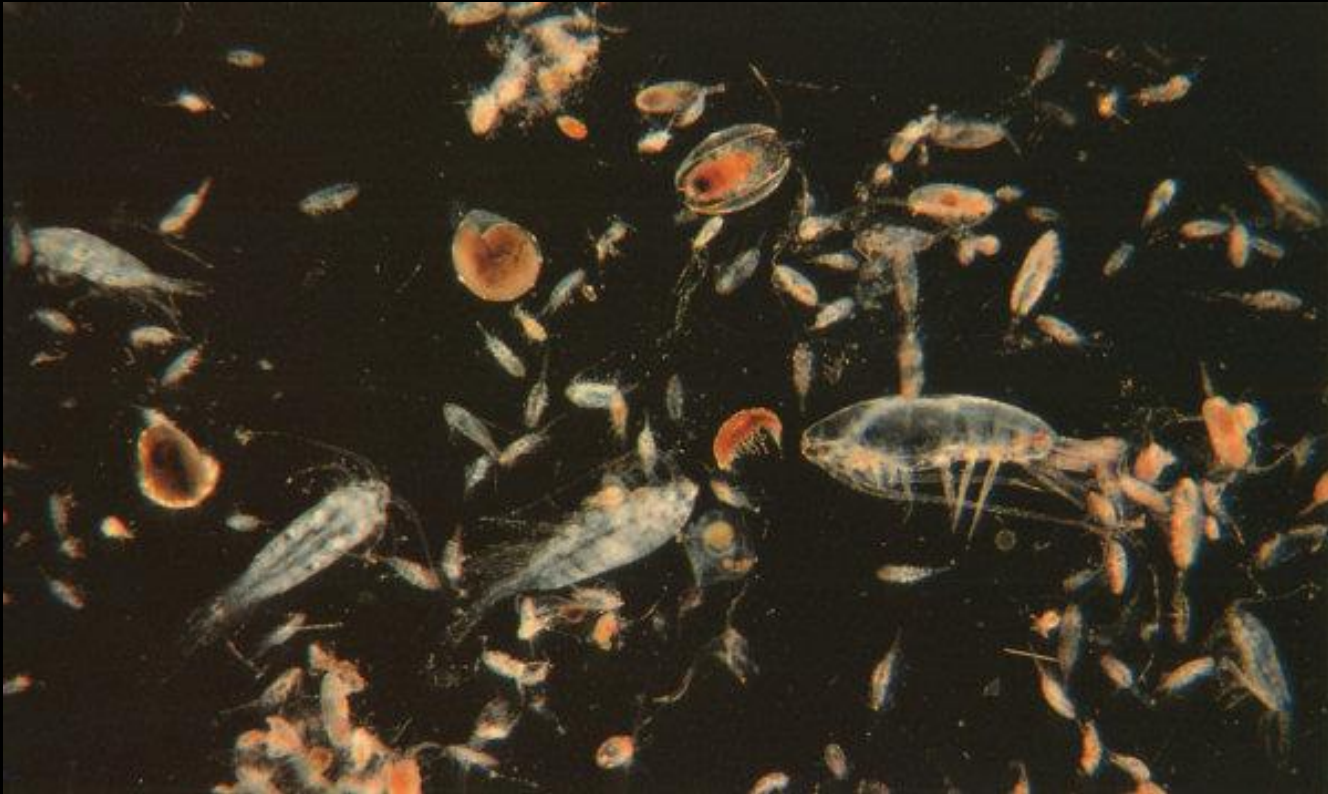


CLASSIFICATION OF MARINE ZOOPLANKTON

Marine Zooplankton



Classification of Marine Organisms

1. **Benthos:** bottom dwellers; sponges, crabs
2. **Nekton:** strong swimmers- whales, fish, squid
3. **Plankton:** animal/plants that drift in water. They have little control over their movement.

Includes:

Cyanobacteria, Diatoms, Dinoflagellates, Copepods, Amphipods, Chaetognaths, Jellyfish, Larvae of Invertebrates & Vertebrates ...etc

Plankton

- Victor Hensen in 1887
- The term “plankton” meaning wanderer to apply to the minute floating and drifting organisms
- Plant (phytoplankton) or animal (zooplankton)
- Plankton are often used as indicators of environmental and aquatic health because of their high sensitivity to environmental changes and short life span.
- Plankton forms an important link in the marine food chain as primary and secondary producers.







Zooplankton

Zooplankton (Greek: Zoon, animal; *planktos*, wandering) are myriads of diverse floating and drifting animals with limited power of locomotion

Majority of them are microscopic, unicellular or multicellular forms with size ranging from a few microns to a millimeter or more

These usually microscopic organisms occupy a key position in the pelagic food web, as they transfer organic energy produced by phytoplankton to higher trophic levels, including fishes exploited by man

Why study them?

-  Most abundant animal on earth
-  Secondary producers in marine systems
-  Found in nearly both pelagic and benthic habitats
-  Critical step in marine food chains
-  Early life-stages of important commercial fish, shellfish
-  Important in nutrient cycling

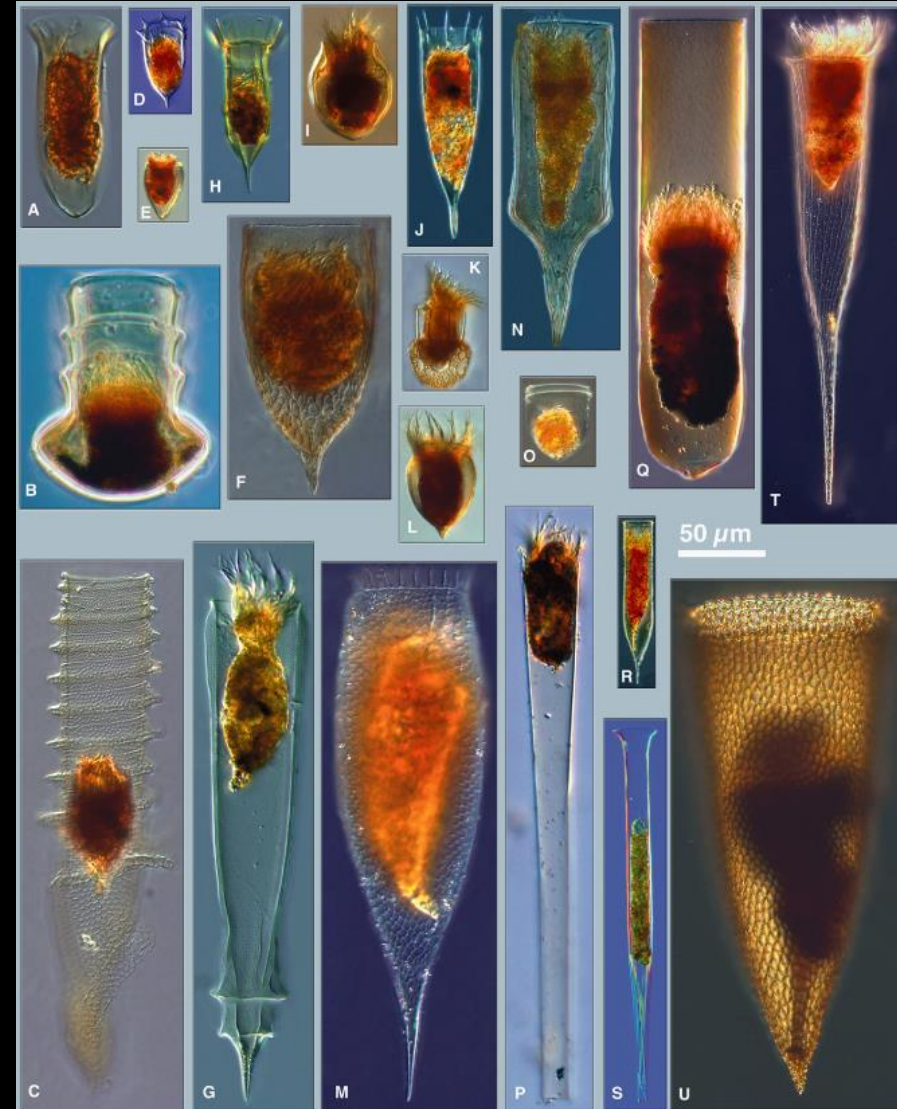
Classification Based on size

Femtoplankton (0.02–0.2 μm)
eg. *Vibrio* plankton, Bacterio plankton

Picoplankton (0.2–2 μm)
eg. Phytoplankton, protozooplankton etc.

Nanoplankton (2–20 μm)
eg. Phytoplankton, Heterotrophic
nanoflagellates feeding on bacteria

Microplankton (20–200 μm)
eg. Phytoplankton, eggs and early
larval stages of crustaceans etc.



Classification Based on size

Term	Size	Examples
Macrozooplankton	> 20 mm (> 2 cm)	Metazoans: Chaetognaths; Medusae; Ctenophores; Salps, Doliolids, adult and juvenile Decapods
Mesozooplankton	0.2-20 mm	Metazoans: Copepods; Cladocerans; Ostracods; Chaetognaths; Tunicates; Pteropods; Heteropods



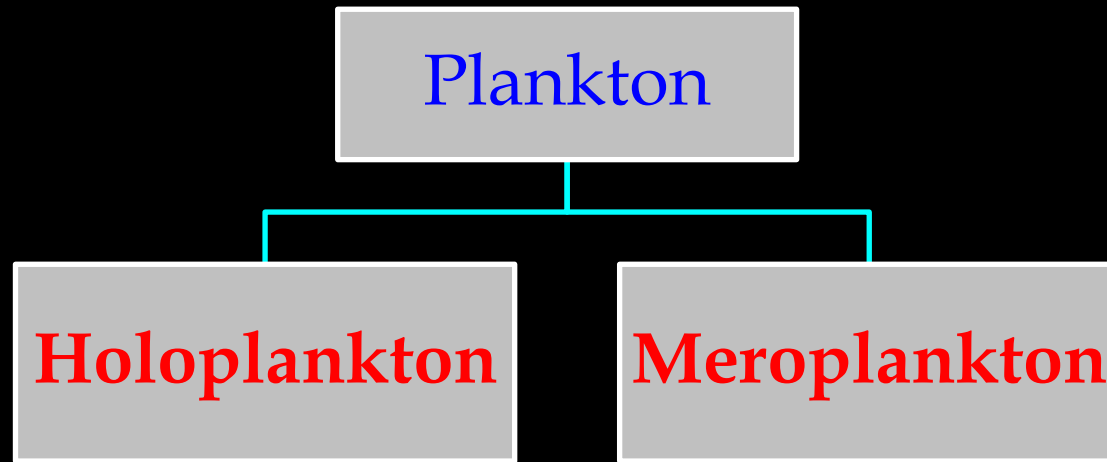
Based on ecology

Neritic Plankton:- those inhabiting waters overlying continental shelves

Oceanic Plankton:- those inhabiting waters beyond the continental shelves



Based on length of planktonic life



Holoplankton (Permanent plankton):- whole life as plankton



Euphausiid



Copepod



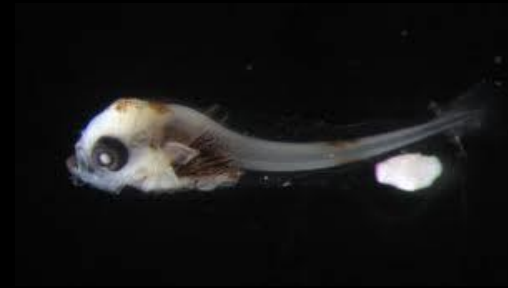
Chaetognath



Mysid

Meroplankton (Temporary plankton):- only a part of their life cycle as plankton

Eg: Eggs and larval stages



Based on depth distribution

Pleuston:- Those living at the surface of the sea, part of whose bodies project in to the air.

Neuston:- living in the upper most part (few to 1 mm) of the surface layer

Epipelagic:- living between 0-200 m

Mesopelagic:- living between about 200 and 1000 m in day time

Bathypelagic:- living below 1000 m-3000 m depth

Abbyssopelagic:- >3000 depth

Epibethic or demersal :- live near or temporarily on the seafloor, mostly crustaceans (shrimps and mysids) and fishes

Based on food habit

Herbivorous :- feed on phytoplankton

Eg. Most of the Copepods, shrimps larvae etc.

Carnivores:- feeds on other small zooplankton.



Eg. Chaetognaths, ctenophores etc.

Omnivores:- feeds both on phytoplankton and zooplankton.

Eg. Mysids




Detrivores: feed primarily on dead organic matter
(detritus)

Life cycle of zooplankton

-  In general, the smallest plankton have the shortest life cycles, bacteria and flagellates generally multiply within a few hours to one day.
-  Most mesozooplankton have life cycle of few weeks, while the macro-and mega plankton usually have life cycle spanning many months and longer.

Zooplankton Sampling

Type of Sampling

-  **Quantitative sampling:**- to obtain information about their systematic, their distribution in time and space, their life histories, their community structure and trophic relationships.
-  **Qualitative sampling:**- to obtain information about their production, biomass, population dynamics and physiology.
-  **Standard sampling:**- to investigate long term variations in species composition and abundance of plankton community on a particular region.

Zooplankton methodology



Collection



Fixation

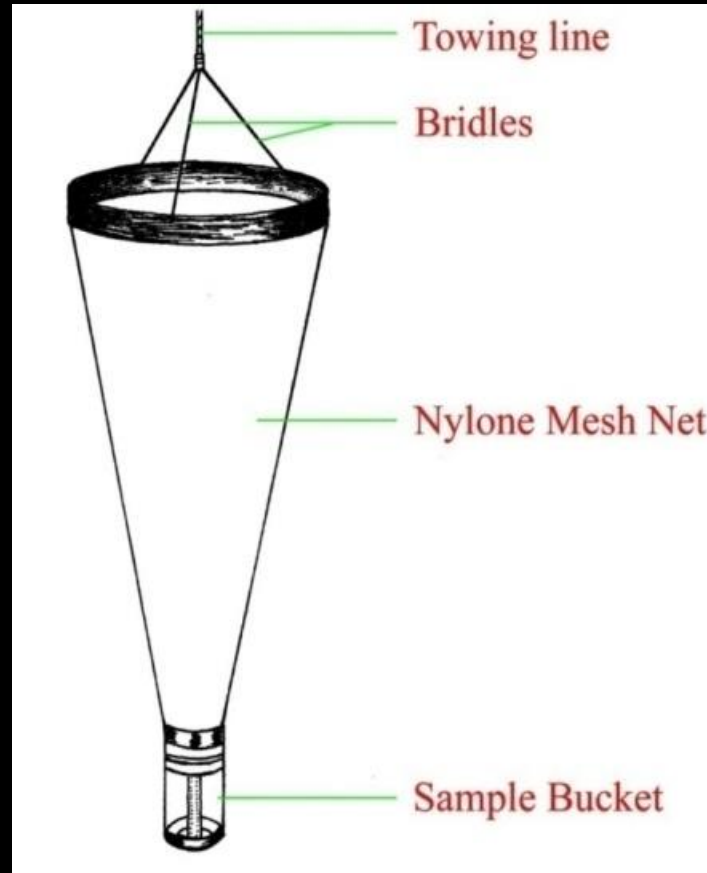


preservation



analysis

Standard Plankton net



Different type of Plankton nets



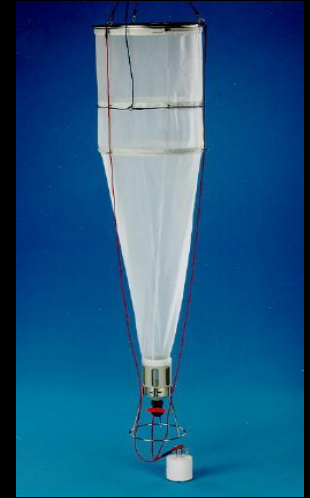
Bongo Net



WP Net



Nansen closing net



IOS net



Heron Tranter Net

Multiple Plankton Sampler (MPS)



MPN



AMPS



MOCNESS



RMT 1+8



BIONESS

Preserved samples



Important Zooplankton Groups

Phylum : Protozoa

Class : Sarcodina

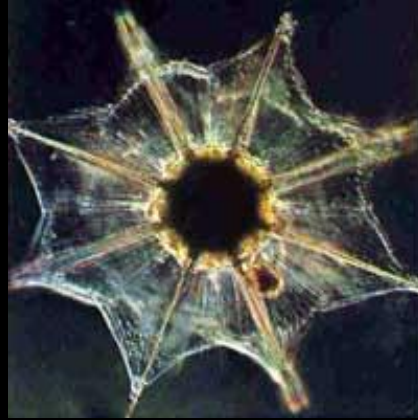
Foraminifera



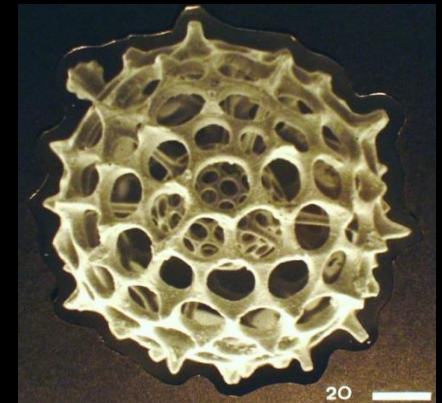
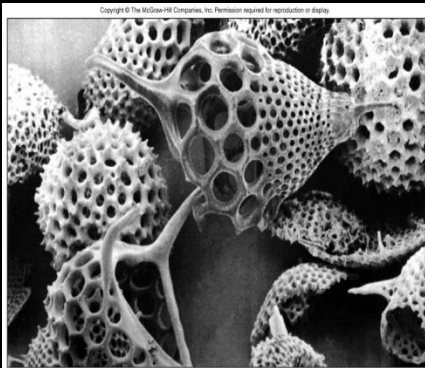
Phylum : Protozoa

Class : Sarcodina

Acantharia



Radiolaria



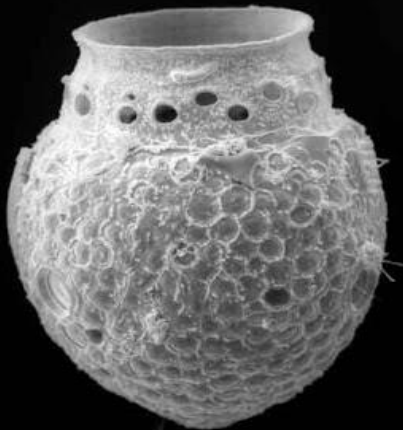
Phylum : Protozoa

Class : Ciliata

Oligotricha



Tintinnidiidae



Phylum : Cnidaria

Hydrozoa



Siphonophora



Siphonophora



Leptomedusa

Phylum : Cnidaria

Scyphozoa



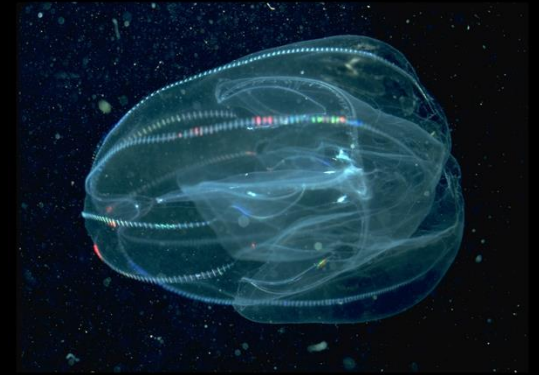
PETRYL.COM

Phylum : Cnidaria

Anthozoa



Phylum : Ctenophora



Phylum : Chaetognatha

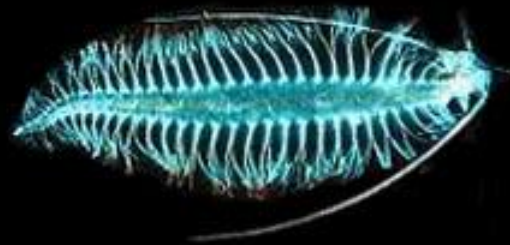


Hesperia/AFIC/ML/NOAA



Phylum : Annelida

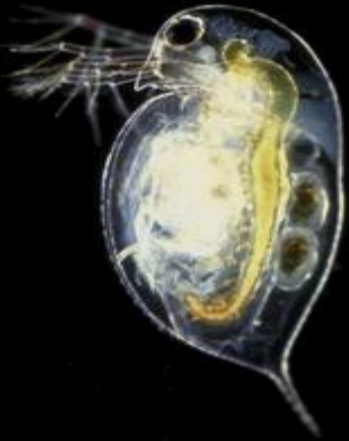
Polychaeta



Phylum : Arthropod

Crustaceans

Cladocera



Phylum : Arthropod

Copepoda



Phylum : Arthropod

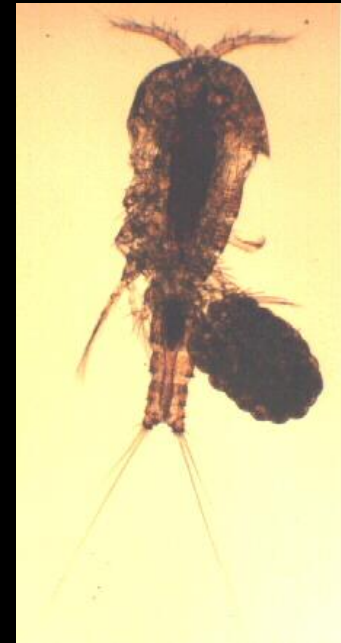
Cyclopoid



Calaniod



Herpaticoida



Phylum : Arthropod

Ostracoda



Phylum : Arthropod

Mysids



A. Michener/T4711715

Phylum : Arthropod

Amphipoda



Phylum : Arthropod

Isopoda



Phylum : Arthropod

Cumacea

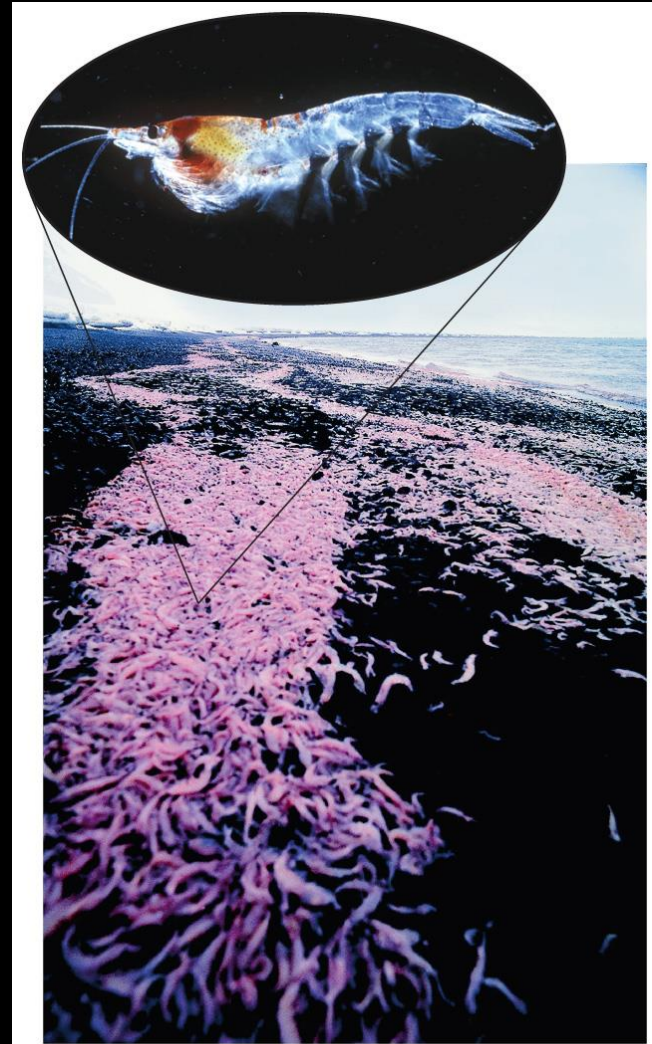


Phylum : Arthropod

Euphausiid



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Phylum : Arthropod

Decapoda



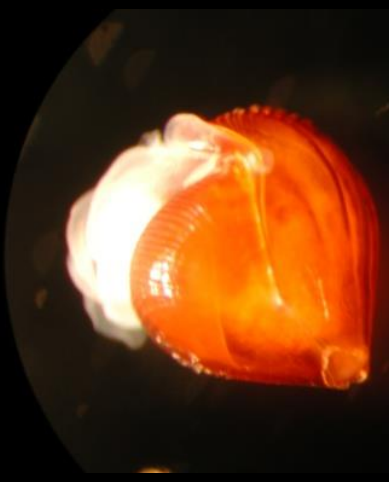
Phylum : Mollusca

Gastropod



Phylum : Mollusca

Pteropod

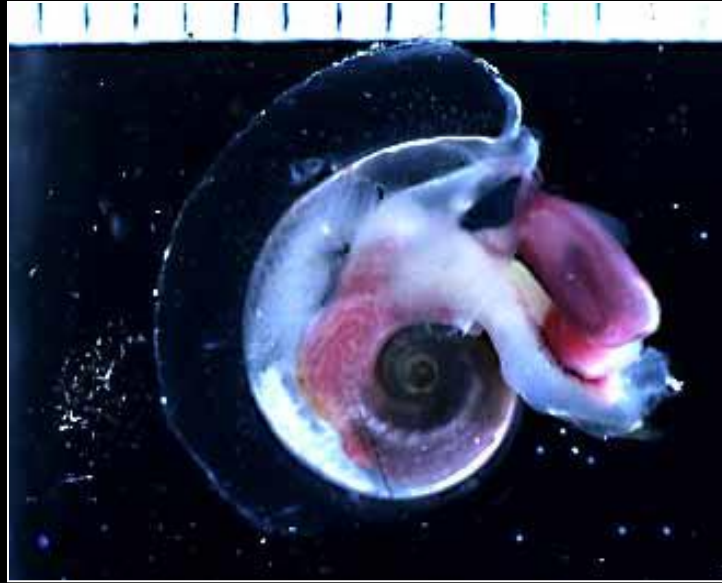


Hopcroft/UAF/CoML



Phylum : Mollusca

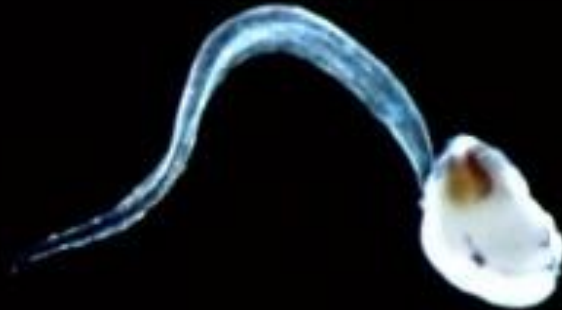
Heteropod



Phylum : Chordata

Subphylum: Urochordata

Oikoplura



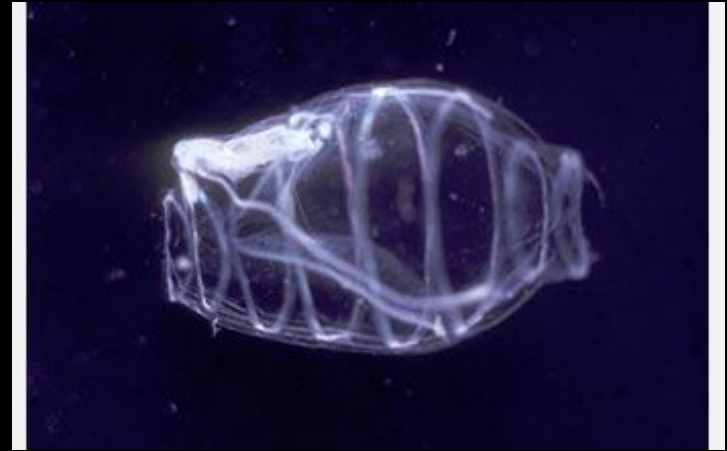
Pyrosoma



Salpa



Doliolid



Protochordates

Invertebrate larvae



Phoronid larva



Nereid larva



Cephalochordate larva



Glaucothoe larva



Veliger larva



Phyllosoma larva

Invertebrate larvae



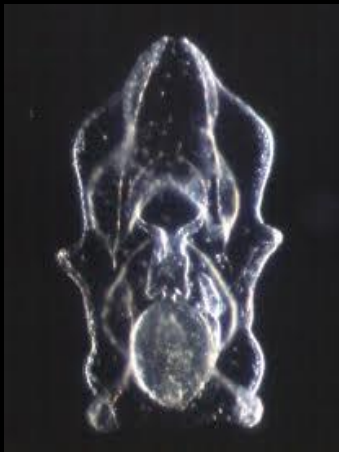
Megalopa larva



Nauplius



Brachyuran larva



Auricularia larva

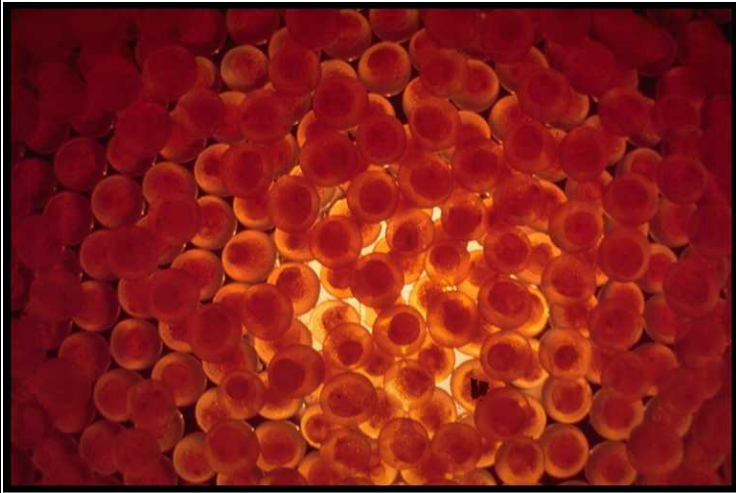


Alima larva



Bipinnaria larva

Fish eggs and larvae



Ecological Significance of Zooplankton

- Vertical Migration
- Deep Scattering Layer (DSL)
- Bioluminescent zooplankton
- Tropical submergence
- Zooplankton and fisheries
- Ecological indicators – water mass and fishery
- Food for baleen whales – Antarctic krill
- Herring fish shoals - *Calanus*

Economical significance

- Food for commercial fishes
- Calcareous and siliceous oozes - a resource material for thermal insulators and chromatographic columns

Thank you