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Collection, Preservation and Identification of Phytoplankton – An Outlook

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SUMMARY

Phytoplankton is the base of the food chain and provides food for the microscopic zooplankton found in various aquatic systems. Since they are the first group to react to changes in nutritional levels in an ecosystem, phytoplankton are crucial for evaluating the quality of water. In this context, this paper is considered important because it provides information on various techniques involving the collection, preservation, and morphological identification of some common phytoplankton. There are incredibly few people working on phytoplankton taxonomy. This article, which is regarded as significant in this context, offers details on a number of methods for gathering, preserving, and identifying some common phytoplankton morphologically.

INTRODUCTION

The term 'plankton' was coined by Victor Hensen in 1887 and denotes collectively all free floating and suspended bodies, both plants and animals, living or dead, that essentially move passively in a body of water. The phytoplankton are the microscopic plant life of the sea, which constitute the primary producers synthesizing the basic food. It belongs to the class algae, which, besides chlorophylls, possesses other characteristic pigments. The important components of phytoplankton are diatoms (Bacillariophyceae), dinoflagellates (Dinophyceae), blue-green algae (Cyanophyceae), phytoplankton (Xanthophyceae, Chrysophyceae, Haptophyceae, Cryptophyceae), and nanoplankton (Chlorella, Nannochloropsis, etc.). Together with these, two other classes—silicoflagellates and coccolithophores—are included in the phytoplankton group. When water samples are studied under a microscope, the more visible phytoplankton representatives in the seawater are the dinoflagellates and diatoms, both in terms of cell size and availability.They serve as the foundation of the food chain and are ultimately dependent upon all other trophic groups. One of the most fundamental and basic species on the planet is phytoplankton. Moreover, one of the leading basal creatures in the food chain is phytoplankton. This indicates that the majority of the microscopic organisms that form the foundation of the web eat them. It is believed that phytoplankton is a rich source of feed, food, biofuel, and biofertilizers. It is clear that phytoplankton absorbs carbon dioxide more effectively than land plants do, which contributes to reducing global warming. The versatility of this little microbe and its ability to enhance the lives of those in need of novel medical interventions are simply astounding. Phytoplankton will eventually be acknowledged as one of the planet's most significant and subtle living things. Regrettably, however, phytoplankton systematics and taxonomic identification remain at a crucial stage. The number of people working on the taxonomy of phytoplankton is so meager.

The following categories apply to plankton species based on their size:

- More than one millimeter: Macroplankton
- Microplankton is less than one millimeter.
- Organisms of 5 -50 µm: Nanoplankton
- Less than 5 µm: Ultra plankton
- Less than 1 µm: Picoplankton

Collection of phytoplankton

The most expedient method for procuring a concentrated phytoplankton sample is to drag a cone-shaped net made of bolting silk through the water. A metal ring that is fastened to the tow rope by a rope bridle keeps the net's broader end open. A bucket made of plastic or metal closes the narrow end. A backpressure forms at the opening when the net is towed through water, preventing some water from passing through it. By lowering the amount of water that enters the net, a tapering canvas sleeve facilitates more efficient filtering. Nets with finer mesh sizes yield slower filtration rates and gather smaller organisms. Net samples can be taken at different depths.

Because sampling is unpredictable, net samples are insufficient as the foundation for quantitative research. The amount of water passing through a net can be more precisely measured with flow meters, which are multibladed propellers with a counter to record total revolutions. However, because the method of catching organisms is selective, nanoplankton may not be included in the measurement.

Preservation of phytoplankton

For sensitive organisms, a neutral formalin solution containing 5–8% can be used; however, this is not very satisfactory. Better preservation of flagellates is achieved with Lugol's iodine solution (10 gm of iodine and 20 gm of potassium iodide in 200 ml of district water with 20 gm of glacial acetic acid added two to three days prior to usage). Water samples are treated with Lugol's iodine at a ratio of 1:100 volume of water.

Identification of Phytoplankton

Counting and trying to identify organisms using keys and images at the same time is challenging. Identifying species requires experience. Prior to commencing counting, it is advisable to look over the material and identify as many of the organisms as you can. Making a series of pencil or ink drawings of the animals you have seen is also beneficial. These designs, when pinned on a board and positioned close to the microscope, will expedite the counting process until one gain experience in recognizing them.

CONCLUSION

Alterations in the monsoon-related physical and chemical characteristics of coastal waters Factors including detrital loading, coastal upwelling, river runoff nutrient intake, and temperature and salinity reductions on the surface all affect the formation of blooms. Events like the PSP outbreak, the DSP discovery, fish kills, and the marine fauna's annihilation as a result of toxic algal blooms highlight the risks to public health and the financial losses brought on by some blooms. It would be very helpful to regularly evaluate shellfish for toxicity in order to prevent outbreaks of shellfish poisoning. Other nations' experiences have demonstrated that toxicity can appear out of nowhere following times of non-toxicity. Vigilance is required in order to save precious human lives. For instance, it is known that a number of dinoflagellates can live in sediments as "cysts" for extended periods of time. When favorable ecological conditions are met, the cysts can function as "seeds" to start blooms. Toxic algal bloom hotspots could be identified with the aid of benthos research, particularly with regard to the sediments found in various sections of the Indian coast.

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