. – Nov.
74	*Salvinia natans* Hoffins.	Salviniaceae	FF	May – Sep.

MA = Marshy Amphibious; FA = Floating aquatic; SA = Submerged aquatic; EA = Emergent aquatic; FF = Free Floating

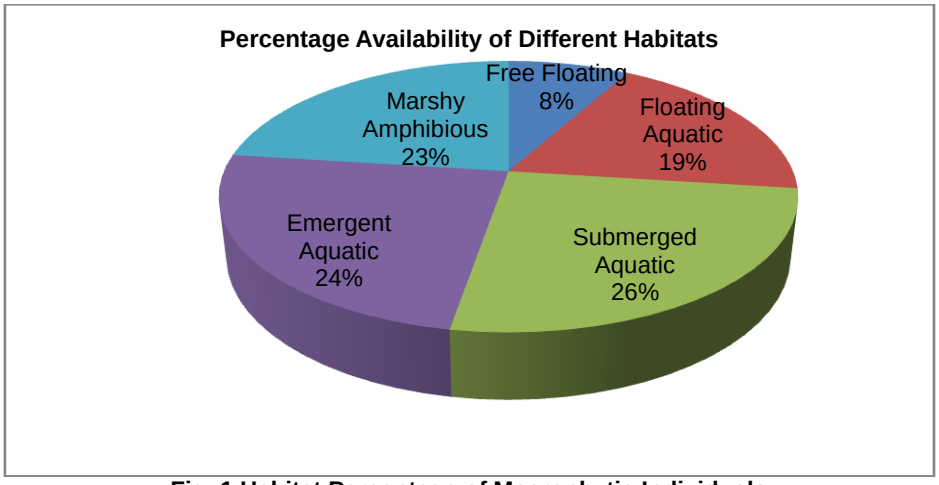

Fig. 1 Habitat Percentage of Macrophytic Individuals

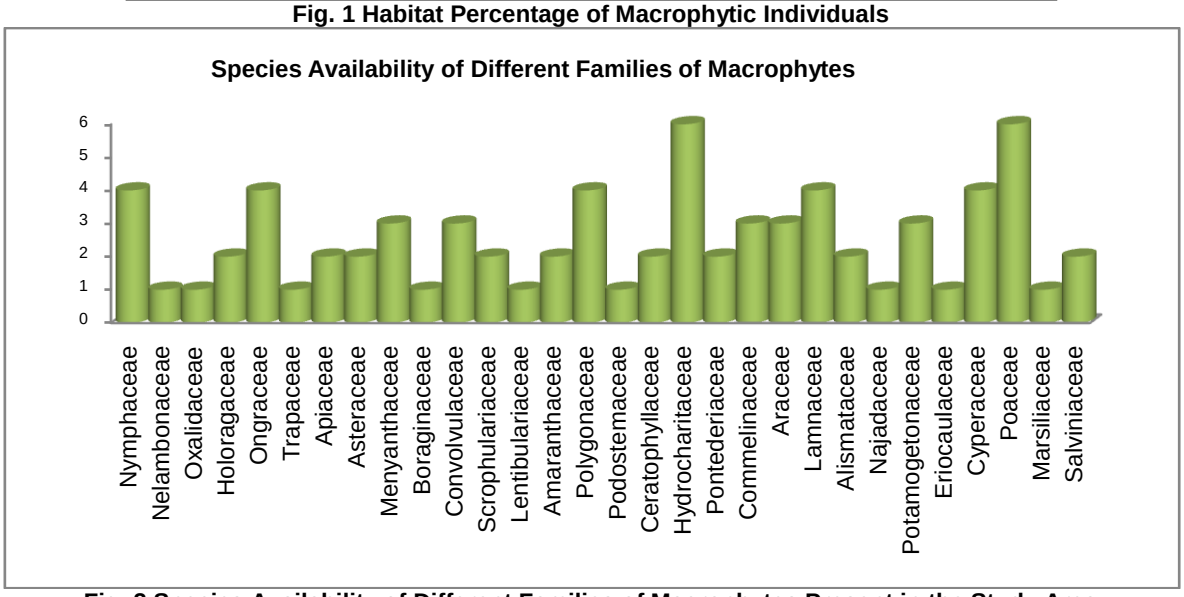

Fig. 2 Species Availability of Different Families of Macrophytes Present in the Study Area

Discussion

The Urpod beel appears to be relatively high with respect to the biodiversity of submerged aquatic and emergent aquatic macrophytes. The floating aquatic and free-floating plants *Eicchornia crassipes, Azola pinnata, Pistia stratiotes, Lamna perpusila* are exist throughout the year and they become plentiful during the summer. The floating and submerged aquatic plants dominate the Urpod beel habitat. The foremost were the *Euryle ferox, Nymphea rubra, Trapa natans, Azolla piñata, Marselea quadrifolia, Valisnaria spiralis, Hydrilla verticillata* etc. The weeds which were prevalent in the cropped area are *Heliotropium indicum, Alternanthera sessilis, Polygonum hydroiper, P. barbatum, Rumex nepalensis, Cyperus compressus, C. irea, C. rutundus, Eleocharis congesta* etc.

Conclusion

Vigorous growth of marginal macrophytes; emergent, sub emergent and floating vegetation cause silting of the beel. A large part of the Urpod beel is now covered by water hyacinth. The intensive fishing activities, settlements and permanent agriculture are steadily encroaching on the wetland and reducing the extent of the marsh vegetations. The entire beel area is utilizing as a traditional fishing ground by the inhabitants of surrounding villages. The wetland produce a large quantity is each year which supports poor families of Fishermans of the villages surrounding the beel as their sources of income. The beel plays an important role in maintaining the environmental quality of the areas and its vicinity and also of the Goalpara town. So it is essential to conserve the beel for the future generation.

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