DIVERSITY OF PERIPHYTON IN SIDDHESHWAR RESERVOIR OF HINGOLI DISTRICT, MAHARASHTRA, INDIA.

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Abstract

The diversity of Periphyton studies were carried out from various selected sites and different depths of Siddheshwar reservoir. The periphyton samples were analyzed using quantitatively by the Sedgwick Rafter Counting Cell Phase and Contrast Microscopy after the collection of sample from the different sites at different levels of depths in the reservoir. Periphyton Diversity communities observed belong to different zooplankton, algae and macro invertebrate groups. During the study it is fascinatingly observed that abundance of periphyton were collected from dried submerged woody plant parts like stem and branches reached through the flood in the reservoir, these periphytons are also known as 'Epixylon'. The study is helpful to understand the availability of the usual food materials in the form of periphyton along with the traditionally known zooplankton, phytoplankton and other free living food components for the fishes in the reservoir hence to manage the reservoir fishery based on periphyton.

Keywords: Periphyton, Siddheshwar, Hingoli District.

Introduction

'aufwuchs' or Periphyton comprising the organisms living on submerged surfaces. Periphyton is also described as assemblage of organisms growing upon the free surfaces of submerged objects of water and cover them with a slimy coating. Periphyton is defined as an assemblage of algae and tiny animals covering submerged objects with a slimy coating. In India inland freshwater bodies like lakes, reservoirs, ponds, play an significant role in giving fish production, which is the good quality source of nutritional food. But present studies show that the reservoirs giving only 29.71 kg/ha/yr. fish production from available reservoirs which is extremely less. This can be improved by giving more concentration, good policies implementation and more significant is availability of good quality of seed and feed. In freshwater ecosystem different types of organisms are present at various levels of depth, the presence of which indicates the level success of particular ecosystem. The lentic habitats like ponds reservoirs and lakes are the complex habitats in terms of its biological components in the form of plankton.

extremely less data is available in this regard and no such information is available in case of reservoirs of Maharashtra and particularly the Siddheshwar reservoir of Hingoli district of Maharashtra. Siddheshwar reservoir is a large major reservoir from Hngoli district of Maharashtra and gives high-quality production of fishes, but not up to the expected national fish production from the reservoirs in India. If the Periphyton based aquaculture techniques are used the whole production will enhance, as periphyton community is a superior source of natural and nutritional food, and provides main productivity that supports a broad range of aquatic organisms easily grazed upon by small invertebrates, fishes and shrimps, and therefore has a good contribution significant to the productivity of aquatic ecosystem. Studies were conducted in the reservoir on availability of diversify periphyton community naturally available on diverse substrata for improvement of fish production

Periphyton as described is the whole complex of attached aquatic biota on submerge substrates counting associated non-attached organism and detritus, comprising bacteria, algae, fungi, zooplankton and invertebrate organisms. Thus the current study has been undertaken to observe the fauna of Periphyton and its biodiversity, assessment of growth and their availability, from Siddheshwar reservoir which is a main and largest reservoir in Hingoli district of Maharashtra, having 6272 ha. area giving estimated fish production 709.6 tons/Year

MATERIALS AND METHODS

For the investigation of periphyton, submerged samples from naturally existing substrates were collected from 03 different sites of Siddheshwar reservoir (Fig.1) these were: i) Reservoir embankment, ii) Village Rupur, iii) West of reservoir, along the reservoir at about one Km distance. Periphyton was collected from 3-7 ft. depths during January 2019-2020, and analyzed. The samples include the substrata like sub-merged woody plant parts, , submerged dried plants, aquatic weeds , bamboo stick, sugarcane waste, rocks and big stones. The periphyton sample was collected in the enamel tray by scraping the substrates carefully with a brush and washed with water, after settlement, the surplus water was thrown out. big sized periphyton are sorted out along with other active huge organisms and sample was preserved in 4% formalin, ethanol and Lugol's Iodine and kept in the refrigerators for further investigation to prevent the destruction and deformation of the delicate parts of the plankton. The collected samples were observed under the compound Microscope at 10x40, 15X40 enlargement and microphotographs were taken by Sony 12 Pixel Camera and recognized by using standard key given in the Fresh Water Biology edited by Edmondson10 and the books APHA (2001)9. Quantitative estimation for percentage concentration of Periphyton Community and individual species was carried out through using Sedgwick Rafter Counting Cell Method. The methods for the study of Periphyton based aquaculture were also followed from the explanation in the standard reference book on Periphyton by Azim et. al.

RESULTS AND DISCUSSION

Thus from the current studyit can be conclude that the highest % concentration / ml of periphyton groups belonged to families like Chlorophyceae (27.27), Euglenophyceae and Cyanophyceae. amongst zooplankton Cladocrerans were 29.09, Chironemids were 25.25 and Arthopods larvae were 10.90. Periphyton growth was plentiful on the submerged dried substratum as dried plants, dried sticks (sugar cane dried sticks) and dried aquatic weeds which were in the submerged situation in the reservoir, these type of Periphyton are named as epixylon. The entire the substrates might have drifted in to the reservoir through the flood, which were the natural plant partsThe biological studies on Periphyton of Faukkas sagar and Hussain sagar showed abundant growth of periphyton (1157 - 1264 individual per sq mm) of the colonized surface 12 which was fairly higher than the current investigation. The method of Periphyton based aquaculture was initially derived from traditional fishing methods of West Africa. As with phytoplankton, the Periphyton can be occurred in almost every type of water body from small ponds to large oceans and in tropic conditions that range from the most oligotropic to the most eutropic. Periphyton, in terms of structure, composition, diversity and the process of colonization has received less attention of limnologists as compare to huge phytoplankton studies. And therefore worldwide efforts are being made to see the use of Periphyton in aquaculture systems to get improved fish production and promote an understanding of Periphyton systems. The available information on the process underlying Periphyton based fish production in ponds needs to be developed into a quantitative framework that can help to understand the impact of Periphyton substrates on the fish growth. Dempster et.al. also noted same results experimented on *Oreochromis niloticus* in a glass fiber tank. Wetzel noted the periphytic algae production/unit area of water surface is higher than phytoplankton Potentiality of Periphyton base aquaculture technology in Rice-Fish setting was reported successful results in case of common carp culture in Bangladesh. Periphyton based aquaculture is an economically viable technology; which can amplify fish production with cheaper local resources and also intensify the fish production

CONCLUSION

The Periphyton study from the Siddheshwar reservoir in Hingoli District of Maharashtra represent that, the different natural substrata in the form of dried plant bodies, rock pieces , flood drifted agricultural wastes like dried sugarcane wastes and tree branches support the growth of Algae species in greatest and the zooplankton species in moderate, therefore the reservoir may support the Periphyton based aquaculture practice in the form of reservoir fishery for the Phyto-planktophagous fish species such as *Catla catla* and *Hypopthalmychthys molitrix* for the best growth and high yield from the reservoir.

Periphyton Group/ Family	Periphyton Community	Species/ml of Periphyton Concentrate/ml.	% Periphyton Group/ml.
Bacilariophyceae (Diatoms)	*Gyrosigma,kutzingii* *Navicula,radiosa* *Flagilaria,capucina*	4 13 7	43.63
Chlorophyceae (Green Algae)	*Volvox,* *Oedogonium,* *Pandorina,* *Ulothrix,*	2 2 6 5	27.27

Table 1 Periphyton species and their % Concentration/ml observed during the study period (Year Jan 2019 to Jan20).

Periphyton Group/ Family	Periphyton community species	Species/ml	% Periphyton Group/ml.
Cladocera	*Daphnia,* *Cerodaphnia,* *Flagilate,* *Euglina,* *Synura*	4 2 4 4 2	29.09
Diptera/ Chironomidae	*Chironomous larvae*	9 5	25.45
Phylum-Arthopoda	*Mysis larvae,* *Mosquito larvae.*	2 4	10.90
Ostracoda	*Cypris sp.*	3	5.45
Copepod	*Cyclosp sp.*	2	3.63

Table 2. Zooplankton composition in the Periphyton sample from Yelderi Reservoir (Year 2008-09).

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