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IMPORTANCE OF PERIPHYTONIN IN AQUATIC ECOSYSTEM

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ABSTRACT

Periphytonin serve as a bridge between the substrate below and the water column above which create an impact on the ecosystem. Periphytons act as an important food source for nibbling fish like Rita rita and Botia sp. These serve as a crucial bioindicator of stream water quality and ecological health as well as a link in the transport of materials and energy along many food chains. Periphyton maintains the balance between biotic and abiotic components of aquatic ecology as well as these creatures act as a pollution indicator.

INTRODUCTION

The slimy layer that sticks to rocks and other stable substrates that make up the stream bed is known as the periphyton community. Periphytons are present in different forms in aquatic water bodies i.e. Algae, fungi and bacteria. The appearance of the periphyton layer is very variable and can reveal many fundamental details about the stream environment.The major group of microalgae is phytoplanktonic which means they contain chlorophyll and need sunlight to live and grow (Sigamani *et al.,* 2020). The plant group is a three-dimensional structure like a plant, in which the uppermost layer is spread in the form of mats, and filamentous algae, the central layer with erect stalks, and the lowest layer is found in the form of prostrate algae (Stevenson *et al.,* 1996). However, periphyton's significance in stream trophic structure has been proven by aquatic ecologists. They act as both structural and functional components of the aquatic ecosystems, and their relevance is a function of quality rather than quantity. Although use terminology words for the periphyton like "biofilms," "microlayers," "aufwuchs," and "benthos. Periphyton is the term currently used most frequently in the aquatic scientific literature (Gulzar *et al.,* 2017).

CLASSIFICATION OF PERIPHYTON

There are other periphyton subgroups depending on the type of substrate colonized, such as epiphyton (macrophytes), epixylon (wood), epilithon (stone), episammon (sandy sediments), and epipelon (muddy sediments)(Gulzar*et al.,* 2017).For taxonomic identification, the periphyton is divided into two groups: siliceous diatoms, which can be easily distinguished from one another, and non-salicaceous-diatom

algae, which are more diverse and can be easily distinguished from one another. The most varied and global are the algae·There are several types of periphyton. They are named according to where they grow as Follows (Chavan & Shaikh, 2019).

- **Epiphytic** algae grow on the surface of aquatic plants;
- **Epipelic** algae are attached to sediments;
- **Epilithic** algae are attached to rocks, and;
- **Benthic** algae grow on the bottom of a water body (including epipelic and epilithic algae) (Merican *et al.*, 2006).

The periphyton are divided into two groups for taxonomic identification, the diatoms having silica cases and can be easily identified to species while the non-diatom algae (sometimes called "soft" algae) are more difficult to identify and are more diverse and include several taxonomic orders·

REGULATING FACTORS

The structure of the benthic community in lotic systems is influenced by several elements, including those that are present at diff**e**rent times and locations (such as nutrient level, flow, substrate, physicochemical parameters, disturbance, etc.). An ecosystem's species respond differently to changes in the regional environment, and as a result, so does the ecosystem's composition.Any alteration to a species' natural environment does not affect the community as a whole; rather, only the percentage composition will change as a result of some species currently there being unable to proliferate.

NUTRIENT CONCENTRATION

While nutrients are necessary for a healthy aquatic ecosystem to function, they can have detrimental effects at much lower concentrations by changing tropic dynamics, increasing algal and macrophytic production, increasing turbidity (via increased phytoplanktonic algal production), lowering average dissolved oxygen (DO) concentrations, and increasing fluctuations in dissolved oxygen. Excessive nutrient concentrations lead to shifts in species diversity away from efficient assemblages of unacceptable species, which in turn causes these changes. The main limiting factors for periphytic algal development tend to be nutrient concentrations, especially nitrogen, and phosphorus, and the amounts of these nutrients are generally controlled by land use practices and intensification. In streams with a stable substratum and sufficient substratum irradiance, significant nutrient pollution increases periphyton biomass accumulation; nevertheless, the regulating role of nutrients in un-enriched or weakly enriched streams is still not fully understood. This could be because other taxa produce more biomass accumulation but need high nutrient concentrations to replace those that develop only modest biomass per unit area at low nutrient concentrations. Additionally, periphytic assemblages react more favorably to the addition of both nutrients

than to either nutrient individually. The dominance of filamentous and blue-green algae tends to shift away from diatoms as a result of nutrient enrichment. Thus, a decline in nitrogen levels without a subsequent reduction in phosphorus could promote the growth of blue-green plants.

FLOW VELOCITY

Variations in water level and velocity have an impact on the development and relative abundance of several species of periphytic algae in lotic habitats. The structural differences between two diatom-dominated communities that emerged under various current regimes were discovered. Several algae species measured increased rates of phosphorus uptake and respiration.

IMPORTANCE OF PERIPHYTON AS NATURAL FOOD FOR FISHES

Periphyton communities are the preferred food for fish.For nibbling fish like *Rita rita* and *Botia sp.*, periphyton is an essential food source. Fish and benthic insects prefer periphyton communities as their primary food source (Srivastava *et al.*, 2019)

ROLE OF PERIPHYTON IN THE ECOLOGY

Periphyton significantly contributes to bio-manipulation monitoring; since it quickly responds to slight variations in the environmental conditions, its short life cycle, and abundance in the littoral zones of aquatic ecosystems. Periphyton plays a crucial role in photosynthesis, the food chain, and the food web and acts as an important source of natural food for various aquatic organisms.

CONCLUSION

Periphyton plays a most important role in biotic and abiotic component aspects of streams, they mediate many ecological interactions, and their inconsistent responses to nutrients and other abiotic factors emphasize the significance of understanding the variables that regulate the temporal and spatial dynamics of these communities in lotic aquatic ecosystems.For nibbling fish like *Rita rita* and *Botia* sp., periphyton is an essential food source.

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