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BIODIVERSITY OF FRESH WATER MACROPHYTES OF BHANDARDARA LAKE OF AKOLE TALUKA, DISTRICT - AHMEDNAGAR (MAHARASHTRA)

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ABSTRACT:

The aquatic plants those are grown in or near water are called as macrophytes. The macrophytes are of three types floating, submergent and emergent. The present investigation of aquatic macrophytes of Bhandardara dam of Ahmednagar district showed 39 aquatic macrophyte species from 30 different families and 21 different genera. Aquatic macrophytes comprises a diverse group of organisms including angiosperms, ferns, mosses, liverworts and some macroalgae that occur in seasonally or permanently wet environments. Aquatic plants play an important role in aquatic systems, where they provide food and habitat to fish, aquatic organisms and wildlife. In the present study presence of aquatic macrophytes were undertaken during June 2018 to May 2019. Macrophytes play an important role in dam ecology. They have been investigated as possible indicator of water quality (Unni, 1986, Chaphekar and Mhatre, 1981). The productivity of dam is often dependant on terrestrial leaves, grasses and aquatic plants. They form the base of food chain.

Keywords: Bhandardara dam, ecology, macrophytes

INTRODUCTION:

Macrophytes diversity in different freshwater bodies of India and abroad have been done by several workers Billore and Vyas (1981), Day (1978), Cook, C.D.K. (1974) Kiran et.al. (2006), Yoganarasimhan et.al (1992), Pandit (1992) were studied aquatic macrophytes in fish culture ponds at Bhadra fish farm, Karnataka. Best (1982) were studied occurrence of macro invertebrates in relation to water and sediment characteristics in their seasonal ponds of southern Rajasthan.

Aquatic plants can be used as diagnostic tools for surveying water quality in rivers Accordingly, *Hydrilla, Vallisneria, Lemna paniculata* represent clean water. They are oligotrophic and sensitive to heavy metals. *Eichhornia, Pistia* is notorious weeds. *Potamogeton pectinatus* accumulates lead.

Aquatic macrophytes play a significant role in freshwater ecosystems as they provide food and shelter to invertebrates Rejmankova (2011) and stabilize sediments & shorelines thus reducing turbidity of aquatic systems Bamidele and Nyamali, 2008). However, they can also be nuisance to the aquatic ecosystem, human health and economy when they turn out to be invasive. Invasive aquatic macrophytes can reduce species composition Douglas and O'Connor (2003), Perna et al. (2012; Amorim et al. (2015), affect habitat conditions Crooks, (2002), change soil properties Windham and Lathrop, (1999) and biogeochemical functions Ravit et al. (2003); and disturb recreational activities like boating,

swimming and fishing. The aquatic plants and animals are bringing about changes in the food web of the freshwater aquatic ecosystem. The massive growth of aquatic macrophytes such as *Hydrilla, Verticillata and Vallisnaria* species initiates succession leading to swallowing of the water bodies. These species are showed more vegetative cover during winter and pre monsoon when water level was low. The *Nymphaea, Hydrilla Verticillate* and *Vallisneria* species are propagated and sold as ornamental plants for decorative purpose in gardens and aquariums. The review on the utilization and aquatic macrophytes for food, medicine and other miscellaneous uses in Peninsular, Malaysia is provided by Nather Khan (1990). Marginal or partially submerged plants that generally lined the banks of the water bodies are useful in preventing soil erosion some freshwater macrophytes provides a feeding ground for migrating birds and breeding ground for snails.

STUDY AREA AND LOCATION:

The present investigation is on Aquatic hydrophytes of studies of Bhandardara dam. Bhandardara Dam is located at Bhandardara in western part of the Ahmednagar district in Maharashtra. It is also commonly known as Bhandardara Dam. This dam is located between 19.5375° N, 73.7695° E. It is built across the river Pravara, near the village Bhandardara. This is one of the oldest existing dams in the state. Mr. Arthur Hill discovered the site for this dam in (1903). The total cost of the construction is Rs. 84, 14,188/- The catchment area of dam is 12200 Sq.kms. The live storage is of water is 11,039 TMC and dead storage is 3 TMC. The depth of dam is 270 feet. The base width of the dam wall is 260.10 feet. The main sources of water for dam are streams, rivers, fountains etc. The annual rainfall up to Ghatghar is 5460 mm and on dam 3225 mm. The total irrigated area under the dam is 23077 hectors.

Study sites: -

For the present investigation following five sites were selected –

S_1 - Amruteshwar
S_2 - Panjare (Backside of dam)
S_5 - Ghatghar
S_3 - Pimparkane
S_5 - Chitalwade

MATERIAL AND METHOD:

The study area was explored thoroughly and detailed observation on the vegetation. Macrophytes were collected and preserved according to herbarium techniques. Collected material were identified with the help of standard literatures and confirmed in the herbarium of Botanical Survey of India.

RESULT AND DISCUSSION:

The result shows rich biodiversity of aquatic plants. The study of flora and fauna of an aquatic ecosystem in present investigation is useful for planning of different types of macroinvertebrates and fishes for fishery development as well as nature. These aquatic plants and animals show variations during seasons of the year and also depending upon distribution as well as habitat of the species and also depends upon local and environmental condition and physico-chemical parameters of the water body. The physico-chemical and biological parameters of freshwater bodies are playing an important role in the productivity of water body. The growth reproduction and development of biota is influenced by physical factors like temperature, pH, dissolved oxygen, nitrates, phosphate and chemical factors like biological oxygen demand (BOD), and others, due to this

the aquatic ecosystem is an important and having large number of micro and macro-organisms, aquatic plants including aquatic weeds, *Hydrilla verticillata, Marselia, Vallisneria spiralis, Cyprus* and *Azolla* and other aquatic animals which are economically important for nature such as Protozoans, Crustaceans, Molluscans and Fishes. The distribution of aquatic plants and animals are quite variable or differ because of geographical and geological condition of water bodies.

In the present study altogether 39 species of hydrophytes belonging to 21 genera were recorded. The species were grouped under different class viz., Algae, pteridophytes, dicotyledons and monocotyledons. In present study 2 species of 2 genera of 2 family belongs to Algae, 3 species of 3 genera of 3 families belongs to pteridophytes,19 species of 15 genera of 14 families belongs to dicotyledons and 15 species of 11 genera of11 families belongs to monocotyledons. The result shows the diversity of aquatic macrophytes of Bhandardara dam was recorded in Table.

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Table no - 1: List of aquatic macrophytes and their presence (+) and absence (-) status at study sites

Sr. No.	Name of the Plant species	Study sites				
		S_1	S_2	S_3	S_4	S_5
1.	*Azolla pinnata* R.br.	+	+	+	+	+
2.	*Nymphaea stellate* Willd.	+	+	-	+	-
3.	*Nymphaea nouchali* Burm.	+	+	-	-	+
4.	*Nelumbo nucifera* Gaertn.	+	+	+	+	+
5.	*Aeschynomene aspera* L.	+	+	-	-	-
6.	*Jussiaea repens* L.	+	-	+	+	+
7.	*Trapa bispinosa* Roxb.	+	-	-	+	-
8.	*Nymphoides indicum* (L.) O. Kuntze	-	+	+	-	+
9.	*Ipomoea aquatic* Forsk	+	+	+	+	+
10.	*Polygonum glabrum* Willd	+	+	-	-	-
11.	*Polygonum barbatum* L.	-	-	+	+	+
12.	*Polygonum amhibium* L	+	+	+	-	+
13.	*Centella asiatica* (Linn.) Urb.	+	-	+	+	-
14.	*Utricularia Vulgaris* L.	+	-	+	-	+
15.	*Eclipta alba* Hassk.	+	+	+	+	+
16.	*Drosera burmanni* Vahl.	+	-	+	+	+
17.	*Alternanthera sessilis* (L.) DC.	+	-	+	+	+
18	*Astracantha longifolia* (L.) Nee.	-	+	+	+	+
19	*Najas major* Allioni	+	-	+	+	+
20	*Cyperus pachyrisus* Nees	+	+	+	-	+
21	*Cyperus compressus* L.	+	+	-	+	+
22	*Cyperus rotundus* L.	+	+	+	+	-
23	*Elodera* sp.	-	+	+	+	+
24	*Eleocharis dulsis* R. Brown	+	+	-	+	-
25 27	*Colocasia esculentum* L. Schott	+	+	-	+	+
26	*Belosynapsis vivipara* Fischer	+	+	+	+	-
27	*Ceratophylum demersum* L.	+	-	+	-	+

28	*Ceratophylum deile* L.	+	+	-	+	+
29	*Chara zylanica* L.	-	+	-	+	+
30	*Echhornia crassipes* (Mart.) Solms	+	-	+	+	+
31	*Eriocaulon heterolepsis* Fyson.	-	+	+	-	+
32	*Hydrilla verticillata* Casp.	-	+	+	+	+
33	*Lemna mimor* L.	+	-	+	-	+
34	*Marsellia quadrifolia* L.	+	-	+	+	+
35	*Nitella mirabilis* L.	+	+	-	+	+
36	*Pogostemon purviflorus* L.	+	+	+	-	+
37	*Potamogeton crispus* L.	-	+	+	-	+
38	*Typha angustata* Bory and Chaub	-	-	+	+	+
39	*Equisetum debile* L.	+	+	+	-	+

Table No -2 Distribution of macrophyte species in Different class

Class	Family	Genera	Species
Algae	Characeae	Chara	*Chara zylanica* L.
		Nitella	*Nitella mirabilis* L.
Petridophyta	Azollaceae	Azolla	*Azolla pinnata* R.br.
	Marsellaceae	Marsellia	*Marsellia quadrifolia* L.
	Equisetaceae	Equisetum	*Equisetum debile* L.
Dicotyledons	Nymphaceae	Nymphaea	*Nymphaea stellate* Willd.
			Nymphaea nouchali Burm.
		Nelumbo	*Nelumbo nucifera* Gaertn.
	Fabaceae	Aeschynomene	*Aeschynomene aspera* L.
	Onagraceae	Jussiaea	*Jussiaea repens* L.
	Trapaceae	Trapa	*Trapa bispinosa* Roxb.
	Gentinaceae	Nymphoides	*Nymphoides indicum* (L) O. Kuntze
	Convolvulaceae	Ipomoea	*Ipomoea aquatic* Forsk
	Polygonaceae	Polygonum	*Polygonum glabrum* Willd
			Polygonum barbatum L.
			Polygonum amhibium L
	Apiaceae	Centralla	*Centella asiatica* (Linn.) Urb.
	Lentibulariaceae	Utricularia	*Utricularia Vulgaris* L.
	Compositae	Eclipta	*Eclipta alba* Hassk.
	Droseraceae	Drosera	*Drosera burmanni* Vahl.
	Amaranthaceae	Alternanthera	*Alternanthera sessilis* (L.) DC.
	Acanthaceae	Astracantha	*Astracantha longifolia* (L.) Nee.
	Ceratophyllaceae	*Ceratophylum*	*Ceratophylum demersum* L.
			Ceratophylum deile L.
Monocotyledon	Najadaceae	Najas	*Najas major* Allioni
	Cyperaceae	Cyperus	*Cyperus pachyrisus* Nees
			Cyperus compressus L.
			Cyperus rotundus L.

	Hydrocharitaceae	Hydrilla	*Hydrilla verticillata* Casp.
		Elodera	*Elodera* sp.
	Eleochariaceae	Eleocharis	*Eleocharis dulsis* R. Brown
	Araceae	Colocasiae	*Colocasia esculentum* L. Schott
	Commelinaceae	Belosynapsis	*Belosynapsis vivipara* Fischer
	Pontederitaceae	Echhornia	*Echhornia crassipes* (Mart.) Solms
		Echhornia	*Echhornia heterolepsis* Fyson.
	Araceae	Lemna	*Lemna mimor* L.
	Lamiaceae	Pogostemon	*Pogostemon purviflorus* L.
	Potomogetonaceae	Potamogeton	*Potamogeton crispus* L.
	Typhaceae	Typha	*Typha angustata* Bory and Chaub

Table No. – 3. Number of Species distribution of Macrophytes found in Bhandardara lake

Class	Family	Genera	Species
Algae	2	2	2
Pteridophytes	3	3	3
Dicotyledons	19	15	14
Monocotyledons	15	11	11

Graph – Showing Number of Macrophtes found in Bhandardara lake