

Collection, Preservation and Quantification (Periphyton)

6.1 What is Periphyton

Periphyton is any aquatic planktonic (phyto- or zoo-) organism attached to some submerged substratum. They are direct nutrient as well as pollution indicator of any aquatic body. Wetzel (1983) defined it as the micro 'floral' community living attached to the substrate inside water. For its property in substrate selectivity, it commonly prefers submersed plants or plant parts, rocks and sediments for growth. Saikia (2011) featured it as a mid successional biofilm community mainly dominated by floral members i.e. phytoplankton.

6.2 Periphyton Collection and Quantification

Periphyton can be collected from two available substrates:

1. Natural substrate and
2. Artificial substrate

However, the basic procedure of sample collection is same for both substrates.

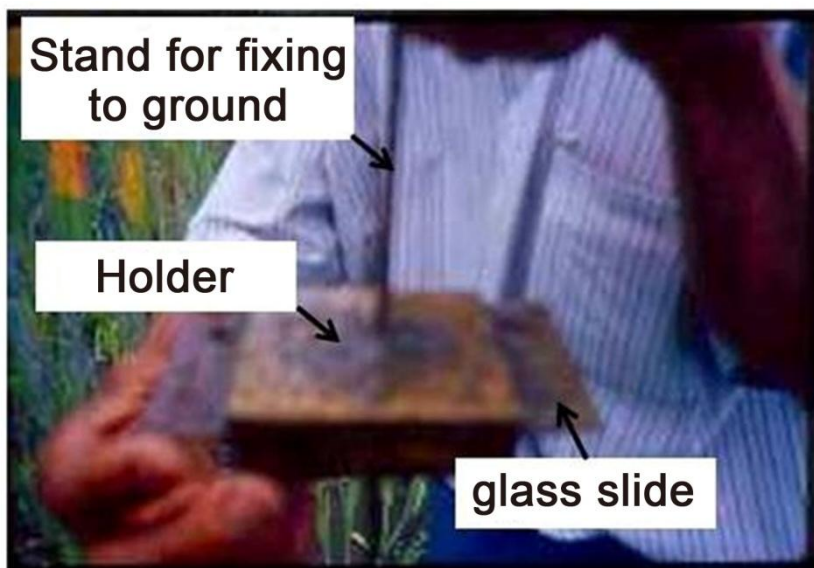
6.2.1 Periphyton Collection from Natural Substrate

- Submerged portions are usually cut in a required length. The cut-length is noted.
- The cut portion is directly preserved in fixative, mostly in 4% formalin in a vial containing distilled water.

- In laboratory, the surface of the substrate portion is scrapped using a fine razor or scalpel upto visibility by naked eye in the same distilled water where it was preserved.
- This is then transferred to centrifuge tube (preferably of the volume 15 ml) and centrifuge at 1500 rpm for 20 minutes.
- Volume is reduced to desired level and kept in a glass container (vol <15ml) and labeled properly along with all information required for the determination of surface area scrapped.

6.2.2 Periphyton Collection from Artificial Substrate

Artificial substrates like glass slide, cellophane paper, PVC pipe etc. are placed in water for periphyton collection. These substrates are fitted in suitable depth of water. However, glass or plastic slides are frequently preferred over other artificial substrates. A design of the glass slide sampler for shallow water body has been shown in Fig. 4.



Periphyton sampler using glass slide

Fig. 4. A device for collection of periphyton from shallow water body using glass slide.

6.3 Quantitative Analysis of Periphyton

Organisms are counted using an S-R cell according to the procedure described for plankton. Periphyton numbers were estimated using the formula

$$\text{Periphyton cell or unit/cm}^2 = \frac{P \times C \times 100}{S}$$

Where

P = total number of periphyton units counted in desired fields (minimum 10);

C = Volume of final concentrate of the sample (ml);

S = Area of scrapped surface (cm²).

Where periphyton organisms are counted by Lacky's drop count method, periphyton numbers are enumerated as:

$$\text{Number/cm}^2 = \frac{C \times A_c}{A_s \times S \times V \times A_p}$$

Where C, A_c, A_s, S and V are same as plankton counting.

A_p = Scrapped area for periphyton collection.

Periphytic organisms in artificial substrate can be quantified as per the methodology described for natural substrates.

