

Unit Four: Benthos & Meiofauna

Fauna

- Organisms that live on or above the substrate are called _____.
- Organisms that live in the substrate are called _____, and are divided into categories based on size:
 - macrofauna are greater than 0.5 mm
 - meiofauna are 0.5 to 0.062 mm
 - microfauna are smaller than 0.062 mm

Echinoderms

- The phylum Echinodermata, containing over 6,000 species, includes sea stars, sea urchins and sea cucumbers. They all have radial symmetry and a water vascular system, although most Echinoderm larvae are planktonic with bilateral symmetry.

Cnidarians

- The phylum Cnidaria includes corals, anemones, jellyfish and hydroids. With about 9,000 species, Cnidaria is a diverse phylum common in their possession of stinging tentacles. The stinging cells are called _____ and contain a harpoon-like _____ that injects toxin into the victim.

Mollusks

- With over 50,000 species, Mollusks are second only to Arthropods in phylum size. Mollusks include _____ (snails & sea slugs), _____ (clams, scallops, oysters etc.) and _____ (octopuses, squid, cuttlefish & nautilus). All mollusks have well-developed body organs but lack body segmentation.

Arthropods

- The largest phylum of life on Earth is Arthropoda. There are over 1 million species, with the vast majority being insects. Most marine Arthropods are _____, including crabs, lobsters, barnacles and copepods. Crustaceans have an exoskeleton and most have five pairs of appendages, often with claws.

Benthic Macroinvertebrates

- The health of freshwater and estuarine systems is often determined by analyzing the benthic macroinvertebrate population. A _____ can be calculated based on the relative abundance of different species

Sedimentary Communities

- Sedimentary communities have a sandy, unstable substrate. Benthic organisms in the sedimentary _____ zone may be classified into two major groups:
 - sediment destabilizers, or _____, include both motile and sedentary organisms that cause sediment to move and become resuspended
 - sediment stabilizers include various seagrasses whose roots bind sediments and frequently restrict burrowing animals (competitive interference)

Sedimentary Predation

- _____ predators are exposed at the surface and take organisms at or near the surface without disrupting the sediment structure
- _____ predators move down various tubes or channels provided by the deep-dwelling prey and attack them
- digging predators excavate holes to get food
- infaunal predators burrow through sediment and live in it at all times

Rocky Subtidal Communities

- Not as common as sedimentary communities, rocky subtidal communities have a hard substrate with low-growing _____ plants and animals.

Kelp Beds and Forests

- In colder temperate regions, the hard subtidal substrates are dominated by very large brown algae known collectively as _____.
- These associations are known as kelp beds if the algae do not form a surface canopy and kelp forests where there is a floating canopy.

Kelp Structure

- Kelps are attached to the substrate by a structure called a _____ rather than by true roots. From the holdfast arises a stem-like or trunk-like stipe, which ends in one or more broad, flat blade. At the base of the blade is a pneumatocyst or float, which keeps the _____ at the surface.

Seagrass Communities

- Seagrasses are flowering plants adapted to live submerged in seawater. All types of substrates are inhabited by these grasses, from soupy mud to granite rock, but the most extensive beds occur on soft substrate.
- Seagrass beds are _____ environments, often with high organic content that can make the sediment under the bed anaerobic.

Meiofauna

- Meiofauna, or _____ organisms, are organisms that occupy the microspaces between particles or live on the individual particles.

Limiting Factors: Grain Size

- The most important factor determining the presence, absence, and types of meiofauna is grain size.
- The coarser the _____ size, the greater the volume of interstitial space, and therefore the greater the size and number of meiofauna.
- Other limiting factors include:
 - _____ - the most extreme range occurs in intertidal beaches and minimally in subtidal sediments
 - Salinity - particularly in intertidal areas where freshwater runoff occurs
 - _____ Action - both intertidally and subtidally affecting the arrangement of sediment

Adaptations of Meiofauna

- The major adaptation of most meiofauna is the statocyst, which is an organ that detects gravity and helps the organism differentiate up and down.
- Other adaptations include:
 - reduction in cell number, simpler _____
 - vermiform shape (elongated, wormlike)
 - neoteny - retention of larval form
 - _____ - ability to cling to grains by an adhesive material or hooks and claws
 - efficient reproduction - short life cycle, few gametes

Major Benthos Phyla

- _____ – sponges
- Cnidaria – coral, sea anemones, siphonophores
- Platyhelminthes – flatworms, flukes, tapeworms
- Nematoda – roundworms
- Annelida – segmented worms
- Mollusca – chitons, snails, bivalves
- _____ – crabs, shrimp, barnacles
- _____ – sea stars, sea urchins, sea cucumbers
- Chordata – fish, tunicates