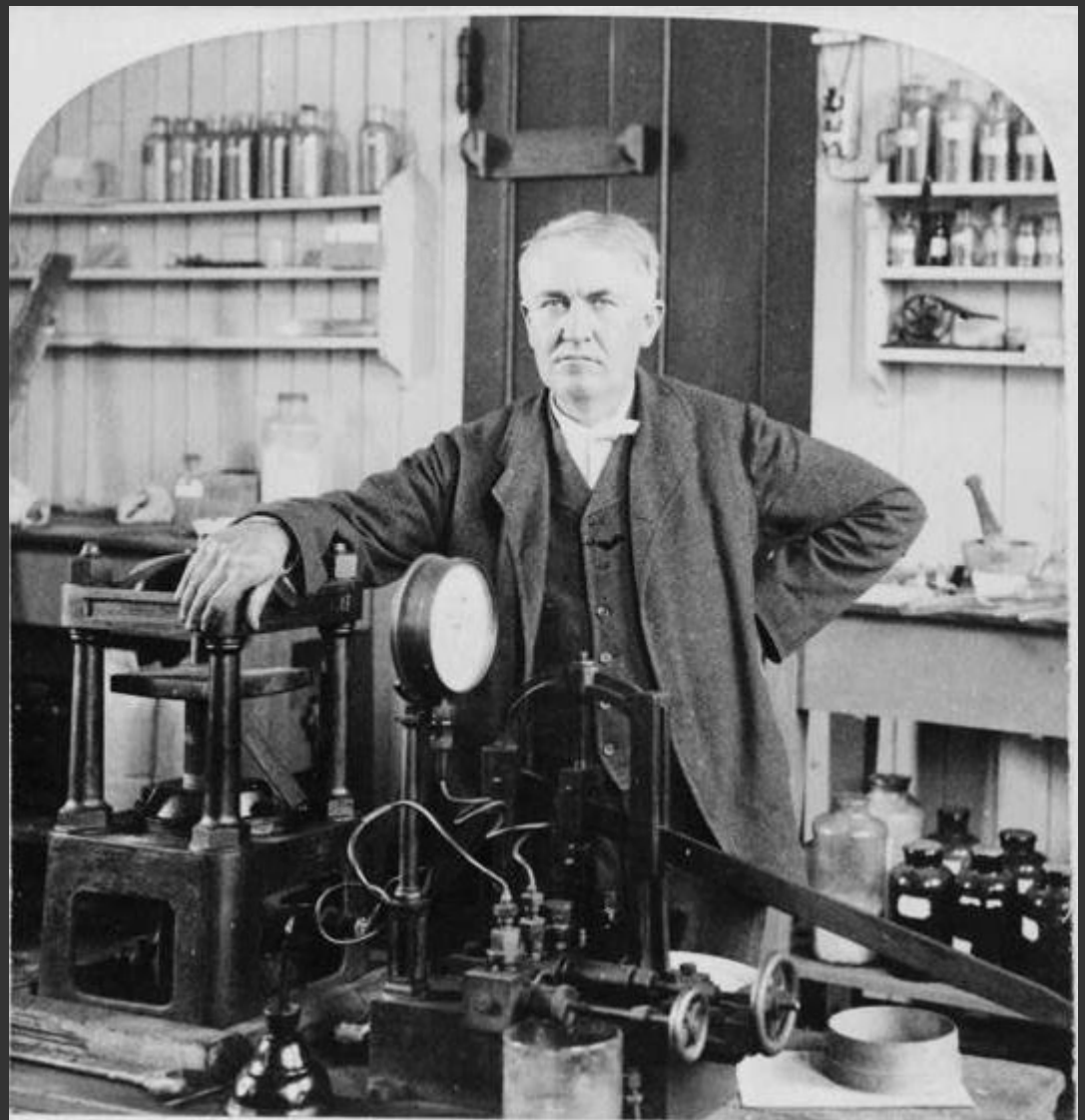
I have not failed. I have just found ten thousand ways that won't work.

Thomas Alva Edison



Molluscs as Bio-indicators

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- Mollusca (Latin *mollis*, “soft”), popularly known as "molluscs" are soft bodied animals.
- Structurally they are heterogeneous.

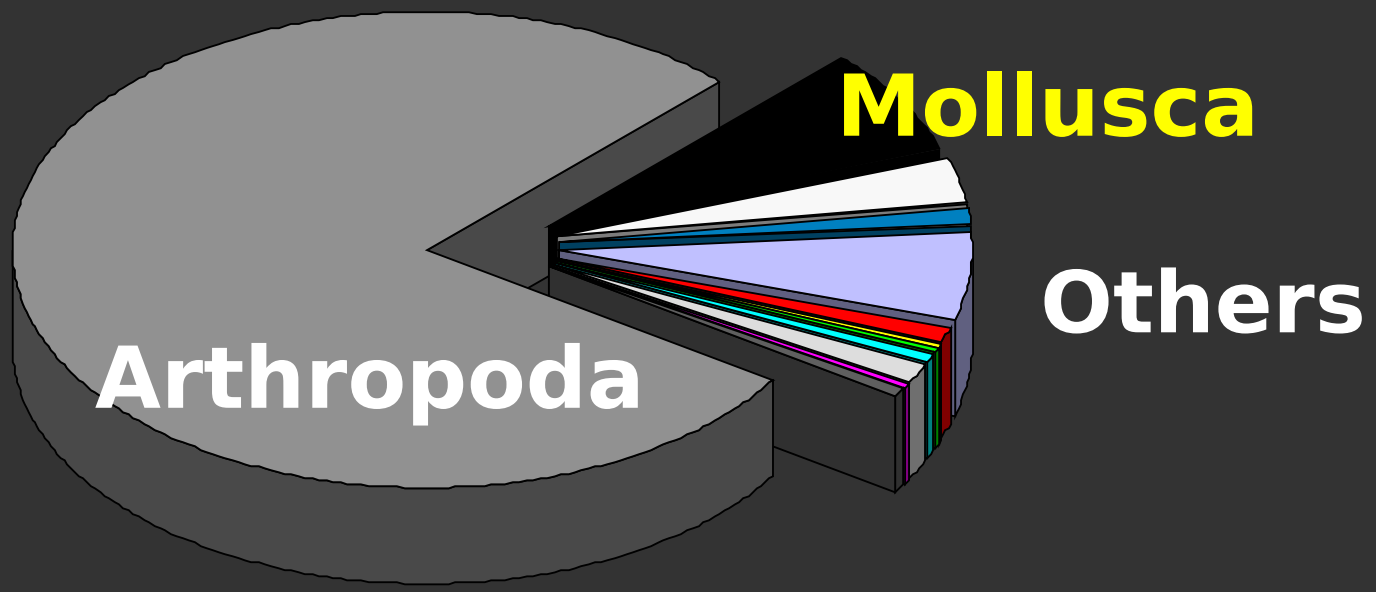
slugs

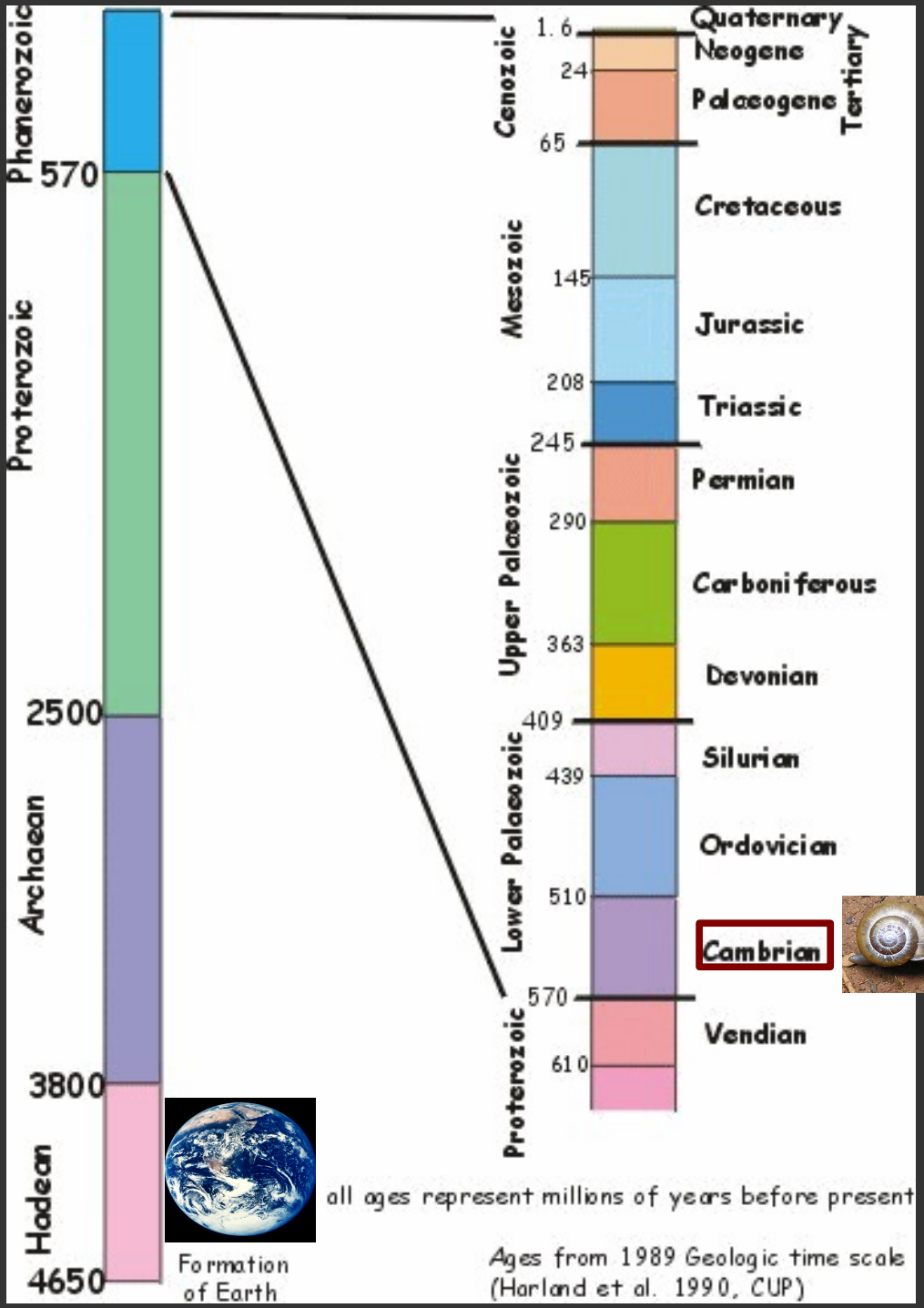
mussels

octopuses

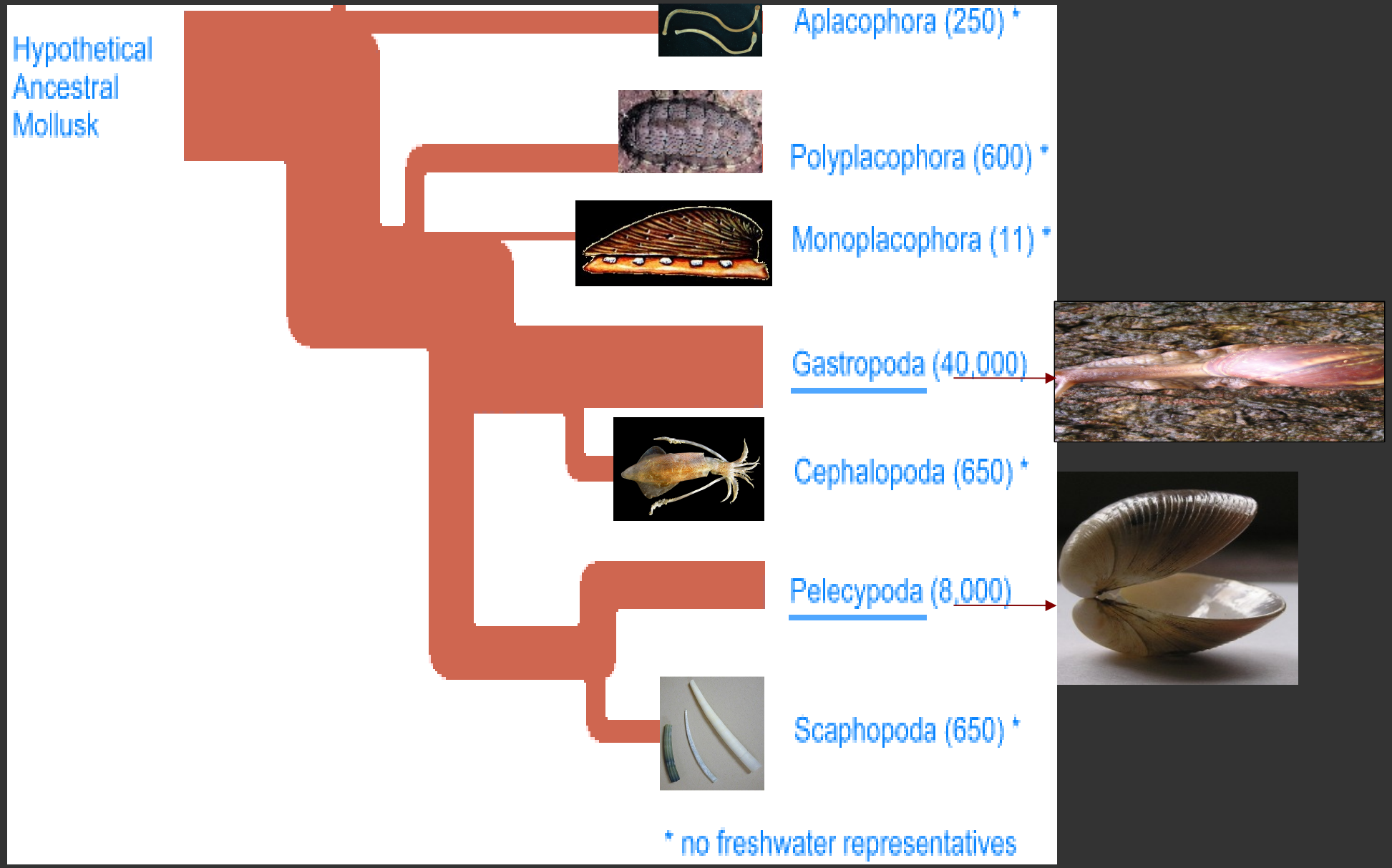
snails.

Number of species




Phanerozoic
570
Proterozoic
2500
Archaean
3800
Hadean
4650
Formation of Earth
Cenozoic
1.6
Quaternary
Neogene
24
Palaeogene
Tertiary
65
Mesozoic
Cretaceous
145
Jurassic
208
Triassic
Upper Palaeozoic
245
Permian
290
Carboniferous
363
Devonian
Lower Palaeozoic
409
Silurian
439
Ordovician
510
Cambrian
570
Proterozoic
Vendian
610
all ages represent millions of years before present
Ages from 1989 Geologic time scale
(Harland et al. 1990, CUP)

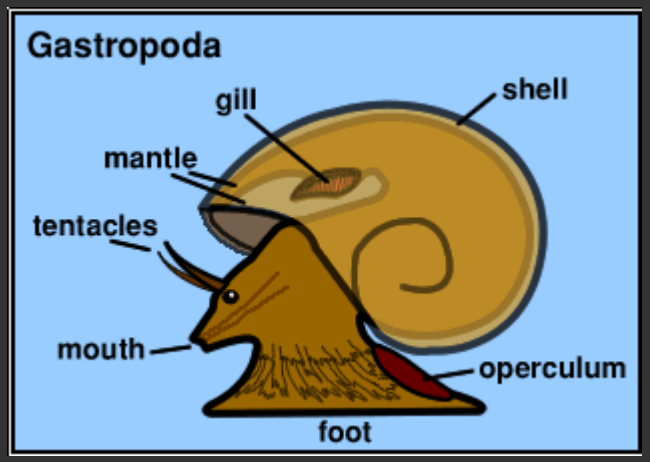
Evolutionary diagram of Mollusca

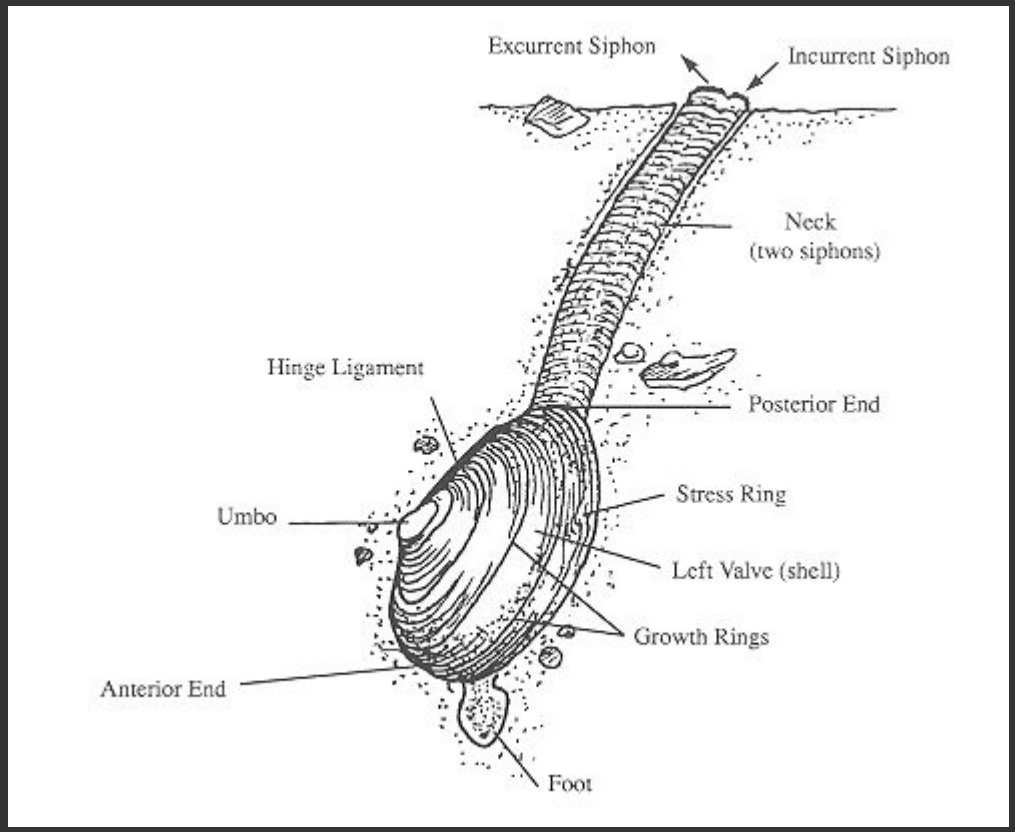


Gastropoda

Pelecypoda
(Bivalvia)

Structure of gastropods and bivalves





Shell Formation

mantle

↓

calcium ions

↓

mix with the fluid present in the mantle cavity

↓

calcium carbonate

↓

absorbed by “conchiolin”

↓

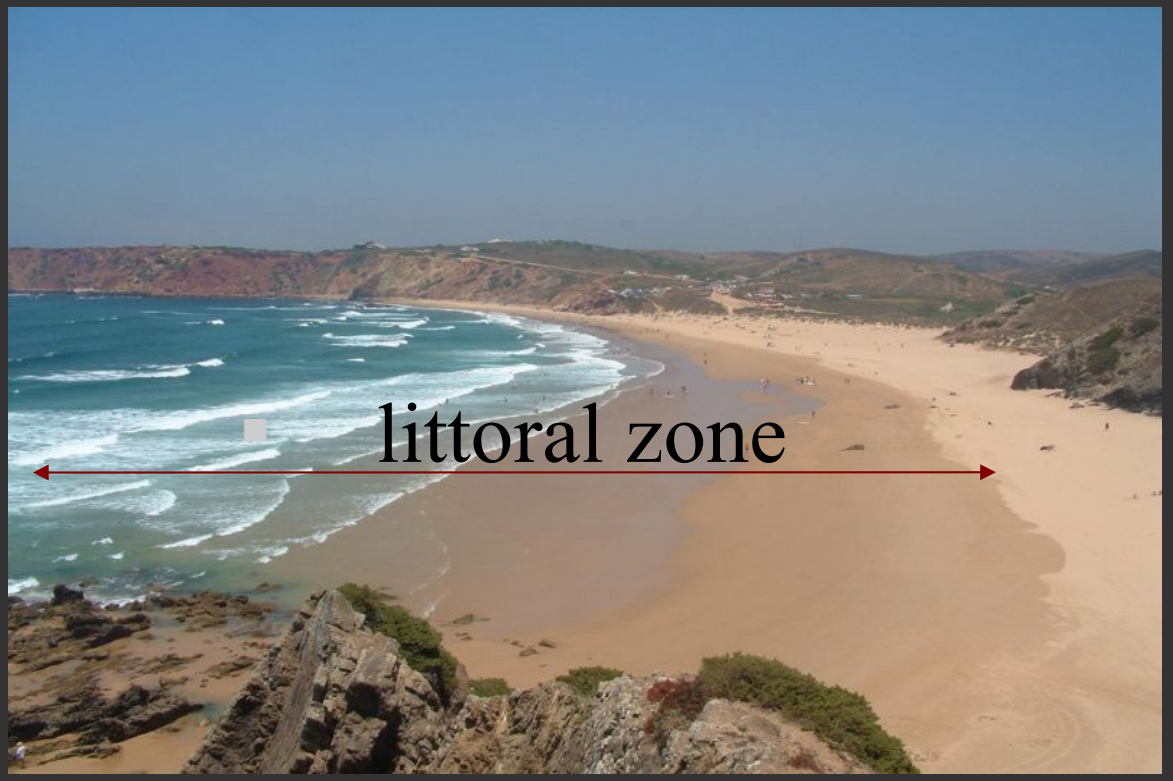
conchiolin crystallises

↓

calcite and argonite

Occurrence

- Colonized all possible habitats from deep sea to high mountains.
- More abundant in the littoral zones of tropical seas.




Aquatic vegetation
Stones or Rocks
Wood , other solid surfaces, or soft sediment
Habitat

Food

- Freshwater gastropods are micro-herbivorous and/or micro-omnivorous

Algae

Bacterial films

Habitat

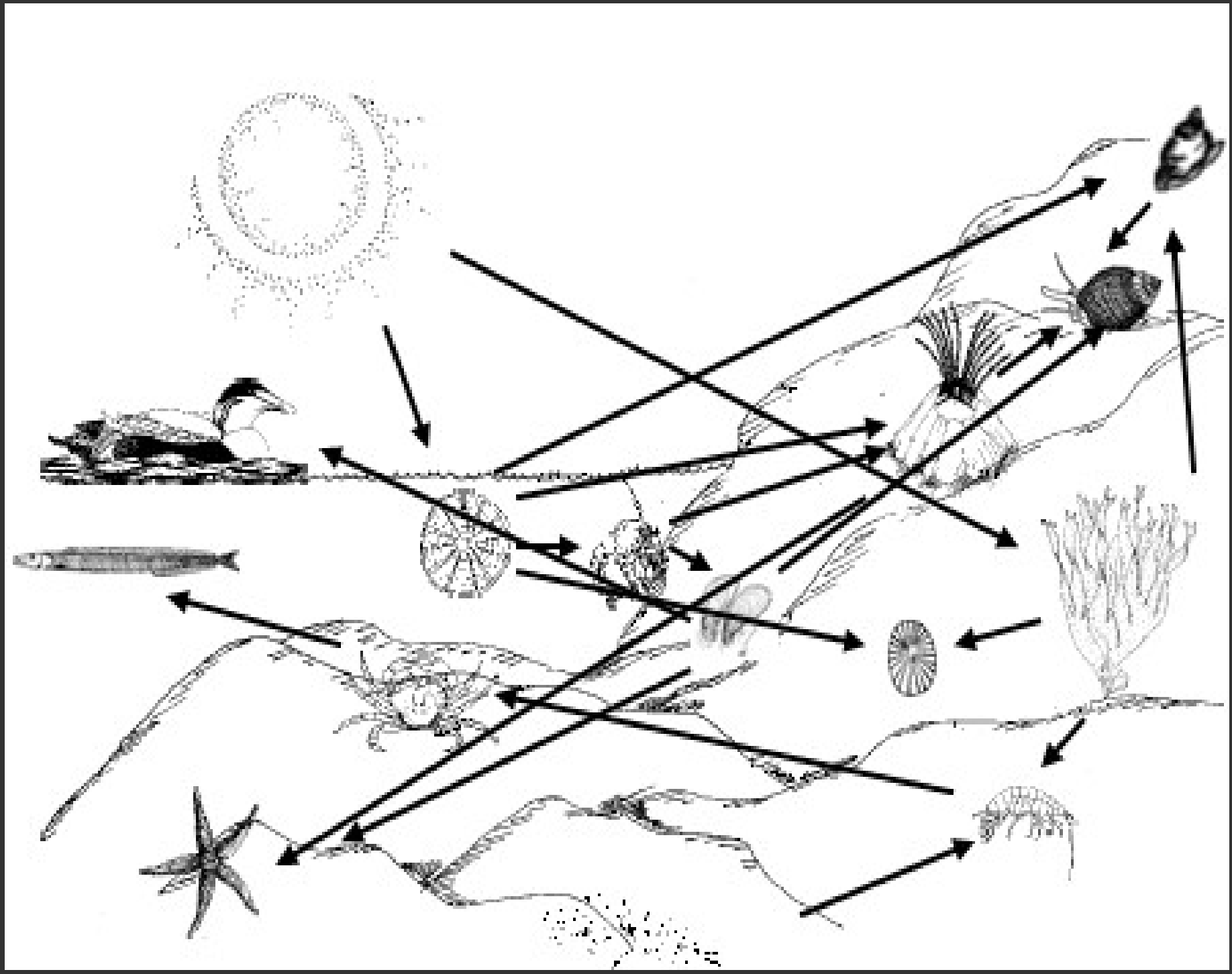
- Bivalves live buried in sand to cobbles and gravel but a few species exploit the exposed hard surfaces by attaching to hard surfaces with byssal threads.

Food

- Filter out large quantities of blue–green algae,
- Bacteria

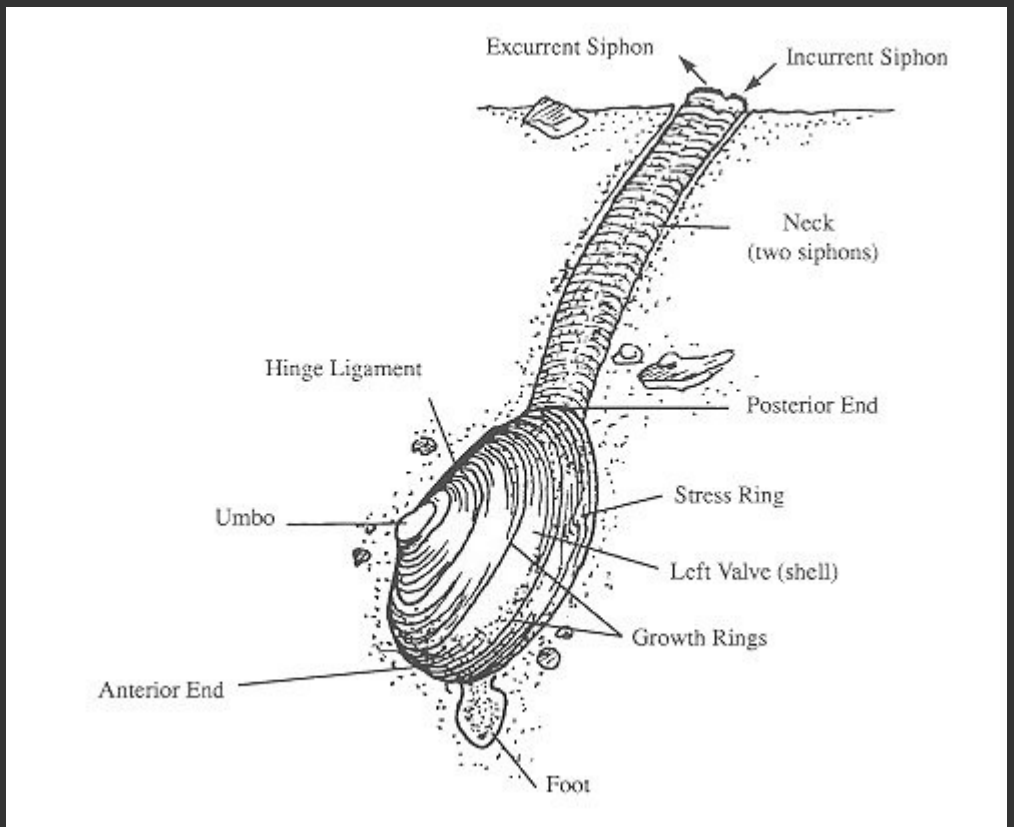
Algae

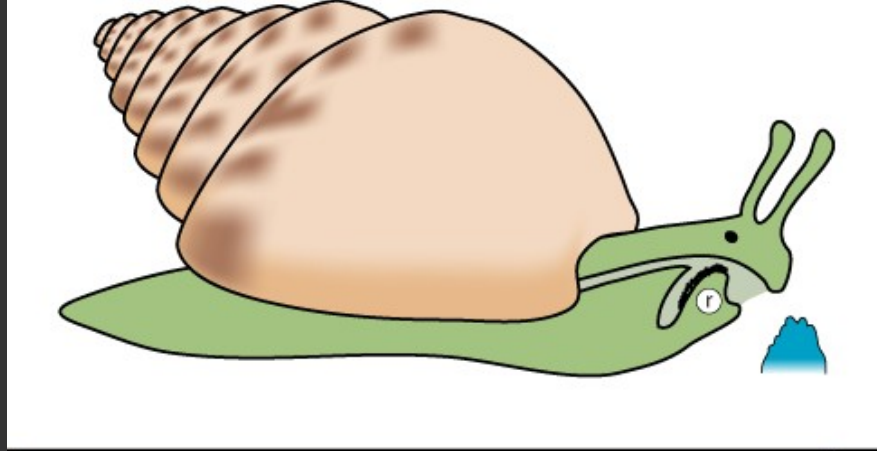
Bacterial films

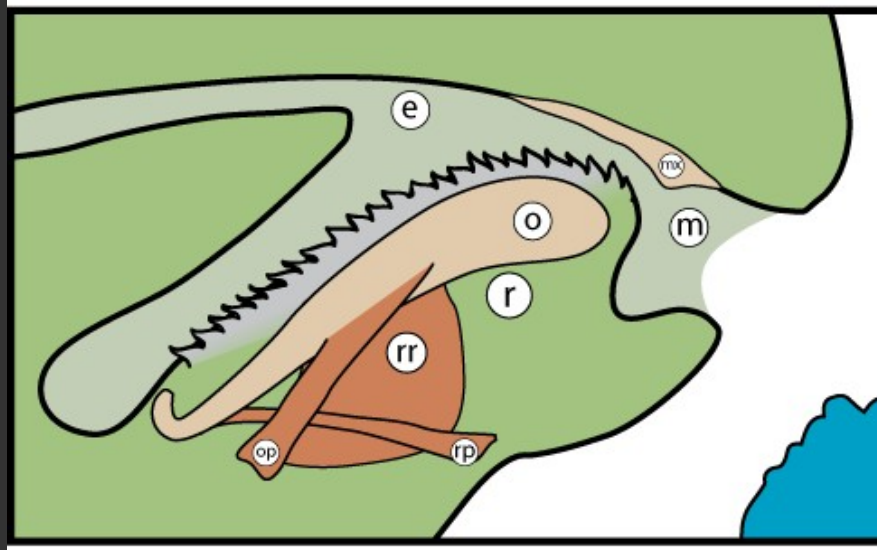


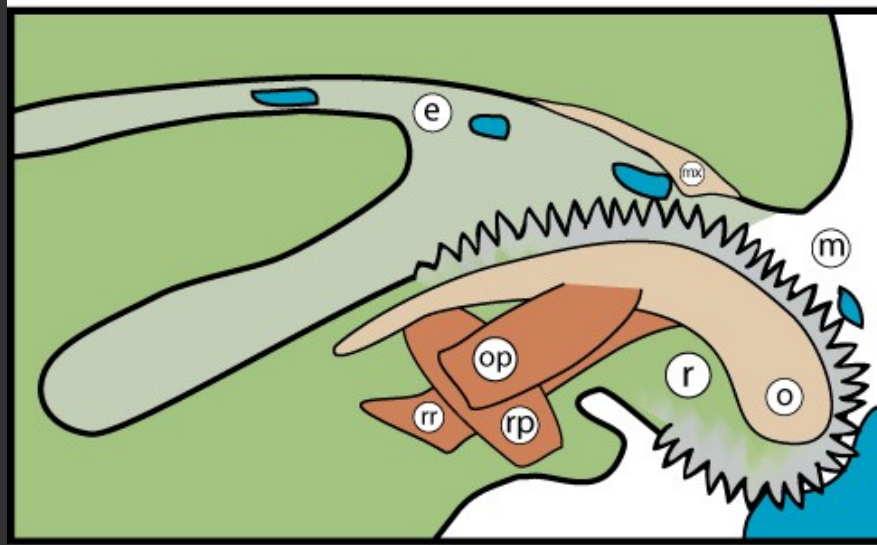
Ecological role

- Food for invertebrates and chordates
- Filter feeders, Grazer, detritus feeders.







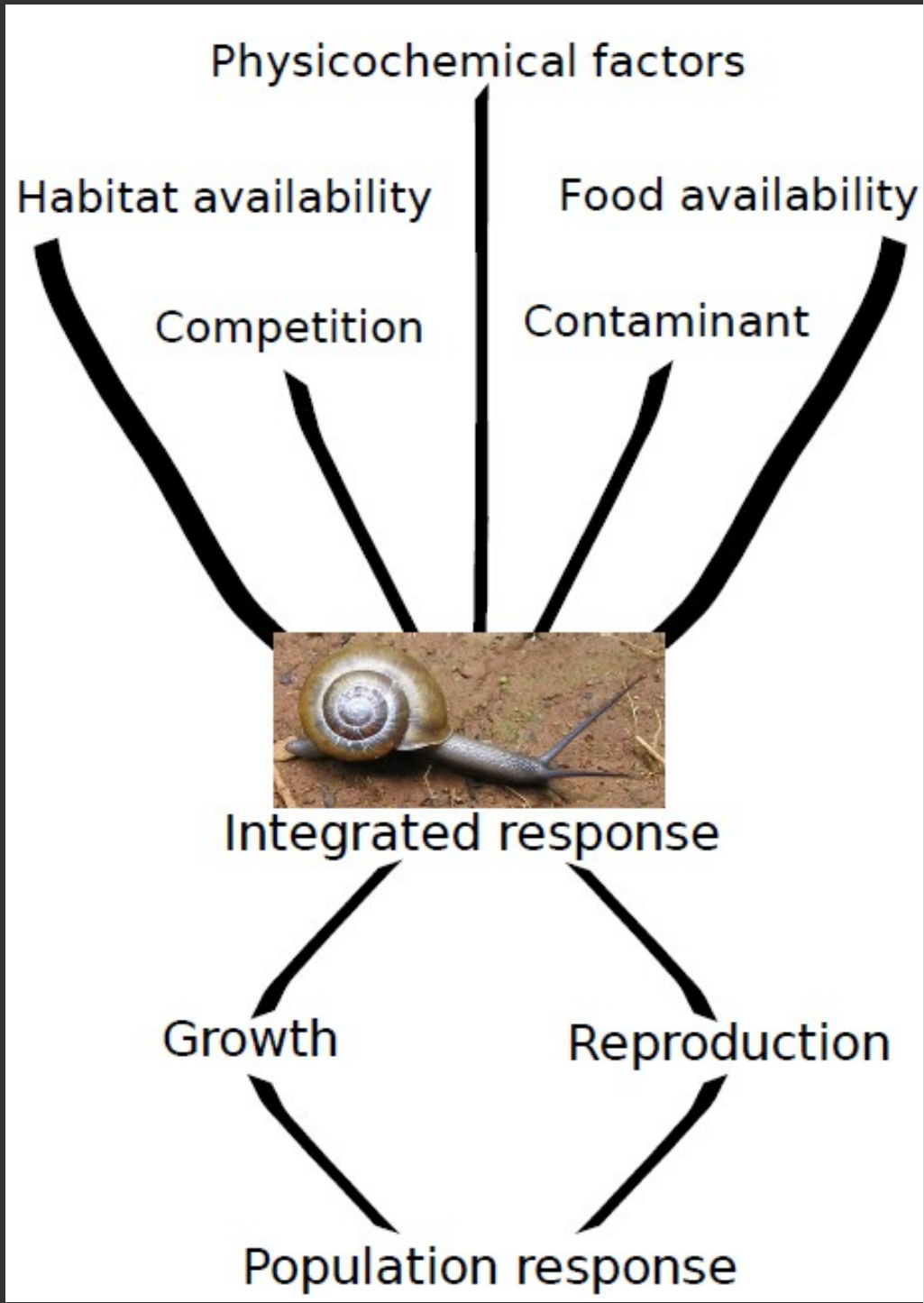


Bio-indicator ?

- Species or species assemblage.
- Presence / absence.
- Numbers.
- Morphology.
- Physiology.
- Behavior.

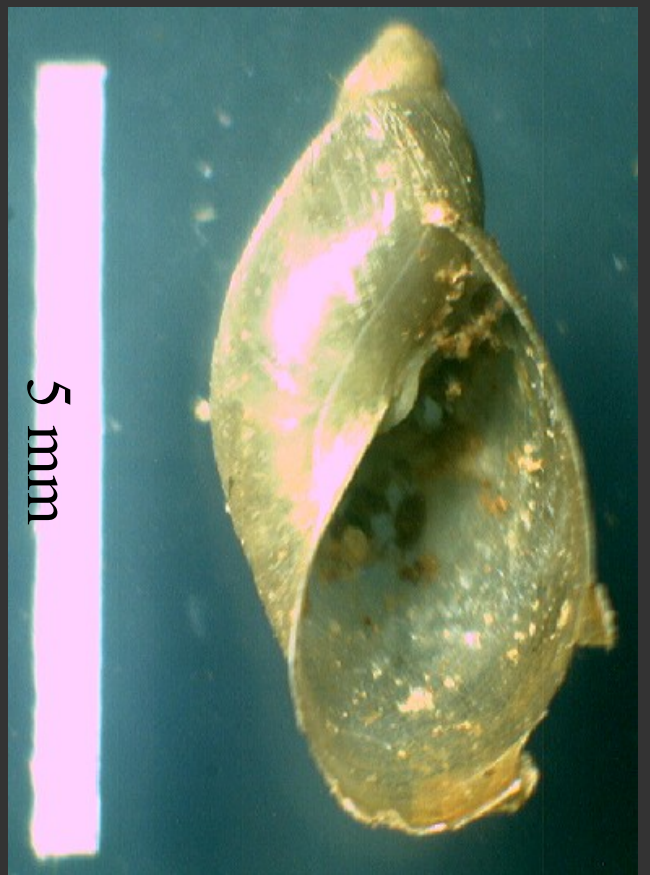
Bio-indicators

- Limited migration patterns.
- Significant role as links in food chains.

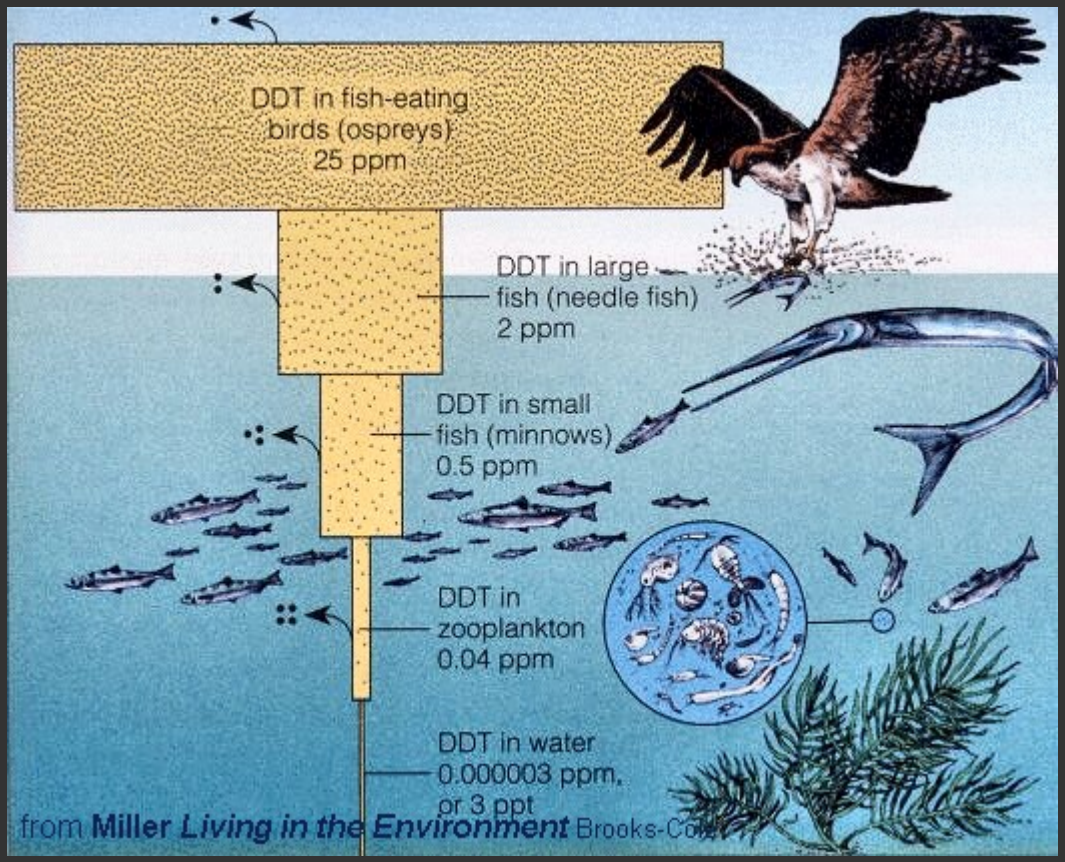


Warning signal

- *Thiara* and *Indoplanorbis* thrive in slightly polluted environments.
- *Pseudomulleria dalyi* reside in highly specialized environments.
- *Lymnea* are thrive in polluted environments.



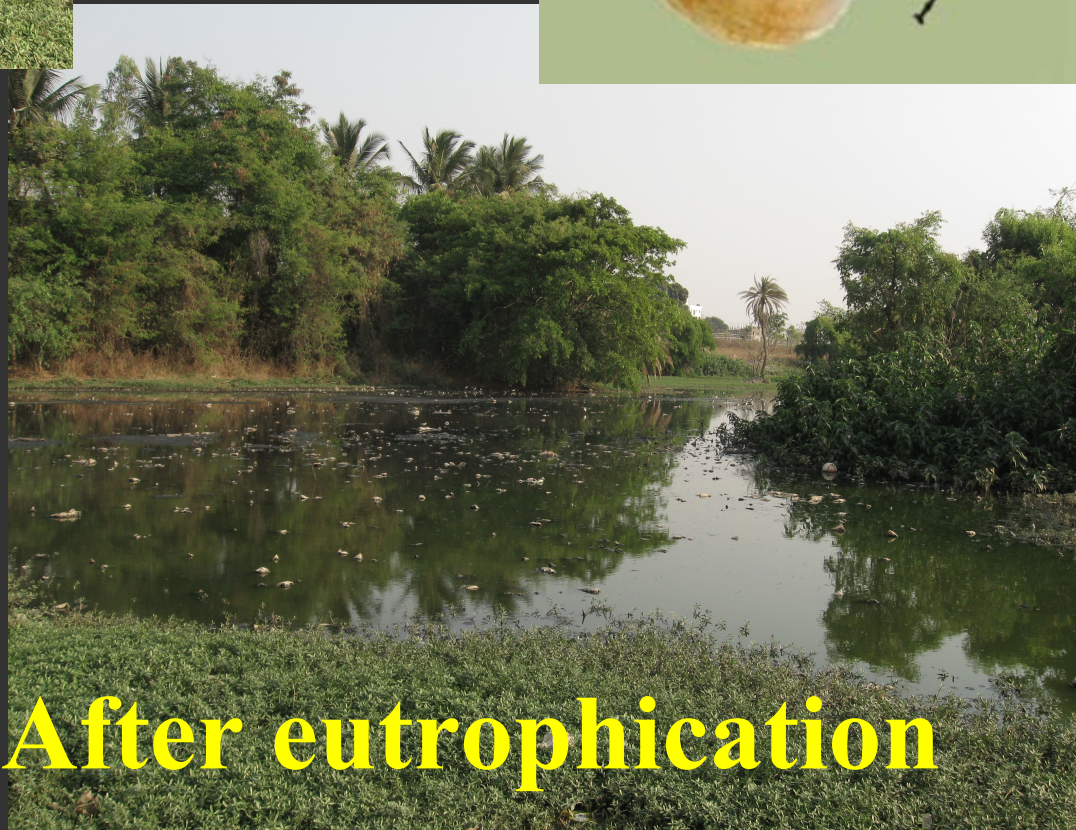
- Abundant in many types of freshwater environments.
- Bioaccumulation of pollutants in molluscs are greater than that in fish.



- Vectors of trematode parasites.
- Death shells reveals the past environment condition.
- It is the only invertebrate can live for many years (10 – 100 years in case of mussels)

Low cost

Mallathahalli Lake



Potential Use of Freshwater Molluscs for Monitoring River Pollution

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WATER MOLLUSC COMMUNITIES AND BIOINDICATION OF LOWER SALZACH FLOODPLAIN WATERS

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Molluscs in biological monitoring of water quality

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Suitability of Molluscs as Bioindicators for Meadow- and Flood-Channels of the Elbe-Floodplains

The Use Of Molluscs As Biological Indicators In Assessing Climate And Environmental Change

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Thank you!