

Benthos

All the organisms living or inhabiting in the bottom regions of the aquatic environments are termed benthos. These benthos/benthic organisms live in a variety of bottom environments of the aquatic ecosystems and are as diverse as the plankton. These bottom living organisms have direct contact with the substrate, which limits the distribution of these organisms. The factors such as the composition, size of the particles, its firmness or resistance to penetration, its lability and the food they contain, are all known to have major influence on the distribution of organisms.

Classification of Benthos-Based on size

Benthic organisms include both plants (phytobenthos) and animals (zoobenthos) and no vertebrates are represented as true benthos.

Based on size

Life in the benthic region is also classified based on size viz. macrobenthos, meiobenthos and microbenthos. Macrobenthos are organisms that are larger than one millimeter like oysters, starfish, lobsters, sea urchins, shrimp, crabs and coral.

Meiobenthos are between one tenth and one millimeter in size. Organisms in this group include ciliates, annelids, kinorhynchans, copepods, etc., Microbenthos are very tiny organisms like bacteria and ciliates. They are smaller than one tenth of a millimeter.

Types of meiobenthos

Meiobenthos are also called as interstitial organisms (mainly fauna) which live in the spaces between the sand grains or particles of the substratum or live on the individual particles. However, meiofauna is the preferred term to refer to the organisms that live interstitially. Meiobenthos and meiofauna are synonymous terms to each other. These organisms include all animals that pass through a 0.5 mm screen but are retained on a 62 μm screen mesh. This term meiofauna is mainly based on size of the benthic organisms and it does not explain about the location of the organisms or their movements within their habitats. In order to indicate their location and to refine the classification of these forms, some other terms have been introduced as, endobenthic, mesobenthic and epibenthic.

Endobenthic organisms are the meiofaunal sized organisms which move within the sediment by displacing particles (i.e. as they are the bigger than the interstitial spaces of the sediment (sand) particles). Mesobenthic organisms are the meiofaunal organisms living and moving within the interstitial spaces of the sand grains. Epibenthic organisms are those that living at the sediment-water interface.

Based on the mobility

Based on mobility or movement, benthos are grouped into sessile or attached, sedentary and vagrant.

Sessile organisms are those that do not have any mobility, attached or fixed firmly with the substratum or bottom of the aquatic environments and rely on currents or other mechanisms to bring food to them.

Plants such as benthic algae (seaweeds) and sea grasses and animals such as corals, other attached forms such as barnacles, oysters, etc. are the typical examples for sessile organisms. Sedentary benthos include all the slow moving animals like snails and nudibranchs. Vagrant benthos are those that have locomotory powers and they can move very rapidly on the substratum (e.g. shore crabs). Only animals are included under this category.

Based on the mode of life

Based on the mode of life i.e. whether they inhabit on the surface and on the substratum or into the substratum, benthic organisms are divided into epifauna and infauna. Epifaunal organisms are those that animals which live on the substratum, the infaunal organisms are those that animals live into the substratum. These terms are applied regardless of whether the bottom sediment is unconsolidated (soft) or hard rock. Organisms that penetrate or burrow into the unconsolidated bottom sediments are called burrowers, whereas organisms those that penetrate or bore the hard rock or substrate materials are called borers, These organisms exhibit a variety of feeding behaviour, some scavenge across the substrate or bottom for organic debris, some are aggressive carnivores, others plough through the bottom sediments and ingesting unselectively, still others burrow into the sediment and take in food through a filtering system of inhalant and exhalant siphons (bivalves, Scrobicularia sp, and Teredo sp.).

Benthic Plants(Phytobenthos)

Bottom living plants include varieties of algae and angiosperms or flowering plants, particularly sea grasses. The algae include the Cyanophyta (blue-green algae), Chlorophyta (green), Phaeophyta (brown) and Rhodophyta (red), in increasing order of diversity. All range from microscopic to large except the blue-green algae, which are all microscopic. They commonly have filamentous character and occur in clusters or mats. Green algae include several calcareous species that are important contributors to the sediment substrate, especially in the shallow waters of the low latitudes. The brown algae include the largest varieties of seaweeds i.e. the kelps, which are very abundant in shallow cold waters Most of them are of commercial value as they contain algin, a gelatinous material that is used as an emulsifier in ice-creams, paints, drugs, and cosmetics. The red algae are represented by more species of seaweeds than all other classes of algae. They may inhabit relatively in the deep waters of the subtidal regions of the sea. Some are calcareous and an important constituents of low-latitude reefs.

There are very few common types of marine grasses. Some of these occupy the intertidal marsh environment. For example, *Juncus* sp, is known to occupy the higher level and *Spartina* sp occupy the lower level of the intertidal marsh regions. The sea-grasses are known to occupy the sub-tidal regions, which are included by the species such as *Thalassia* spp. (turtle grass), and *Halodule* spp. live in shallow waters of the low-latitudes. In the higher latitudes, *Zostera* spp (eel-grass) are the dominant type of seagrasses.