International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 28-08-2021, Accepted: 13-09-2021, Published: 28-09-2021
Volume 6, Issue 5, 2021, Page No. 870-872

Aquatic macrophytic diversity in Kotmara reservoir of Sangamner Tehsil, Ahmednagar, Maharashtra

Wagh BD[1], Jondhale AS[2]

[1] Department of Botany, SMBT Arts Commerce and Science College, Sangamner, Tal-Sangamner, Ahmednagar, Maharashtra, India

[2] Department of Botany, MJM Arts Commerce and Science College, Karanjali, Tal-Peth, Nashik, Maharashtra, India

Abstract
In the present experimental, study the algal aquatic macrophytes diversity of Kotmara reservoir, Taluka Sangamner, District Ahmednagar, Maharashtra. The present experiment was conducted in the laboratory of the Department of Botany, MJM, Arts Commerce and Science College Karanjali during the period of 2004 to 2005. During the experimental investigation, three different sites (K1, K2, and K3) were selected for the collection of aquatic macrophytes samples. The present study total of 21 species was recorded throughout the year and maximum plant diversity was recorded in winter as compared to summer and rainy seasons. *Chara* and *Nlitella* are the most dominating algal macrophytes observed in all three selected locations in Kotmara reservoir. During the investigation, the sites K2 and K3 found the highest aquatic macrophytic diversity as compared to the K1 site.

Keywords: *Chara*, *nlitella*, macrophytes, Kotmara and diversity

Introduction
The standards of water quality vary significantly due to different environmental conditions. High populations of microorganisms present in water cause health hazards. Swimming, fishing, rafting, boating, and industrial effluents are some more causes for the deterioration of water quality. Water quality depends on local geology and ecosystem and human interrelation such as sewage dispersion, industrial pollution, etc. Physical, chemical, and biological studies of the reservoirs are some aspects of hydrobiology. Aquatic plants are good indicators of water quality. So, the density and diversity of macrophytes depend on the quality of water in the reservoir. The seasonal changes are direct effects on the distribution and periodicity of macrophytes in the reservoir. It mostly depends on various factors such as light, temperature, depth of the water, etc. The aquatic macrophytes are of considerable ecological and economical importance (Wagh, *et al*., 2019) [14].

Numerous investigations have been made to determine the water quality and pollution status of various water reservoirs, Nandan and More, (2000) [15], Musaddiq (2000) [16], Wagh and Jondhale (2021A and B) [12, 13], and Bhatt and Patak (1992) [17]. Sanchita *et al*.,(2012) [8], reported that freshwater macrophytes play an important role in aquatic ecosystems by providing food, shelter and a variety of habitats for large numbers of organisms and some aquatic plants play an important role in removing pollutants from water. For that reason, such plants are used as a good indicator of water pollution such as, *Chara*, *Wolfia*, *Utricularia*, etc. Wagh *et al*., (2019) [14] Reported that it was observed that very few macrophytes were found in Deothan reservoir. Das and Datta, (2006) [3] also reported that the prepared macrophytic plant list. Therefore, present investigation to find out aquatic macrophytes diversity in Kotmara reservoir. It will help and understand how many types of macrophytes are observed in Kotmara reservoir. Kotmara reservoir (Ambidumala Project) is an important reservoir in the Sangamner tehsil in Ahmednagar district and it is mostly used for drinking and irrigation purposes for the local peoples of Ambidumala and Kurkutwadi villages. So, such types of investigation are important for understanding the water quality of reservoirs and also finding macrophytic plants. Therefore, during the present study, the survey has been carried out on aquatic macrophytes of Kotmara reservoir.

Material and Methods
Study area
The Kotmara Dam is a freshwater reservoir of Sangamner taluka, Ahmednagar, Maharashtra, India. The dam was constructed on Kus River in 1989-1992 and It was handed over to Ahmednagar irrigation department in November 1993. The total catchment area is 30.50 sq. miles and the total command area is 1010 hectares.

Experimental Methodology
The water samples for pollution analysis were collected from the Kotmara freshwater reservoirs. The sampling method was used for the present investigation. Water samples during the experimental study period were collected from January 2004 to December 2005 in Kotmara water reservoirs. The algal samples were collected from three different sampling locations such as K1 (situated near the Kurkutwadi village), K2 (towards southwest near the end of the west weir), and K3 (near tower tank at the Southern extremity of the reservoir) of the Kotmara reservoirs. All selected sampling sites were selected after the survey and all samples were collected monthly in the morning between 6.00 a.m. to 10.00 a.m. The samples were observed on the spot in natural conditions. The macrophytes in the sites were packed in polythene bags and brought to the laboratory. The plant species were identified as per available literature (Cook, 1996 and Das *et al*., 2009) [2, 4].

Result and Discussion
Our experimental study to find out the aquatic macrophytic plants has been identified in selected three different sites of Kotmara reservoirs. All identified macrophytes plants in

three different locations were shown in Table-1. In the present study a total of 21 macrophytes were observed in Kotmara reservoir in all selected three locations. The locations K2 and K3 were found in the highest number of macrophytic plants. The growth of species of *Chara* was found dominant throughout the period of investigation in K2 locations of Kotmara reservoir. *Cyprus, Ceratophyllum, Vallisnaria, Potamogeton,* were abundantly observed at site K2 as compared to the other two sites. Present study some angiosperm and bryophyte macrophytes were also observed.

The aquatic macrophytes have direct effects on water quality. The maximum values were observed in winter and minimum in summer, it depends on the dissolved oxygen in the water. Therefore, similar findings have been reported by Shirke (1984) [9], Karande (1999) [6], Kamat (2003) [5], Nandan and Kumawat (2003) [7]. These observations recorded in the present investigation are in conformity with the findings of Barko and James, (1998) [1], who reported that the growth strategy of aquatic macrophytic plants depends on obtaining dissolved nutrients from either or both of the sediment and water columns. Alkalinity, pH, BOD, Dissolved CO2 were also influenced by the decomposing of organic matter. Similar results were also obtained by Sinha and Naik, (1997) [20], Kumar (1977) [18], and Nomita Sen *et al*., (1999) [19].

The most dominant macrophytes are *Chara* and *Nlitella* species, in the Kotmara reservoir. Both dominant macrophytes are mostly observed in sites K2 and K3 as compared to the K1 site. Sometimes, *Cyperus, Polygonum, Potamogeton, Vallisnaria, Ceratophyllum* were also dominant at the Kotmara reservoir. These observations recorded in the present investigation are in conformity with the findings of Wagh *et al*., (2019) [14], who reported that the aquatic macrophytes are responsible for maintenance or increasing the quality of water.

As per the survey of review literature and references in Kotmara reservoir water quality is good, because there are found 21 macrophytes observed during the present investigation. The species of *Ipomea, Typha,* and *Potamogeton* have also been reported from the sampling sites of the Kotmara water reservoir. Overall observations, I finally concluded that the macrophytes are responsible for the purification of wastewater and minimize water pollution. During the present study the growth of species of *Chara* and *Nlitella* was found as dominant macrophytes in Kotmara reservoir and Maximum macrophytes plant diversity was observed in winter as compared to summer and rainy season.

Table 1

Sr. No.	Name of the Macrophyte	Locations of sampling		
		K1	K2	K3
1	*Ipomea aquatica,* frosk.	-	+	+
2	*Ipomea carnea* Mlarl.	-	+	+
3	*Polygonum glabrum,* Wild	-	-	+
4	*Ceratophyllum demersum* L	-	+	-
5	*Hydrilla verticillata* Rox.	-	-	-
6	*Vallisneria spiralis,* L.	-	+	+
7	*Typha angustata*,Bom.	-	+	+
8	*Cyperus digitatus* Rotth.	-	-	+
9	*Cyperus rotundus* L.	-	-	+
10	*Cynodon dactylon* Pers	+	-	+
11	*Abutilon indicum* Sweet	-	-	+
12	*Tridax procumbens* L	+	-	+
13	*Parthenium hysterophorus*,L	+	+	+
14	*Chara hatei* Dixit.	_	+	+
15	*Chara coralline* Wildenow.	+	+	+
16	*Chara zeylanica Wild.*	+	+	+
17	*Nitella mirabilis* Nordstedt ex. J. Groves	-	+	-
18	*Nitella batrachosperma Nord.*	-	+	-
19	*Nitella furcata* (Rosb)	-	+	+
20	*Wolffia arrhiza* Harkel.	-	+	+
21	*Potamogeton crispus* Linn.	-	+	+

References

1. Barko J, James WF.Effects of submerged aquatic macrophytes on nutrients dynamics, sedimentation and resuspension. In the structuring role of submerged macrophtes in lakes. Edited by E.Jeppesen, Ma.Sondergaard, Mo.Sondergaard and K.Christoffersen.Springer Verlag, New York, 1998, 197-214.
2. Cook CDK. Aquatic and wetland plants of India. Oxford University Press, 1996, 385.
3. Das GK, Datta S. Managing waters of wetlands in and around Kolkata. Indian Science Cruiser,2006:20(3):22.
4. Das SK, Biswas D, Roy S. Study of hydrophytes in some lentic water bodies in west bodies in West Bengal, India. Ecoprint,2009:16:9-13.
5. Kamat, Sima V. Biological observations of the macrophytes of the wetland of Goa. Eco. Env. Cons,2003:9(3):385-390.
6. Karande VC. Biology of some Charophytes from western Maharahstra. Ph.D. Thesis submitted to University of Pune, 1999.
7. Nandan SN, Kumavat MR. Limnological study of algae of Aner river of Dhule (Maharashtra), India. Ecol. Envn. Conserv,2003:9(1):105-107.
8. Sanchita Banerjee, Debalina Kar, Arnab Banerjee, Debnath Palit. Utilization of some Aquatic macrophytes in Borobandh-a lentic water body in Durgapur, West Bengal, India: Implications for socio-economic upliftment of local stakeholder.Indian J. Applied & Pure Bio,2012:27(1):83-92.
9. Shirke DR. The study of the flora of Ahmednagar. Jour of Poona Uni. (Sci. and Tech.),1984:56:55-70.
10. Spence DHN.Light on freshwater macrophytes. Botanical Society of Edingburg Transactions,1972:41:491-505.
11. Wagh BD, Jondhale AS. Estimation of organic pollution by Palmer's algal index of Deothan reservoir, Akole Taluka, Ahmednagar. International Journal of Emerging Technologies and Innovative Research,2018:5(12):1347-1353.
12. Wagh BD, Jondhale AS. Phytoplanktonic diversity Study in Deothan Reservoir, Taluka Akole, District, Ahmednagar, Maharashtra. IJARESM,2021A:9(5):2861-2869.
13. Wagh BD, Jondhale AS. The Physico-Chemical Assessment and Quality of Water from the Deothan Reservoir, Ahmednagar District, Maharashtra. IJARESM,2021B:9(4):1723-1728.
14. Wagh BD, Jondhale AS, Chavan SP. Aquatic Macrophytic Diversity in Deothan Reservoir of Akole Tahsil, Ahmednagar, Maharashtra, International Journal of Emerging Technologies and Innovative Research,2019:6(2):1770-1773.
15. Nandan SN, More YS. Assessment of water quality of Panzara river by saprobity system. Oiko assay,2000:14(1-2):7-9.
16. Musaddiq, Mohammad. Surface water quality of Morna River at, Akola. Polln. Res,2000:19(4):685-691.
17. Bhatt SD, Pathak JK. Assessment of water quality and aspects of pollution in a stretch of river Gosti. J. Environ. Bio,1992:13(2):113-120.
18. Kumar PT. Further studies on the ecology of algal in the river Moosi Hyderabad (Indian) with special

reference to pollution and fertility of the water. Ph.D. Thesis Osmania University. Hyderabad, India, 1977.
19. Nomita Sen, Shukla RV, Badholiya SP. Ecological studies on algae in river Arpa near Bilaspur, Madhya Pradesh. Phykos,1992:31(1&2):55-60.
20. Sinha S, Naik ML. Phytoplankton and Macrophytes in the ponds of Raipur city area. Pt. Ravishankar Shukala, University. Raipur, 1997, 1-163.