

Methodology of Plankton

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Abstract

The term plankton was coined by the oceanographer Victor-Henson to designate that heterogeneous assemblage of minute organisms and fine non living materials then known to occur in the water of the sea and to float at the will of waves and other water movements. The term was soon extended to cover all assemblages of organisms and materials regardless of nature of water which they occupied. Now the term plankton is restricted to organisms only. A single organisms in the plankton is known as ' plankter"

Keywords: Plankton, Plankter, Single organisms, Plankton net, Sedimentation.

Introduction

The water system of Garhwal Himalaya consists of rivers, streams, tarns and torrents. The major rivers have their origin in this region and all other streams and rivulets empty themselves in them. Most of the rivers have got the tendency of flowing parallel to mountains in deep gorges and do not descend from the highest peaks. Generally they descend from their own glaciers and on the way they collect water from the great Himalayan ranges. The river system of Garhwal can be divided into two:

1. The Ganga system which originates from the Gangotri glaciers.
2. The Yamuna system which emerges from Saptarishi Kund in Yamunotri.

Waterfalls and natural springs are very common sight in Garhwal in general and upper Garhwal in particular. Besides , the upper Garhwal Himalaya is famous for its tranquil lakes and tarns. The biodiversity in the water system of this region is very rich.

Plankton

The term plankton was coined by the oceanographer Victor-Henson (1887) to designate that heterogeneous assemblage of minute organisms and fine non living materials then known to occur in the water of the sea and to float at the will of waves and other water movements. The term was soon extended to cover all assemblages of organisms and materials regardless of nature of water which they occupied. Now the term plankton is restricted to organisms only. A single organism in the plankton is known as 'Plankter'.

Plankton is a collective term for a variety of marine and freshwater organisms that drift on or near the surface of the water. Their movement depends largely on tides, currents and winds, because they are too small or weak to swim against the current.

The occurrence of plankton is closely related to the flow conditions. During the floods planktonic organisms may be present but are rare, whereas during the dry seasons algal blooms may develop within the lentic waters of the plain and also in the main channel. In short rivers these are generally confined to back waters. In longer rivers the time taken for individual masses of water to travel down stream is sufficient to allow the development of plankton. In river whose flow has been slowed by other hydraulic works, plankton also develop to a greater degree. However, the contribution of free plankton to the primary production is slight.

Method of Collection

Plankton net

Collection of plankton, using plankton net is the most common practice. However, it must be understood that plankton secured by means of a net represent only a fraction of the total population. Plankton nets are



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generalized for sampling where plankton are few or where only qualitative data or a large biomass is needed for analysis.

Plankton net is in the form of a truncated cone with a receptacle at the lower narrow end. The mesh size and net material determine the filtration efficiency of the net.

Sampler

Trustworthy plankton samples can be taken from a known depth with the help of samplers. Large size Kemmerer is convenient for plankton sampling. Nansen's reversing bottle and Van Dorn's water samplers are also quite useful and easily available.

Plankton traps

Plankton traps are modification of bottles especially designed for collection of planktons. They combine in them both bottle and net and are better suited for plankton collection as they close fast and sample large volume of water.

Pumps or Tubes

Pumps or Tubes are also used to sample large volume of water. A rotatory pump is used. A plastic or rubber hose is connected to the pump and large volume of water is collected by lowering the hose at desired depth. The water is then filtered through a net.

Method of concentration

The samples collected by nets and samplers require concentration is Common method of concentration are sedimentation, filtration and centrifugation.

Sedimentation

This method is based upon gravity settling of plankters after addition of a killing and preserving agent. Generally formalin (5-10%) is used for this purpose. The preservative added water is left undisturbed for one to three days so that all the plankters are settled. The supernatant water is drawn-off by siphon avoiding removal of settled material.

Filtration

A number of filters are being used for concentration of plankton, viz, filter paper, sand filter, whipple sling filter, cotton disc filter and plexi glass filter. Simplest method is filtration through Whatman filter paper fitted in a glass funnel. Such filtration is very slow unless speeded up by means of filter pump. Plankton filters have been superceded by other devices because of time consuming and labourious procedure.

Centrifugation

In recent years centrifugation method has become much established in plankton work as it consumes very less time and labour. It secures materials suitable for numerical, gravimetric as well as volumetric methods. All organisms including nanoplankton are removed completely.

Plankton is generally concentrated in a centrifuge at 1000-1500 rpm. For 10 minutes. High speed may produce crushing effect on plankton. Therefore, for qualitative work centrifuge should be operated at low speed whereas, for removal of all kind of plankton, for quantitative work, it can be operated at high speed (10,000 rpm).

Aim of the study

Plankton play a very important role in the aquatic ecosystem. They serve as food for water organisms. the phytoplankton's trap solar energy and prepare food for the ecosystem by photosynthesis.

The objectives of study are as follow

1. To study the variety of planktons in the study area.
2. To study the seasonal variation in plankton diversity.

Method of Preservation

Live specimens for short term storage

If live samples are to be examined, the containers should be filled partially to reduce inhibition of metabolic activities. The containers are then stored in a refrigerator or ice chest, at ambient temperature, to avoid shock to the organism.

Live specimens for long term storage

Various preservative are also available for long time storage of plankton sample.

Formalin

A 5% solution of commercial formalin is a good general killing and preserving fluid. It preserves immediately and permanently. Preserved sample should be stored in dark.

Alcohol

Methyl alcohol (80%) solution is also a good preservative but has decolorising effect. It sometimes causes shrinkage of tissue leaving the material disfigured.

Formal alcohol

It is an excellent solution for general preservation. Consists of 5% formalin added to 70% ethyl alcohol in equal parts

Lugol's solution

It is the most suitable phytoplankton preservative which retains the colour of phytoplankton. 0.3ml. of Lugol's solution is required to preserve 100 ml. sample. The container is kept in dark.

Lugol's solution can be prepared by dissolving 20g potassium iodide and 20g iodine in 0.3 ml. distilled water containing 20ml. glacial acetic acid.

M3 fixative

It is prepared by dissolving 5g potassium iodide, 10g iodine, 50ml. glacial acetic acid and 250ml formalin in one liter distilled water. It is good preservative for phytoplankton sample. About 2ml. of M3 is required to preserve 100ml. of sample. The container is stored in dark.

6-3-1 Preservative

It is composed of 6 parts of water, 3 parts of 95% ethyl alcohol and 1 part formalin. Equal volume of preservative and sample is mixed for preservation.

Identification

For qualitative work collected plankton should be in good condition. Plankton in living form is always good for identification. Very-active plankters may be slowed down by use of mechanical methods or anaesthetics. Plankton are studied immediately after collection for identification.

Temporary water mounts are generally used for this work. Living plankter can be mounted directly in dilute glycerine and used for longer time. Cotton

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fibers can be put over the material to slow down the active plankters. A small crystal of chloroform on a bit of cotton can be placed at the edge of cover glass to immobilize the active plankters.

Commonly, identification of plankters to genus is adequate but in some plankton work, plankters are identified to species. Plankton identification essentially requires a standard compound microscope with 10X eye piece and 10X 5X objectives.

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Conclusion

The plankton community is comprised by organisms of plant origin, i.e. phytoplankton and organisms of animals origin, i.e. zooplanktons.

Methodology of plankton play an important role in my research work.

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