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Research article

DISTRIBUTION AND DIVERSITY OF AQUATIC MACROPHYTES IN JANNAPURA TANK OF BHADRAVATHI TALUK, KARNATAKA

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ABSTRACT: Among aquatic plants, a total of 13 species belonging to 11 families were recorded from Jannapura tank during January to December 2008. Species among plant, indicative of organic enrichment as *Pistia stratiotes, Alternanthera philoxeroides* and *Commelina sp.* were found in large population. Pistia stratiotes and *Alternanthera philoxeroide*s were regarded as pollution tolerant aquatic macrophytes and be used as a biological indicator for eutrophication. It indicates that, aquatic macrophyte species are specific to the environmental quality. The present findings revealed that the surface quality of the tank is productive and eutrophic.

Key words: Physico-chemical characteristics, Aquatic macrophytes, Jannapura tank, eutrophication**.**

INTRODUCTION

Aquatic macrophytes play an important role in primary productivity of the aquatic ecosystem. Aquatic macrophytes used nutrient and thus influences water quality. It also controls water quality by exuding various organic and mineral components. Aquatic communities reflect anthropogenic influence and are very useful to detect and assess human impacts [1,2,3,4,5]. 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 [6,4]. Kshirsagar and Gunale [7,4] reported that untreated sewage significantly alters the physico-chemical parameters of water. The objective of the present study was to know the diversity and distribution of aquatic macrophytes and to determine the water quality of Jannapura tank from Bhadravathi taluk of Karnataka, India.

MATERIALS AND METHODS

Study area

Jannapura tank is situated near Bhadravathi town (Figure 1) in Shimoga district of Karnataka ($13^{O}48'37''$-$13^{O}52'30''$N & $75^{O}40'42''$-$75^{O}43'33''$E). This water body is perennial one and receives the water from Bhadra left bank channel as well as rain water. The tank covering an area of 20 ha and depth of about 5-10m. The tank water is utilised for irrigation and fish culture. In the current investigation, monthly field visit was made from January to December 2008 to collect macrophytes and harvest method was employed by using 1x1 mt quadrates at randomly in different sites of the tank. Aquatic macrophytes were collected at sampling sites I, II and III. The identification of aquatic macrophytes was done as per Singh and Karthikeyan [8], Biswas and Calder [9]. The physico-chemical parameters were estimated by referring the standard procedures of APHA [10], Trivedi and Goel [11] and Trivedi et al.[12].

RESULTS AND DISCUSSION

The physico-chemical parameters of water samples of Jannapura tank is presented in Table 1. Table 2 depicted diversity and morpho-ecological group of Aquatic macrophytes. The water temperature of the tank varied from a minimum of 22^{o}C to a maximum of 31^{o}C. pH of the water was alkaline and the sulphate of water fluctuated from 48.5 to70.7 mg/L respectively.

Calcium content varied 16 to 48 mg/L but magnesium content was slightly lower than calcium and ranged between 14-38 mg/L. However, the nitrate and phosphate contents were deviated from 14.8-53.4 mg/L and 0.26-1.05 mg/L respectively. Dissolved oxygen level was maximum with 4.6 mg/L and minimum with 2.2 mg/L. BOD level fluctuated 4.6 to 16.3 mg/L. It is found that Jannapura tank receives water from surrounding agricultural lands and the depth of the tank is slowly reduced due to deposition of sediment from surface runoff. The tank also receives sewage water from the surrounding residential areas. Hence, Jannapura tank is productive and eutrophic.

Among Aquatic plants 13 species belonging to 11 families were recorded (Table 2). Species spectrum of macrophytes include, *Typha sp., Ipomea aquatica, Alternanthera sessilis, Commelina sp., Spirodela polyrrhiza, Pistia stratiotes, Jussiaea repens, Azolla pinnata , Nymphaea sp.,Nelumbo nucifera,Cynodon dactylon, Monocharia vaginalis, Polygonum glabrum* . etc. The Araceae and Nymphaeaceae consists 2 species and one species each were recorded for convolvulaceae, Amaranthaceae , Onagraceae, Azollaceae, Typhaceae, Poaceae, Polygonaceae, pontederiaceae and Commelinaceae. The aquatic macrophytes of Jannapura tank can be classified in to 4 categories as follows.

1.Free floating macrophytes: -This category include *Pistia stratiotes, , Azolla pinnata, Spirodela* sp.

2.Emergent Anchored macrophytes: -*Alternanthera philoxiroids, Cynodon dactylon, Typha ,Commelina sp.*are included in this category.

3.Floating Leaved Anchored macrophytes: *Ipomoea aquatica , Jussiaea repens, Nymphaea sp* and *Nelumbo nucifera* are belongs to this category.

4.Marshy Amphibious macrophytes: -The species included are *Monocharia vaginalis* and *Polygonum glabrum.*

Table 1 ; Range of Physico-chemical characteristics of water of Jannapura tank

S.No.	Parameters	Range
1.	Air temperature (^{o} C)	24 - 35
2.	Water temperature (^{o} C)	22 - 31
3.	pH	7.6 - 8.1
4.	Sulphate , mg/L	48.5 - 70.7
5.	Calcium , mg/L	16 - 48
6.	Magnesium, mg/L	14 - 38
7.	Dissolved Oxygen (DO), mg/L	2.2 - 4.6
8.	Biochemical Oxygen demand (BOD), mg/L	4.6 - 16.3
9.	Nitrate, mg/L	14.8 - 53.4
10	Phosphate, mg/L	0.26 - 1.05

Jannapura tank supports not only grass species but also provide habitat for pollution indicator species like *Pistia statiotes* and the water body is included under eutrophic category. Rorslet [13] and Murphy [14] found that the maximum macrophytes diversity was observed in mesotrophic to slightly eutrophic lakes. Therefore, similar trend was observed in the present water body. *Jussiaea repens* showed flowering during summer months. *Alternanthera philoxiroids*, grass species and *Typha* species were succeeded at a low water level and grow rapidly throughout the year. Among 13 aquatic macrophytes, 5 species were found to occur in all the three sites of the tank. Some aquatic plants are suppressed by the dominant weed or not getting suitable environmental condition for their growth. Jannapura tank has water throughout the year and the plants like *Alternanthera philoxeroides a*nd *Pistia stratiotes* are the major species. The tankprovide sufficient water for agriculture and fish culture. So the water body should be conserved.

Table 2: Diversity and Morpho-ecological group of Aquatic macrophytes in Jannapura tank

S.No.	Scientific name	Family	Morpho-ecological group	Site I	SiteII	Site III
1	*Ipomea aquatica*	Convolvulaceae	Floating Leaved Anchored	+	+	-
2	*Pistia stratiotes*	Araceae	Floating	+	+	+
3	*Spirodela polyrrhiza*	Araceae	Floating	+	+	+
4	*Alternanthera philoxeroides*	Amaranthaceae	Emergent Anchored	+	+	+
5	*Jussiaea repens*	Onagraceae	Floating Leaved Anchored	+	-	+
6	*Azolla pinnata*	Azollaceae	Floating	+	-	+
7	*Nymphaea sp.*	Nymphaeaceae	Floating Leaved Anchored	+	-	+
8	*Typha sp.*	Typhaceae	Emergent Anchored	-	+	+
9	*Nelumbo nucifera*	Nymphaeaceae	Floating Leaved Anchored	+	+	-
10	*Commelina sp.*	Commelinaceae	Emergent Anchored	+	+	+
11	*Polygonum glabrum*	Polygonaceae	Marshy Amphibious	-	+	+
12	*Cynodon dactylon*	Poaceae	Emergent Anchored	+	+	+
13	*Monocharia vaginalis*	Pontederiaceae	Marshy Amphibious	-	+	+

Figure 1: A view of Jannapura tank, Karnataka showing Aquatic macrophytes

CONCLUSION

Jannapura tank has reached the eutrophic stage. Dumping of solid waste and addition of sewage into the tank to be stopped immediately. However, the tank water is utilized for irrigation and fisheries. The tank water is not suitable for drinking, washing and bathing purposes. In Jannapura tank the aquatic species are declining mainly due to water pollution by sewage from anthropogenic activities which have resulted in some of the aquatic plants disappearing permanently from this water body.

REFERENCES

[1] Narayana, J. & Somashekar, R.K. 2002. Macrophytes diversity in relation to water quality – Investigation on river Cauvery. In: Ecology and conservation of lakes, reservoirs and rivers. ABD Publishers, Jaipur.

[2] Narayana, J. 2002. Nutrient status of lentic water bodies and diversity of Aquatic Macrophytes.Session3-AquaticBiodiversity. http://wgbis.ces.iisc.ernet.in/energy/lake2002/proceedings/3_5.html

[3] Solak C.N Barinova S Acs E and Dayioglu H. 2012. Diversity and ecology of diatoms from Felent creek (Sakarya river basin), Turkey. Turkish Journal of Botany 36: 191-203.

[4] Ayodhya D. Kshirsagar and Venkat R. Gunale. 2013. Diversity of aquatic macrophytes from River Mula Pune City, MS, India. Science Research Reporter 3(1):09-14.

[5] Tapan Dutta, Upen Deka and Pinaki Kr. Rabha 2014. Diversity of aquatic macrophytes of Kapla beel (wetland) of Barpeta district, Assam, India. Annals of Biological Research, 5 (12):41-45.

[6] Chung I.H and Jeng S.S, 1974. Heavy metal pollution of Ta-Tu River. Bulletin of the Institute of Zoology, Academy of Science, 13: 69-73.

[7] Kshirsagar, A.D. and Gunale, V.R. 2011. Pollution status of river Mula (Pune city) Maharashtra, India. Journal of Ecophysiology and Occupational Health, 11, 81-90.

[8] Singh, N.P. & Karthikeyan, S. 1984. Flora of Maharashtra-II. Dicotyledones. Botanical Survey of India, 2001.

[9] Biswas, K. and Calder, C.C. Handbook of common water and marsh plants of India and Burma, Bishen Singh, Mahendrapal Singh, Dehradun, India, p.216.

[10] APHA. 1998. Standard Methods for the Examination of Water and Wastewater. American Public Health Association, New York.

[11] Trivedy, R.K. & Goel, P.K. 1984. Chemical and biological methods for water pollution studies. Environmental Publishers, Karad, India p. 340.

[12] Trivedi, R. K., Goel, P. K. & Trishal, C.L. 1998. Practical methods in Ecology and Environmental Science. Enviro Media Publications, Karad, India.

[13] Rorslet, B. 1991. Principal determinants of aquatic macrophytes richness in Northern European lakes. Aquatic Botany, 39 173-193.

[14] Murphy, K.J. 2002. Plant communities and plant diversity in soft waters lakes of Northern Europe. Aquatic Botany, 73: 287-324.

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