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Investigation of Aquatic Macrophyte Diversity and Taxonomic Survey from Wainganga River Chamorshi Tehsil, District Gadchiroli (M.S.), India

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Abstract: In present investigation, distribution and diversity of macrophytes in Wainganga river in Markanda region Chamorshi Tahsil district Gadchiroli of Maharashtra state, India have been studied, to investigate overall health of the water body. Since the studies on macrophytes diversity are very less in Waingangariver this paper is intended to report macrophytes diversity in present investigation, the present study was conducted on monthly basis for the period of two years from March 2023 to February 2024. The qualitative analytical data was computed and it reveals that macrophytes are abundant. In the present investigation, 20 species from three groups were recorded from Wainganga river ecosystem under study which was categorized by free floating, submerged and marginal aquatic weeds. The data of the present investigation show that the enrichment of an ideal habitat for luxuriant growth of macrophytes.

Keywords: Macrophytes,Wainganga river, qualitative and luxuriant growth**.**

Introduction

Global freshwater ecosystem stability is being threatened by several factors, including habitat degradation, pollution, and overexploitation of water resources, invasive species, and climate change. These pressures disrupt the natural balance of freshwater habitats, reduce biodiversity, and weaken the ability of ecosystems to recover from environmental stress (Ingale et al., 2024). A category of enormous, macroscopic, photosynthetic organisms known as aquatic macrophytes are often grown with their roots rooted in soil or immersed in water. These macrophytes form a group. The more robust growth of these plants seems to be correlated with the increased nutrient loading. They can be classified into three major groups: emergent, submerged, and floating. Aquatic macrophytes play not only an important role in the provision of habitats for many aquatic species, but also contribute significantly to the maintenance of water quality, nutrient cycling and bank stabilisation. Macrophytes on the whole contributes significantly to the maintenance of the ecological balance and health of the ecosystem (Singh and Singh 2020). As a result of the growth in the variety of hydromorphological niches, macrophytes are able to react rather rapidly to improvements in environment.

River restoration has significant positive impacts on the abundance, cover and diversity of macrophytes, according to Lorenz et al. (2012). More natural and diverse substrates, broader floodplain in restored reaches, and greater diversity of existing velocity and depth patterns are the most significant factors that have aided this improvement. As a result, monitoring macrophytes might be a straightforward and economical method for determining whether or not river restoration efforts have been successful. The free carbon dioxide available in river water is used up by the phytoplankton and macrophytes to conduct their photosynthetic process. The concentration of phosphate changed seasonally with higher concentration in summer and monsoon seasons and lower concentration in winter seasons, which were suggested to be due to evaporation and different influxes in summer and monsoon, whereas quick absorption by microphytes and macrophytes was thought to be the reason for low concentration in the winter season (Kharat and Pagar, 2009).

Materials and Methods

The species diversity is one of the most significant factors that should be taken into account when studying the ecology of fresh water. These organisms could be identified and assigned taxonomic status through the application of taxonomic guidelines. Several four locations within the Wainganga River were identified manually with the view of gathering samples of the macrophyte plants. Stored in formalin with a concentration of ten percent and brought to the laboratory. To collect macrophytes, hand picking was done in the littoral area and in the open marginal areas of the Wainganga River, which were adjacent to the sample areas. The macrophytes gathered were then taken to laboratory where they were further analyzed. To arrive at this, the standard text of Ugemuge (1986) and Cook (1996) was used. This made it possible to identify the level of the species.

Results and Discussion

In this study, total 20 plants species were found belongs to 16 families of which 2 species belongs to Hydrocharitaceae family, 2 species of Lythraceae family and 1 species each of belongs to family of Characeae, Najadaceae, Ceratophyllaceae, Portulacaceae, Cyperaceae, Onagraceae, Compositae, Polygonaceae, Phyllanthanceae, Fabaceae, Poaceae, Molluginaceae, Coldeniaceae, Asteraceae, Poaceae and Tamaricaceae.

Free floating macrophytes: Valisnaria, and Rotalamacranda

Submerged macrophytes: Chara spp., Najas spp., Hydrillaverticellata and Ceratophyllum.

Marginal plants: Portulacaquadrifida, Lythrumalatum, Cyperus spp., Ludwigia spp., Biden spp. ,Persicariaglabra, Phyllanthusnlawii, Medicagopolymorpha, Ischaemumrugosum, Mollugoverticillata, Coldeniaprocumbens, Xanthium strummaium, Muhlenbergiarepens and Tamarixramosissima.

During the course of the research, a total of 25 species belonging to three distinct groups were identified from the Kolar lotic ecosystem. These species were classified as free floating, submerged, and marginal aquatic weeds (Rawlekar and Sawane 2020).The presence of these species was classified as marginal, submerged and free floating aquatic weeds. *Ceratophyllum demersum*, *Nitella hyalina*, *Chara vulgaris* and *Potamogeton pectinata* were identified, and their presence indicated a high organic load and fertility (Singh and Singh, 2020). During their research, Badra et al., (2022) documented a total of forty-three species of wetland macrophytes that belonged to twenty different families.

Table no. 1: Showing list of Macrophytes from Wainganga river Chamorshi tehsil, district Gadchiroli (M.S.), India**.**

Macrophytes	Order	Family
Free floating macrophytes		
1) Valisnaria	Hydrocharitales	Hydrocharitaceae
2) Rotala macranda	Myrtales	Lythraceae
Submerged macrophytes		
3) Chara spp.	Charales	Characeae

4) Najas spp.	Alismatales	Najadaceae
5) Hydrilla verticellata	Alismatales	Hydrocharitaceae
6) Ceratophyllum	Ceratophyllales	Ceratophyllaceae
Marginal plants		
7) Portulaca quadrifida	Caryophyllales	Portulacaceae
8) Lythrum alatum	Myrtales	Lythraceae
9) Cyperus spp.	Poales	Cyperaceae
10) Ludwigia spp.	Myrtales	Onagraceae
11) Biden spp.	Asterales	Compositae
12) Persicaria glabra	Caryophyllales	Polygonaceae
13) Phyllanthusn Lawii	Malpighiales	Phyllanthanceae
14) Medicago polymorpha	Fables	Fabaceae
15) Ischaemum rugosum	Poales	Poaceae
16) Mollugo verticillata	Caryophyllales	Molluginaceae
17) Coldenia procumbens	Boraginales	Coldeniaceae
18) Xanthium strummaium	Asterales	Asteraceae
19) Muhlenbergia repens	Poales	Poaceae
20) Tamarix ramosissima	Caryophyllales	Tamaricaceae

Conclusion

Ecological integrity is indicated by both simple and complex plant groupings, including species of Characeae (charophytes), Najadaceae (nail-worts), Ceratophyllaceae (hornwarts) and Asteraceae. The 16 families and 20 species in the research area demonstrate the need for strong and diversified macrophytic communities for ecological balance, habitat for aquatic organisms, nutrient cycling and ecosystem stabilisation. Aquatic macrophytes community in Wainganga river showed diversified community of macrophytes from different families. This diversity plays a crucial role in ecosystem stability, biodiversity, and aquatic health. Ongoing monitoring and conservation is recommended to protect this special plant resource and to help maintain an aquatic ecology.

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