ISSN 0976 – 3333

Available Online at www.ijpba.info

International Journal of Pharmaceutical & Biological Archives 2012; 3(6):1415-1417

ORIGINAL RESEARCH ARTICLE

Diversity and Biomass of Macrophytes of Bahiara wetland, Saran, Bihar

Ravindra K Singh, Manoj Kumar Pandey* and Rakhi Kumari

P G. Department of Zoology, J.P. University, Chapra, Bihar, India

Received 28 Sep 2012; Revised 02 Dec 2012; Accepted 09 Dec 2012

ABSTRACT

The Bahiara wetland consitutes luxuriant growth of macrophytes which are mainly responsible for the fixation of organic carbon. During present study, 10 species of aquatic macrophytes have been observed along with their dry biomass in different seasons.

Key words: Aquatic macrophytes, dry biomass, species diversity.

INTRODUCTION

Plants community dominates in shallow waters. Plants in water are called macrophytes. Macrophytes may be considered as the dominant organisms in wetlands and play an essential role in biochemistry and ecology of aquatic biota. Primary productions by aquatic macrophytes play an important source of energy transformation at different trophic levels of ecosystem compartments.

The rapid and uncontrolled growth of macrophytic species may leads to ecological problem in water bodies. The floating leaves block the photosynthetic process. Many species of aquatic macrophytes are being used an indicator of water quality. Their form, behaviour and resistance, influence pollution in different way.

In general, the macrophytes constituti the principal source of food in the food chain of aquatic animals and fish which is in turn form the food of human beings. Although a number of aquatic bodies have been studied in India by several workers like Nasar and Dutta munsi, 1971; Dutta munshi (1979) pandit (1984) Purohit and singh (1985). Sharma and singhal (1988) but unfortunately meagre data in the field of macrophyte ecology in wetland is available in view of their ecological dominance. The present study was carried out to elucidate the aspects of macrophytic ecology of Bahiara wetland and their seasonal qualitative and quantitative changes in this aquatic environment.

Study Area

The Bahiara wetland is located in the northern part of Chapra city. The total surface area of the wetland is 245 hectare. The wetland is shallow with rectangular shaped basin. It was formed by flood activity of river Gandak. Regular inflow and outflow of water takes place through the various points of wetland. The wetland is gradually getting silted. The major contributor of the silt is the Daha river and flood activity in rainy season.

MATERIALS AND METHODS

The macrophytic species diversity and abundance as well as their dry biomass in the Bahiara wetland were studied on fortnightly basis and the data were modified to depict monthly average.

The macrophytes were sampled by using a $0.3X0.3m^2$ metal quadrates (Southwood 1978). Five random samples were taken from wetland which were composited and brought to the laboratories in the polyethylene bags. In the laboratory all samples were washed with tap water and sorted manually then identified following Gupta (1979).

Macrophytic diversity

The wetland exhibitis luxuriant growth of macrophytes which are mainly responsible for the fixation of organic carbon.

The macrophytic vegetation of the wetland is grouped under four main growth forms representing different vegetational zones viz. (i) Free floating (ii) Bottom rooted (iii) Floating emergent and (iv) submerged types.

During present study, 10 species of aquatic macrophytes have been collected the *Eichornia crassipes* was the most dominant macrophyte

***Corresponding Author:** Dr. Manoj Kumar Pandey, **Email:** manoj_pandey45@yahoo.com

bearing submerged root and aerial leaves and encountered throughout the study period.

Hydrilla verticillata casp, submerged macrophyte was found in good quantity during the whole study period. It showed its maximum growth in june 2009. It started declining probably due to the filling of water body with rain waters during rainy season.

Iussed sp. a marginal creaper, mostly showed its growth at limnetic zone, except during the monsoon. Sudden, disappearance of jurssea sp. Monsoon season was due to outbreaks of rainy season and increase in water level. *Ceratophylum demersum,* a submerged species disappeared during monsoon months the peak period of its growth was in summer.

Ipomea aquatica a floating plant, showed its maximum growth in winter and post winter months.

Vallisneria sp, a submerged macrophyte, generally started growing during winter of the both the years, and gradually declined during summer and completely disappeared during rainy season.

Chara fragilis showed their appearance from November and December and gradually reached their peak during the summer month of the study period.

Table 1: Macrophytic species and their nature observed from Bahaira wetland during 2009 and 2010

S. No	*Species name*	Nature
1	*Eichornia crassipes*	Submerged root and aerial leaves
2	*Jussea sp*	Marginal creeper
3	*Hydrilla verticillata*	Submerged
4	*Ceratophylum demersum*	Submerged
5	*Vallisneria sp.*	submerged
6	*Ipomea aquatica*	Floating plant
7	*Chara fragilis*	submerged

RESULTS AND DISCUSSION

Macrophytic Biomass content

Eichornia sp was observed thoughtout the observation period with little variation in their dry biomass. The highest quantum (377.12 g dry. Wt. / m^2) of *E. crassipes* was recorded during September 2010, while the lowest 45.97 g. dry wt. / m2 in April 2011. The dry biomass of E. *crassipes* showed their maximum quantum during the winter month which gradually decreased during summer.

The minimum dry weight of *jussea sp* (2.81 g/m2) was recorded during August 2010, while the maximum (29.33 g/m2) in December 2010.

The minimum biomass of *Hydrilla verticillata* (14.73 g/m2) was recorded in December, 2010, while the maximum (309.12 g/m2) in june 2011.

The lowest dry biomass of *C. demersum* (21.72 g/m^2) was recorded in October 2010, while the highest (175.74 g/m^2) during june 2010. *Vallisnesia sp.* Showed their maximum dry biomass (310.16 g/m^2) duding January, 2010 and the lowest (47.12 g/m^2) in August 2010. Ipomea aquatica Shoned their Tongest dry biomass (3.12g/m^2) in july 2010, and the highest (59.72g/m^2) during January 2011. The longest gry biomass of *chara fragilis* (4.27g/m^2) was qabsorbed in july, 1986, while the highest (411-58g/m^2) during june 2011.

The seasonal fluctuation of aquatic malrophytes depends upon various environmental factors. In the lentic system or series of lentic water body with water of similar chemical composition, the distribution of macrophytic species is primarily correlated with the nature of substratum. The higher dry biomass productivity could be attributed to the addition of be nutrients, mainly nitrate and phosphate through the domestic drain. Spence (1964) and Boyd (1971) considered that the macrophytic production increase with encouraging concentrations of nitrogen and phosphorous and occasionally with increasing alkalinity.

In the present investigation macrophytes were more productive, which contributed the highest biomass. This may probably be that make the best use of all three possible states with their roots in sediments beneath water and with the photosynthetic parts of the plants floating on the surface of water and remains in contact with air and light. The mud around the roots may be a good source of soluble nutrients which can diffuse to the roots via the water in the sediments. Light and free cabon dioxide are more readily available in air than in water, thus, they make the best of both aquatic and terrestrial environments which confirm the findings of Edwards, 1860.

Brylinske and Mann (1973), Who summarized the literature aquatic productivity, conduced that light plays a more dominant role than nutrients. This is true in the dependent both on nutrients present investigation. The productivity of the macrophytes are availability as well as on the quantum, period and intensity of solar radiation.

REFERENCES

1. Dykjova, D. and pribil S. (1975) Energy content in the biomass emergent macrophytes and their ecological efficiency. *Arch Hydrobiol*. 75 (1) 90-108.

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2. Golley F.B. (1961) Energy Value of ecological material. Evology - 42 : 581-584.
3. Kaul . V. (1971) Production and ecology of some macrophytes of Kashmir lakes Hyrobiologia, 12: 63-69.
4. Spencer, D.H.N (1967) factors controlling the distribution of fresh water macrophytes with particular reference to lake of Scottand. Journal of ecology. 55: 147-170.
5. Trisal C.L. (1987) Ecology and conservation of Dal lake, Kashmir, water resources Development, 3 (1): 44-54.
6. Viosca, Jr (1935) Statistics and the productivity of inland waters the master key to better fish culture. *Trans Amer*, *Fish* Soc 65 : 350-358
7. Gupta op 1979 Aquatic weeds: Their menance and manual, today and, Tomonows publishers, New Delhi, 272 PP.

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