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ABSTRACT

“Bhopal” the capital of Madhya Pradesh that is additionally referred to as “City of Lakes”. Here more than 15 wetlands are present in and around the city and most of the wetlands are suffering from the problem of eutrophication due to various anthropogenic activities. Eutrophication causes poor water quality which in turn causes reduction of zooplankton diversity and other aquatic organisms in their own natural habitat.

The river Kaliyasot arises from Kaliyasot Dam as a result of its overflow and flows in south-east direction and meets the river Betwa near Bhojpur. Its length is approx. 29 kms. “Van Vihar National Park” is also located in its catchment area. Expanded township and other developmental activities are concentrated around the river which has negative impact on water quality of river. The river also receives untreated domestic sewage water.

The present work deals with the study of plankton diversity in river for its conservation and management point of view.

Keywords: Wetland, eutrophication, diversity, habitat, catchment area.

INTRODUCTION

Water is the foundational and one of the prime necessities for survival and no one can imagine to live life without the precious natural source [1]. In the present scenario of modernization, there is advancement in every phase of industrialization which leads to give rise pollutants from alteration of aquatic ecosystem. The wide range of pollutants discharged into aquatic environment may effects the ecosystem adversely [2]. In the aquatic ecosystem, the life of aquatic organisms directly or indirectly depend on the water quality [3]. Due to heavy anthropogenic pressure and negligence by local people, the quality of the river is deteriorated day by day [4]. Owing to various factors which can generates threats not only to the biodiversity of river but also to the people which are directly or indirectly depend on the source and also the aquatic life is badly affected [5,6]. There is change in the movement of Zooplanktons due to the intensity of light, in increased intensity of light there is downward movement occurs and upward movement occurs during decreased intensity of light [7,8]. The Kaliyasot river in Bhopal is ill managed, a large number of houses and slum inhabitants are finded on the river site. Different types of activities such as sewage disposal, agriculture, religious emmersion etc are going on, which results in accumulation of residual fertilizers, pesticides, waste

water in addition to paper wood, clay, heavy metals etc. The carelessness of river management results in its nutrient enrichment consequently blooming of algae and aquatic vegetations along with eutrophication often interfere with the treatment procedures. Various organisms are preserved in these dimentation tanks creating it's logging thereby increasing the cost of water treatment [9].

The phytoplanktonic forms of algae have been studied by various researchers [10-15]. Zooplanktons are the connecting link between phytoplankton and fishes which are secondary producers in aquatic environment. Zooplanktons are both herbivores and carnivores. Carnivores belonging to the tertiary producers or even to some higher levels of production. Their abundance, composition and seasonal variation is an essential obligation for any successful aquaculture program. Rotifers are apparently the most sensitive indicators of water quality reported by [16]. In the course of the decomposition of water blooms, deoxygenation of water is observed which can affect the ability of aquatic animals to survive. In this condition water resources lose much of their recreational attractiveness and their safety and usefulness as domestic and industrial water supplies. As a result, water eutrophication can bring about economic losses in the form of decreased property

values, high cost treatments of raw drinking water, illness, depressed recreation industries, expenditure for management and restoration and ultimately the need to build new reservoirs.

MATERIALS AND METHODS

In a glass bottle one litre of water sample was collected from surface and kept for sedimentation. For the preservation of algae, samples were kept in formalin and studied in the laboratory. Identification of planktons was mainly based on standard recent publication, standard books and monographs [17-19].

RESULTS AND DISCUSSION

Qualitative examination of phytoplanktons and zooplanktons was done and members of chorophyceae, protozoa, cyanophyceae, bacillariophyceae, rotifera, euglenophyceae, charophyceae, crustacea and mesoplankton were identified.

Chlorophyceae: Chlamydomonas, A. tinastrum, Microspora, Closteridium, Cusmarium, Spirogyra, Ulothrix, Volvox, Oedogonium.

Cynophyceae: Microystis, Anabaena, Syndera, Lynbya, Spirulina, Nostoc, Rivularia.

Charophyceae: Nitella, Chara

Bacillariophyceae: Diatoms, Cymbella, Navicula, Cyclotella, Melosira.

Euglenophyceae: Euglena

Protozoa: Arcella, Verticella, Diffugia

Rotifera: Monostyla, Mytilina, Notholea, M.quaridentata, Lecana, Philodina

Crustacea: Cypris, Daphnia, Cyclops, Streblocerers, Diaptomus, Bosmia, Dapharomosoma, Nauplius larva.

Phytoplanktons are the most common in habitats of the surface layers of the water sources exposed to sunlight. There are a large number of factors which influenced the composition of algae population e.g. The shape, size, depth, extends of algae shore areas, characters of sediments, physiography and soil of water shed, amount and rate of precipitation, sunlight and water quality [20,21]. Zooplankton biomass in river is much lower in lakes and population in lake is dominated by Rotifera and small crustaceans and zooplanktons in the lake may be maintained by water resident time [22]. The crustaceans were dominant forms followed by Rotifera [23] and the present work is also confirmed this view. The pre-dominance of

small organisms like Rotifers in river, plankton is presumed to be the result of fish predation on large zooplankton as well as short generation time which permits the in-situ reproduction despite of a short residence time of the water.

Bacillariophyceae and Cyanophyceae are correlated with the intensity of pollution [24]. They noticed that Oscillatoria, Spirogyra, Scendesmus, Anacystis, Closteridium, Anabaena, Navicula, Synedra, Melosira and Cymbella are pollution tolerant forms. Spirogyra and Oscillatoria shows abundant growth in summers [25]. Some similarity is detected in Bhoj Wetland of Bhopal, here Anacystis species formed algal blooms. Some algae also play a noteworthy role in self-purification because of this double role phytoplanktons is important as blue green algae like Nostoc, produces antibiotics called bacteriocins, that kill related strains of algae. In this way these antibiotics play an important role in the survival of the producing organisms by Inhibiting the growth of competing organisms [26]. Mostly quality of zooplankton was comparatively very low from August to December. From July to September, the phytoplanktons were also low due to heavy rains. The population of zooplanktons naturally affected by the depletion of phytoplanktons. The supremacy of Microsystis indicated toxic sub production by giving bad odour.

The temperature affects the growth of algae as low temperature favored the growth of Euglenophyceae and high temperature favored the Chlorophyceae. During the research work change in species dominance was noticed with change in seasons as Euglenophyceae is maximum in January and February, Chlorophyceae was maximum in February and minimum in March, Bacillariophyceae was maximum in March and minimum in February, Cyanophyceae was maximum in January and minimum in February. The main zooplanktons which were responsible for creating problems in water treatment were Daphnia, Amoeba, Euglena, Bosmia, Mesocyclops, Ceriodoptria, Monia etc.

Depletion in population of phytoplanktons and zooplanktons will badly affect the normal food web pattern and this in turn will result into the destruction of natural ecology of the river. Therefore, the effective conservation, maintenance and management of the river is very essential for the future generations.

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