

LIFE FORMS IN FW ENVIRONMENT

In summary, life forms belong to both plant and Animal kingdoms. Can be schemed as:

1. PLANTS
2. ANIMALS

Note that protochordates and echinoderms do not occur in FW. Cirripedia in crustacean class does not occur in FW. However, other many vertebrates e.g. fish, amphibians reptiles (snakes) and birds which depend on water and mammals do occur in FW. It has been noted that many fauna and floral varieties occur more in marine than in FW. These aquatic organisms are divided into different groups based on their micro-habitats. These include:

- (a) Neuston – organisms resting on water surfaces e.g. *Gerris*
- (b) Plankton – Live suspended in the water. Sometimes called drifters or floaters because they cannot control their movement but influenced by water current e.g. the phytoplankton (plant-origin) and zooplankton (animal-origin). Each member of plankton is called plankter.
- (c) Nekton – organism which can control their movement and swim in the water. They are macro-organisms e.g.

Crustaceans, molluscs, fishes. Plankton and Nekton are grouped together as pelagic or limnetic organisms because they live within the water column i.e. below the surface of water and above the bottom.

Phytoplankton

Bryophytes

Bryophytes

Zooplankton

Ctenophores, sponges e.g. Hydra

Annelida (but no polychaetes, *Nereis* occur)

Arachnid

Molluscs and Insect

- (d) Benthos – organisms which live in or on the bottom of the water.

Apart from all these, some organisms live attached to plants e.g. *Hydra*. This is called periphyton. Some are attached to rocks inside the water called Aufwuch.

Present diagram in class to show this distribution into the micro-habitats.

Discuss the classification of plankton under the two types: Phytoplankton are plant-origin while animal-origin are collectively called Zooplankton.

Phytoplankton are divided into 5 groups as:

- i. Diatomaceae
- ii. Myxophyceae
- iii. Dinophyceae
- iv. Euglenoaceae
- v. Chlorophyceae

Zooplankton are divided into

- i. Rotifera
- ii. Cladocera
- iii. Copepoda
- iv. Coelenterata
- v. Protozoa

Note that some nauplius larvae (crustacean larvae), insect larvae and pupae and fish larvae may be occasional in occurrence and hence referred to as adventitious plankton. Attend class for the discussion on the characteristic features of the organisms.

Features of biological success of planktonic organisms

- i. Members have very high surface area to volume ratio. This leads to an increase in frictional force which decreases the rate of sinking of the organism.
 - ii. Cyclomorphosis is a process whereby planktonic organisms exhibit changes in length of their appendages (spines) with the density of water e.g. *Ceratium* shortens its spines during winter when density is high as it needs less energy to keep afloat. During summer when density is low, *Ceratium* elongates its spine to prevent sinking.
 - iii. Many of them possess spines which increase the surface area to the small volume e.g. *Keratella*, *Lecane*, *Trichocera*
 - iv. Secretion of oil droplets e.g. *Noticula*. Oil droplets decrease gravity of the organisms since it is lighter than water.
 - v. Planktonic organisms exhibit patchiness whereby they are not evenly distributed to reduce pressure from predators.
 - vi. Plankton shows seasonality in abundance. This depends on change in water current, water level, transparency and amount of nutrients available i.e. conductivity.
 - vii. Most of the animal plankton are transparent which provide protection from the predators.
 - viii. Planktonic organisms show diurnal ventral migration. Explain this with the three theories of limnologists.
- Nekton – Are fishes and crustaceans mainly. So also molluscs. This is your core course throughout the programme.
- Benthos – Occur at the bottom of water, include bacteria and fungi, protozoan, leeches, oligochaetes, planarians, ostracods, crabs and prawns, coleopterans. They are many snails.
- Periphyton include *Hydra* which attach to plants, water mites and rotifers.
- Neuston – stay at surface of the water. These are mainly arthropods – *Gyrinus*, *Gerris* (Pond skater), adult mosquito (temporarily).