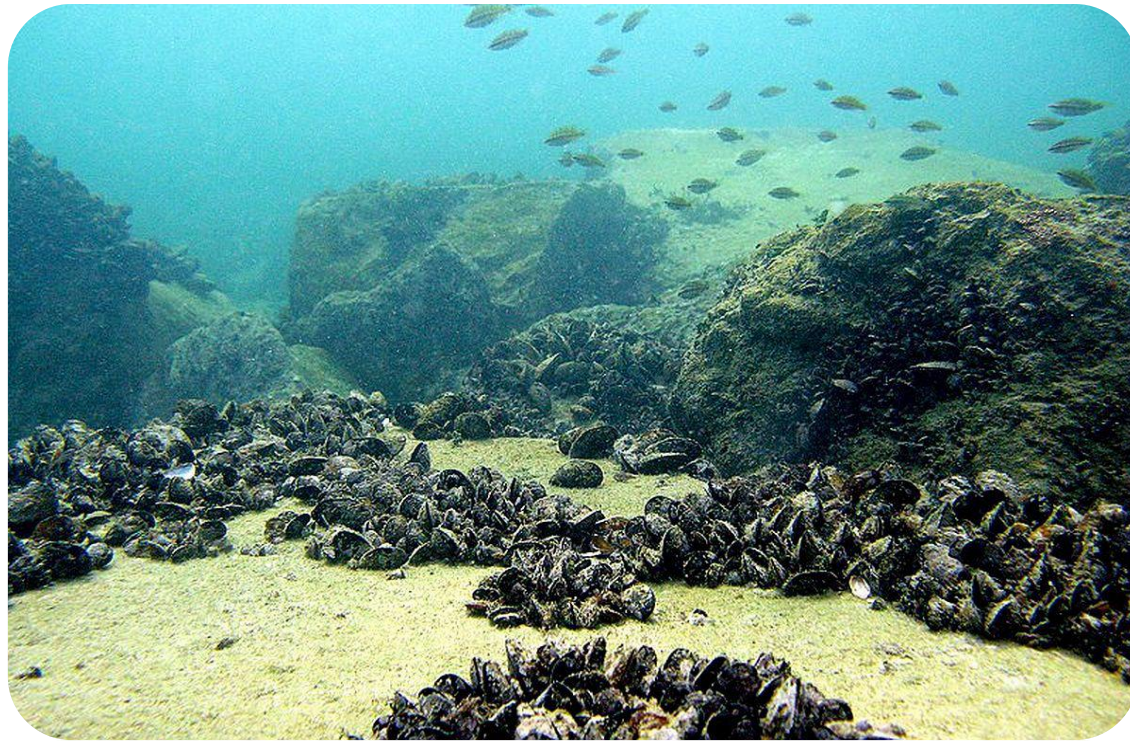




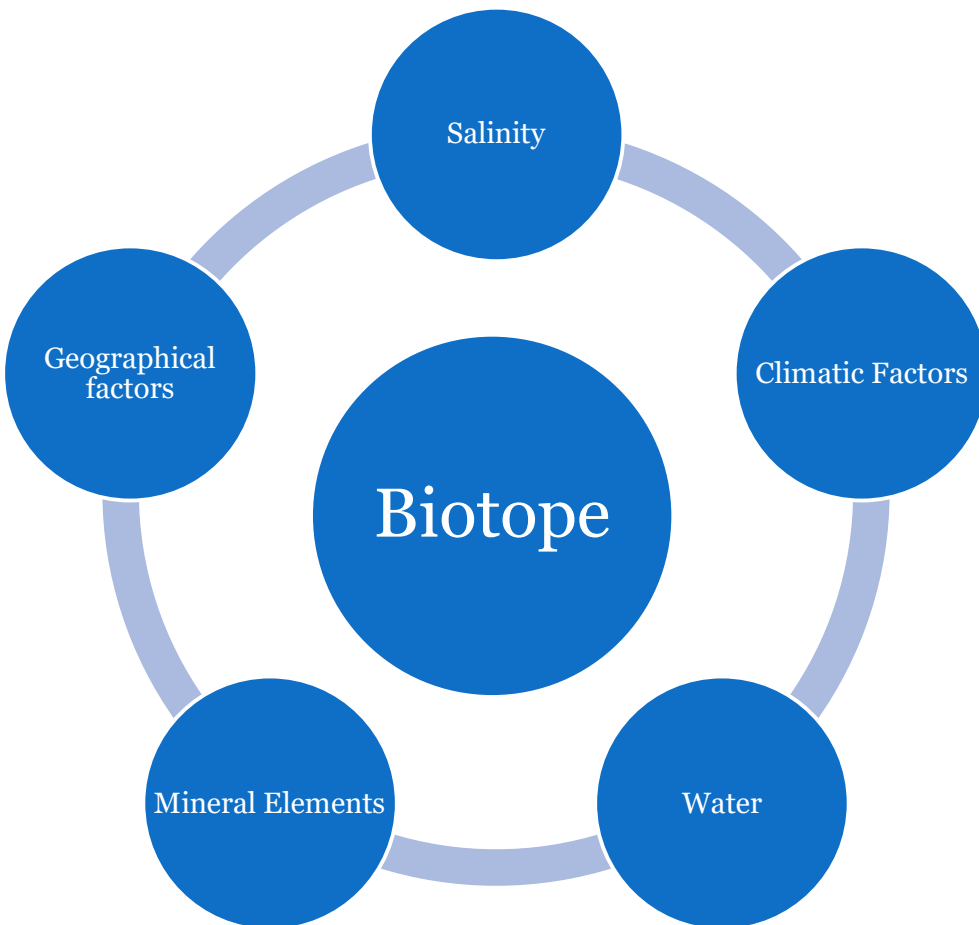
# The Black Sea Ecosystem

Andrei Ionas –Cls XI A  
Liceul teoretic “Avram Iancu”

- Although it does not have a high biological diversity, the Black Sea creates a complex ecosystem with unique features.



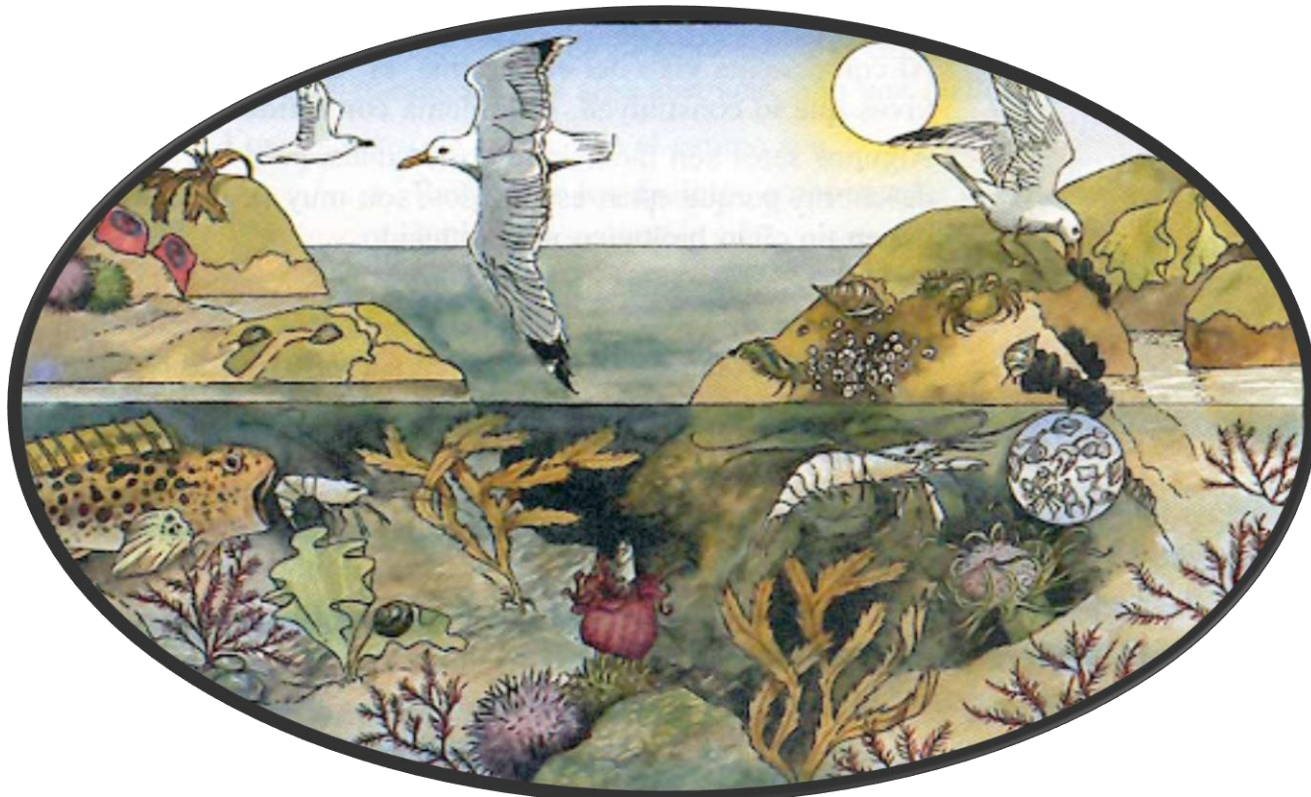
The elements of the the marine ecosystem are the biotope and the biocenosis





# • BIOCENOSIS

➔ Consists of all living organisms in the biotope, which belong to different species and are functionally interdependent



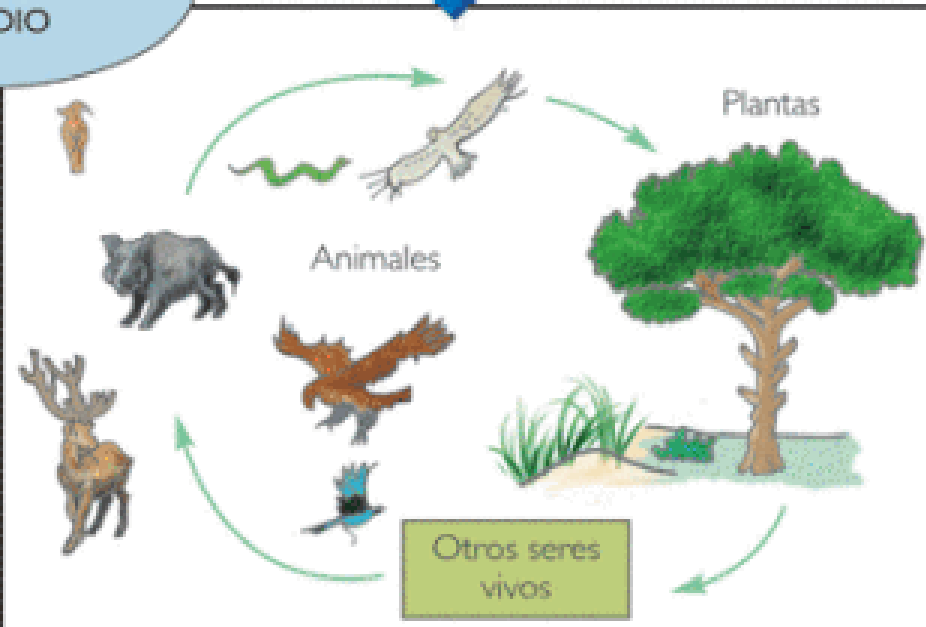
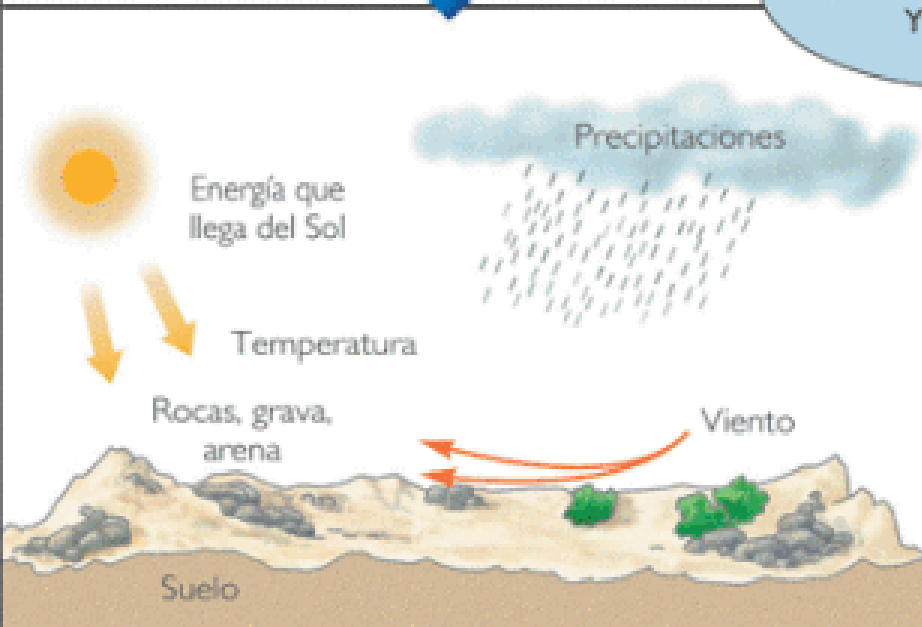
# ECOSISTEMA



## BIOTOPO

## BIOCENOSIS

### RELACIONES ENTRE SERES VIVOS Y MEDIO

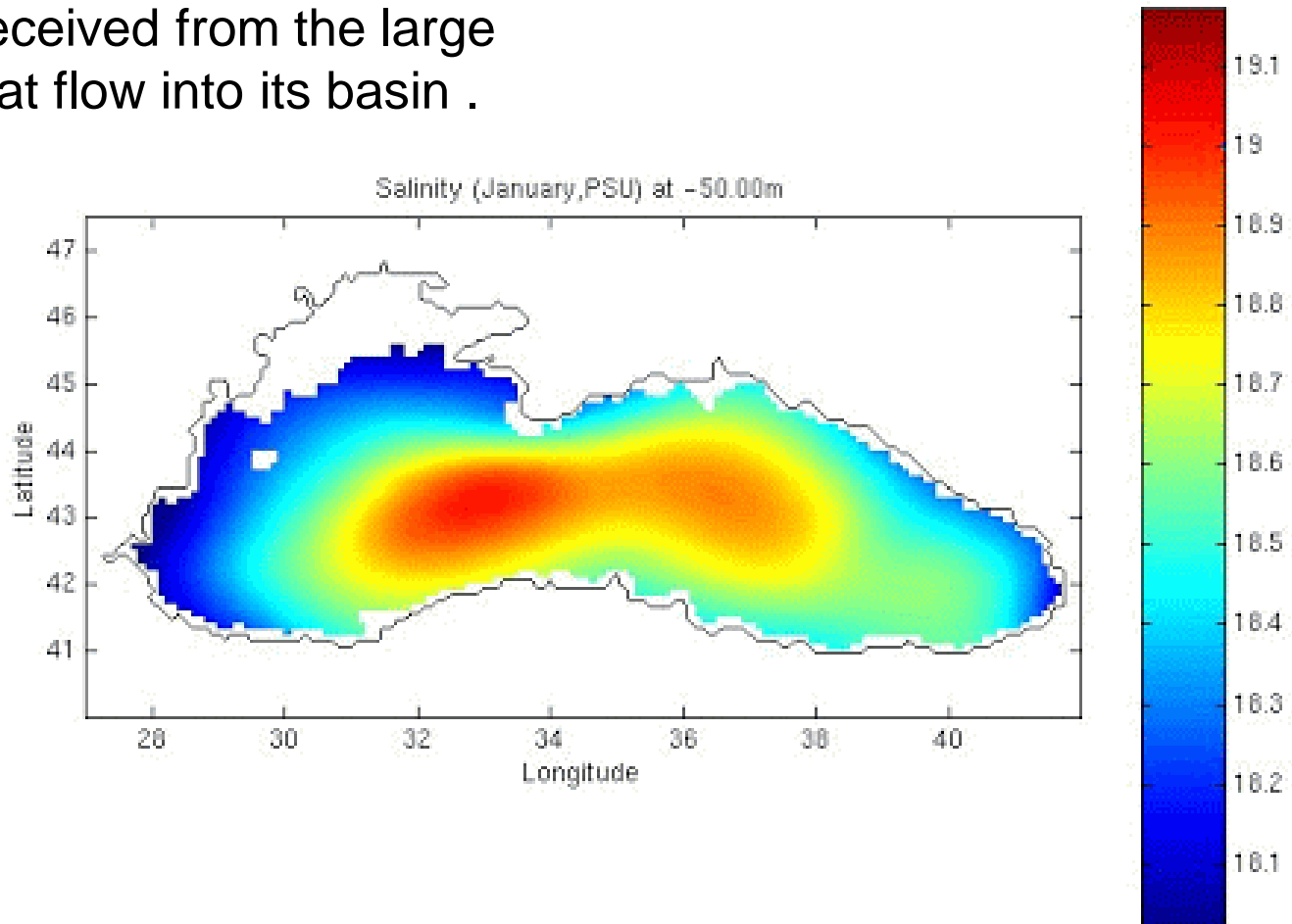


# THE BLACK SEA BIOTOPE

- The environment is composed of rocks, sands, mud, organic or mineral deposits



- A characteristic of the Black Sea is its reduced salinity, which is explained by the significant fresh water supply that is received from the large rivers that flow into its basin .

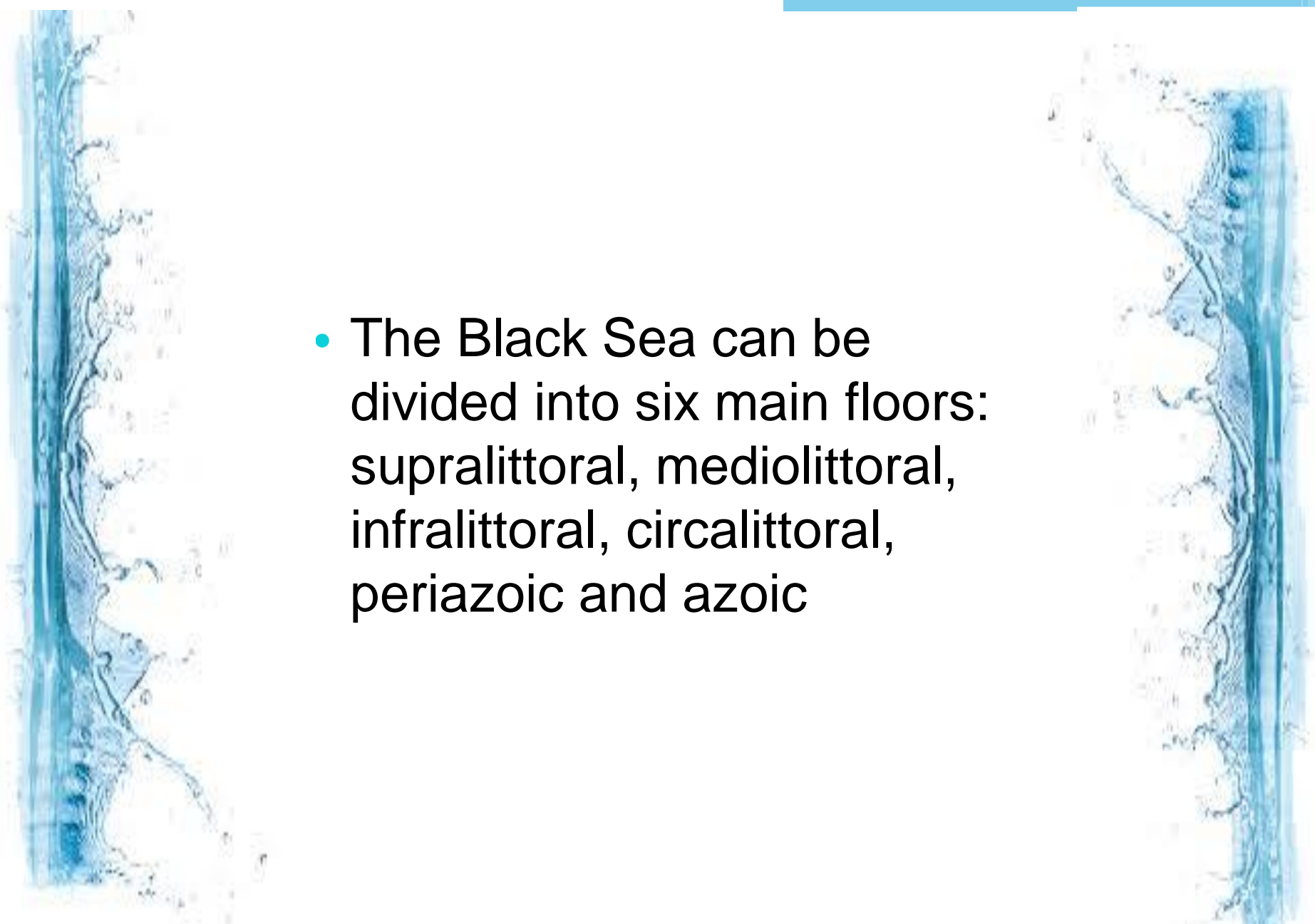




- The thermal variation is quite high during the summer months, when the waters reach 25 - 27 ° C. In the winter months, the temperature can fall below 0 ° C



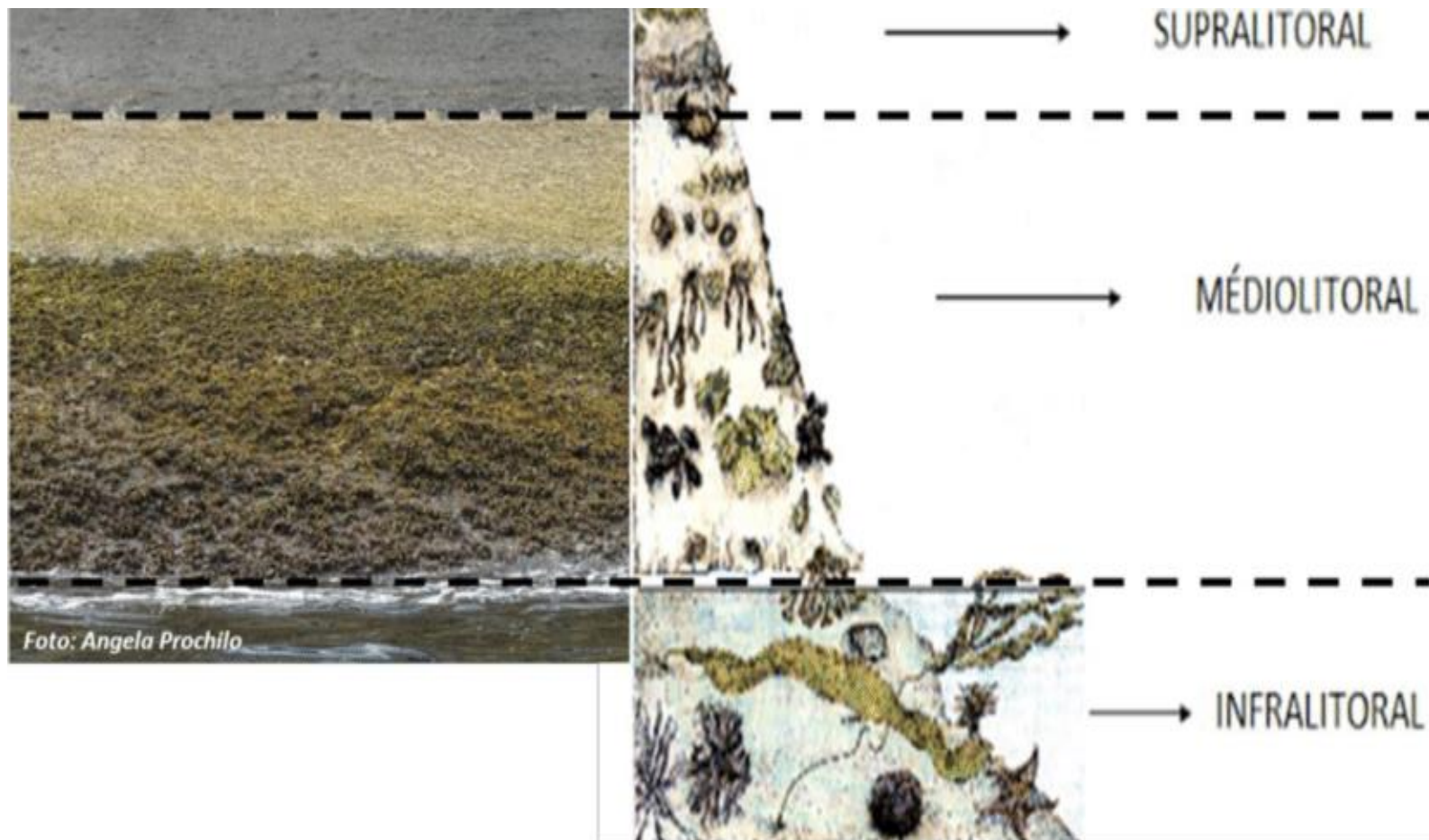


- 
- The Black Sea can be divided into six main floors: supralittoral, mediolittoral, infralittoral, circalittoral, periazoic and azoic

# The supralittoral floor

- It contains beach areas that are covered or sprayed by waves.
- The area has an increased humidity and floodability and it contains a large amount of organic matter brought by the waves





Modificado de: [samarahayashi.blogspot.com.br/2013/05/algas.htm](http://samarahayashi.blogspot.com.br/2013/05/algas.htm)



- The flora is mainly composed of certain forms of algae, rarely lichen
- The fauna includes numerous crustaceans, insects, worms and small predators, especially seabirds



# The mediolittoral floor

- The mediolittoral or pseudolittoral floor contains the breaking waves zone (between 0 and 0.5 m depth) and is divided into rocky, sandy or muddy areas.



# Mussel beds

- Stony areas represent a home for organisms that can withstand short periods of dehydration and can attach themselves to the substrate.





- Example: some species of seaweed and shellfish such as mussels.



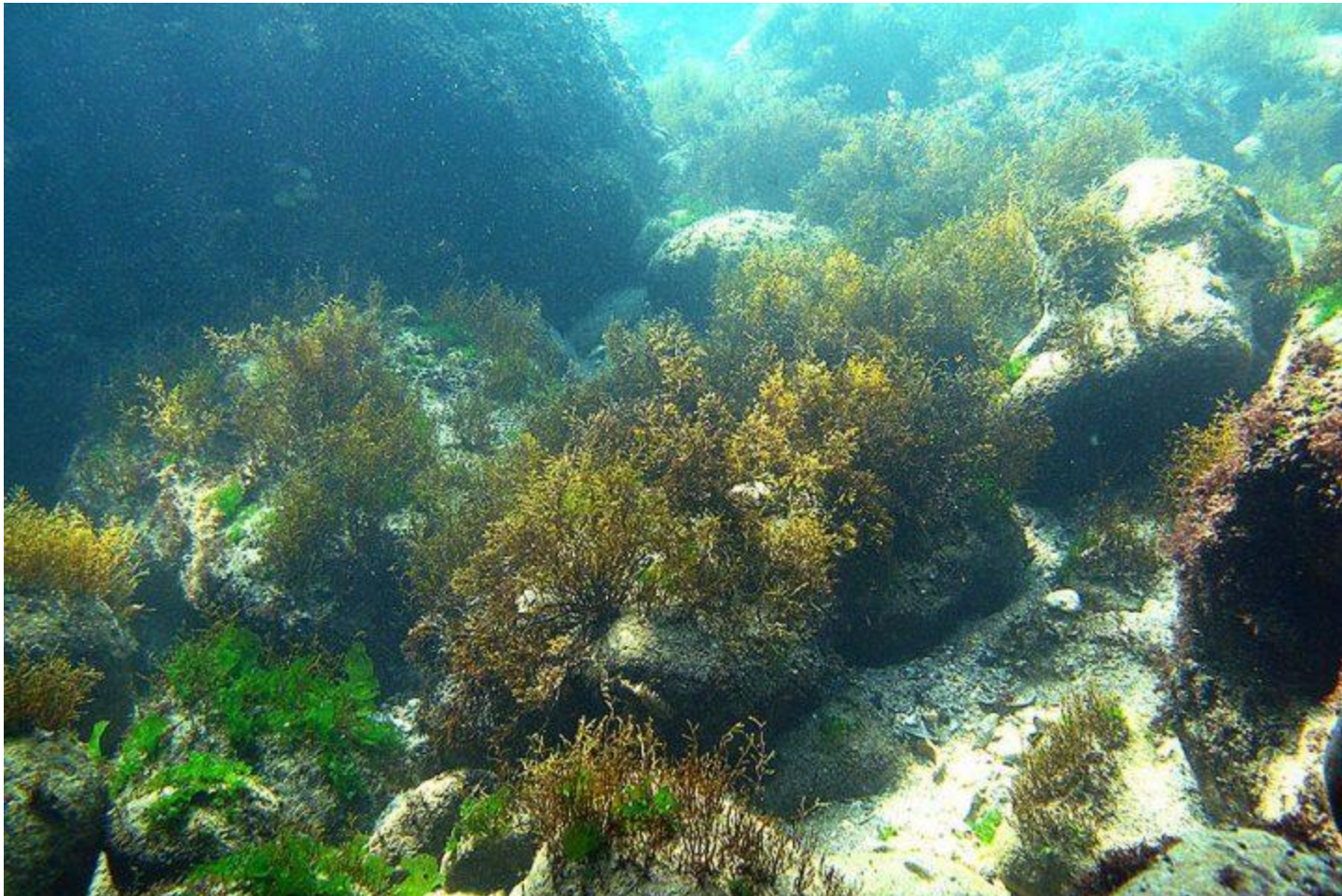
# The infralittoral floor

- The infralittoral floor is between 0,5 - 12 m depth.
- It is the most favorable area for life ,where many species of algae and numerous species of animals live.





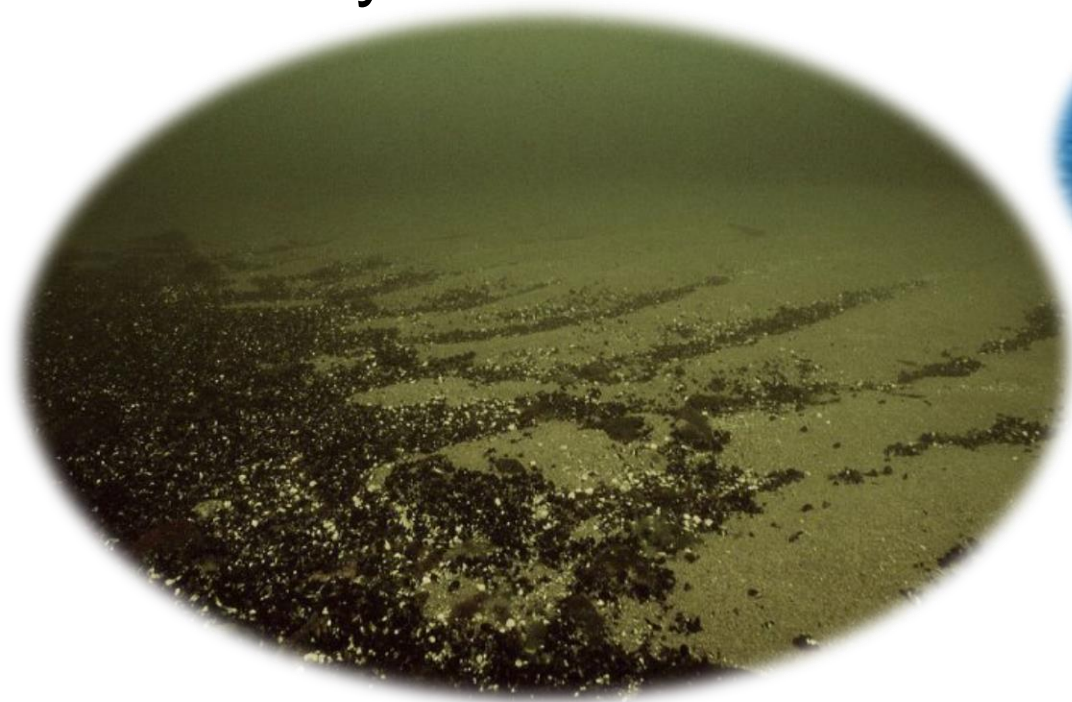
- the largest number of algae species are concentrated at depths of 1 - 5 m





# The circalittoral floor

- The circalittoral floor starts from 18 m to 100 m deep.
- In general, the bottom of the sea is muddy or sandy



The biocenosis in this floor consists of shells and worms, which represent the favorite food of various species of fish

# The periazotic floor

- This floor is situated between 100-150 m deep and it serves as a passage between the oxygenated water layer, which allows the life of the aquatic animals and plants, to the sulfobacteria layer, contaminated with hydrogen sulfide.
- The area contains a mixture of aerobic and anaerobic bacteria .

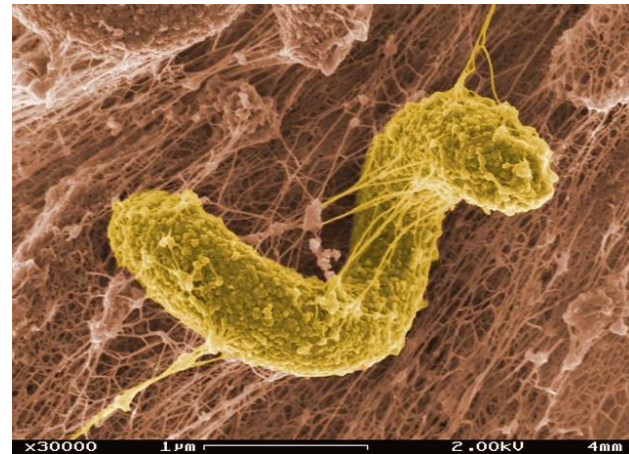


# The Azoic Floor

- The azoic floor starts from 150 to 200 m and descends to the maximum depth of the Black Sea (2,212 m). The only existing species are sulfur-reducing bacteria (*Microspira*, *Desulfovibrio*).



*Microspira*

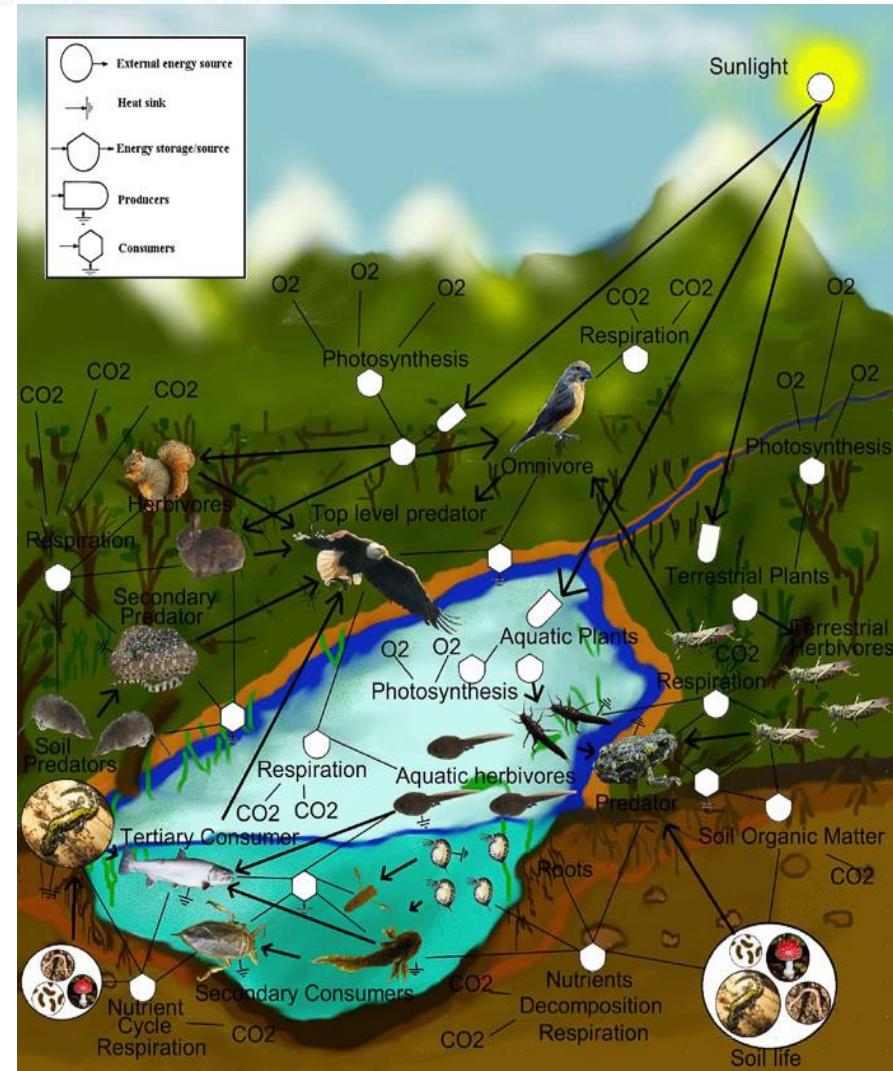
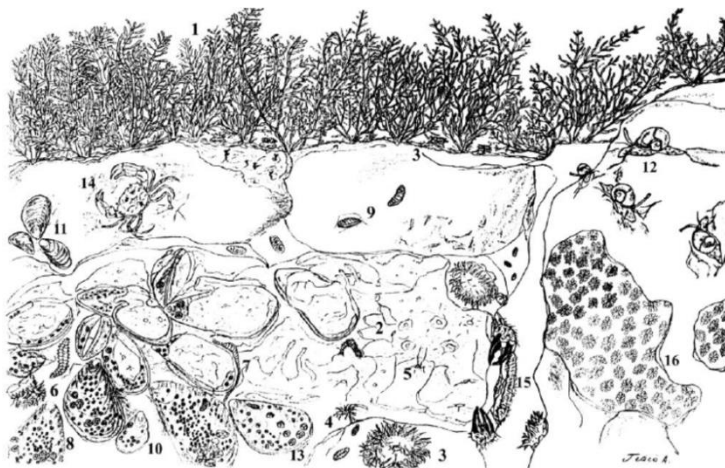


*Desulfovibrio*

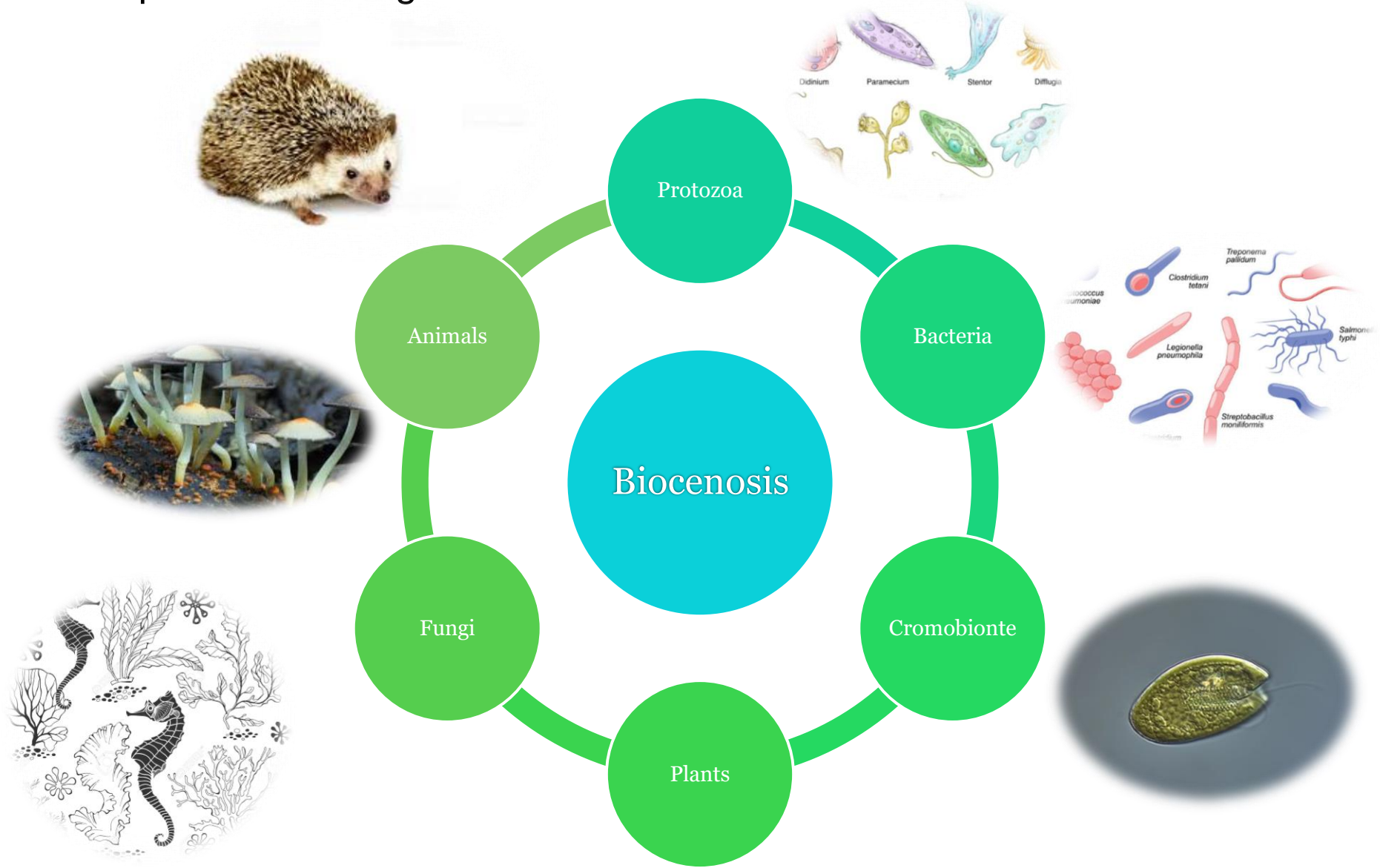


# THE BLACK SEA BIOCECENOSIS

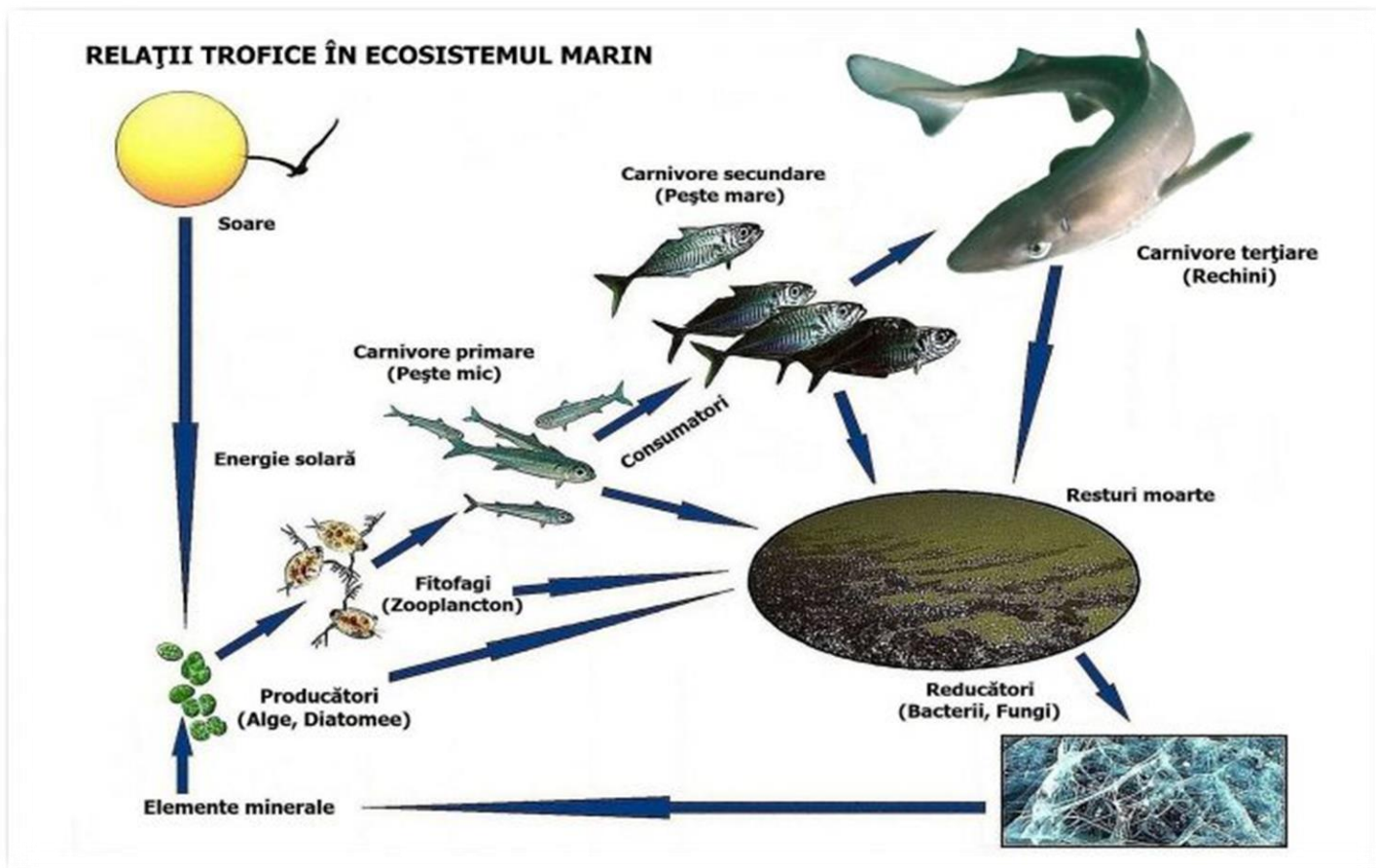
- The structure of the biocenosis is determined by diversity, number of component species and the relationships between them.



- The Pontine basin is made up of 5,000 species, out of which 3,244 species were registered in the marine areas of the Romanian coast.



- Trophic relationships are created between the living creatures in the biocenosis ecosystem.
- The most important trophic relationship is the nutrition
- This takes place between producers ,consumers and decomposers.





- The consumers are some heterotrophic organisms which use other life forms as a source of energy (food)



## CONSUMERS

primary consumers

zooplankton,  
molluscs, fish

secondary consumers

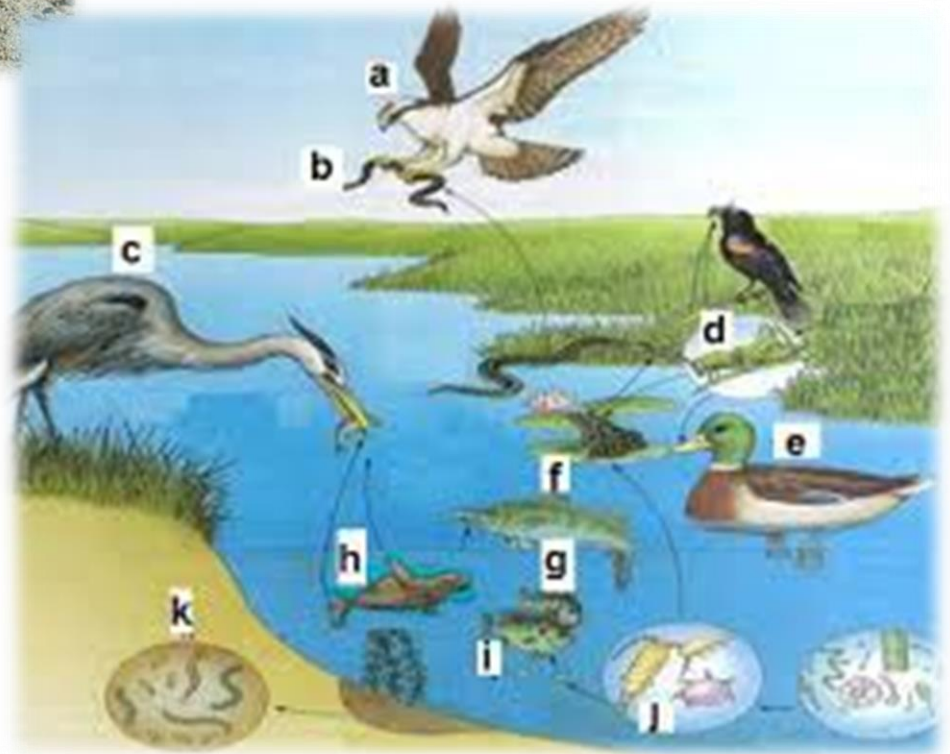
crustaceans, fish,  
birds, marine  
mammals



Spiny dogfish



Seagull

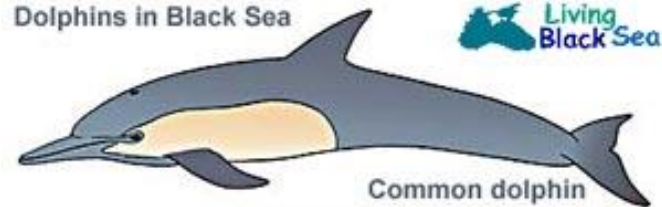


- We can find four species of marine mammals in the Black Sea:

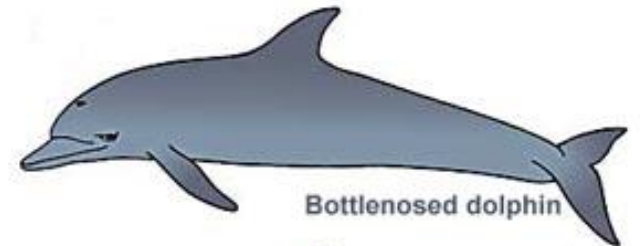
1. the monk seal (*Monachus monachus*)
2. the harbour porpoise (*Phocoena phocoena relicta*)
3. the common dolphin (*Delphinus delphis ponticus*)
4. the bottlenose dolphin.



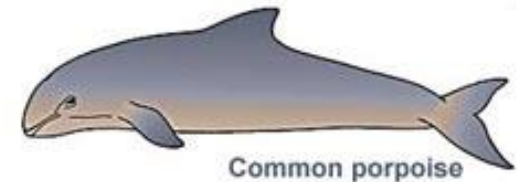
Dolphins in Black Sea



Common dolphin

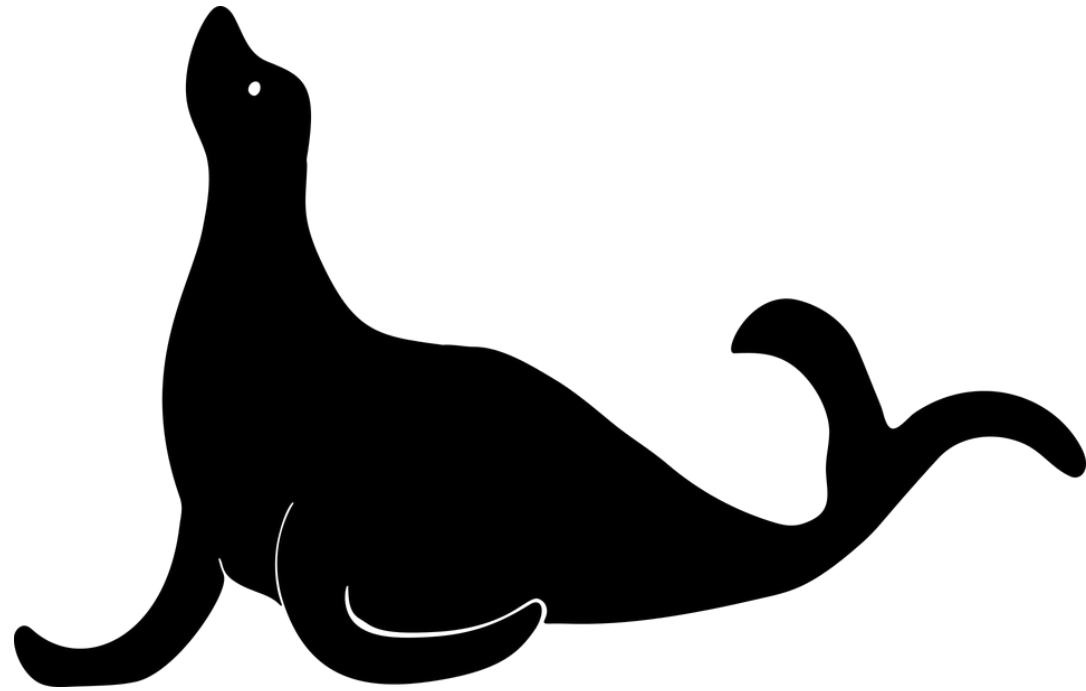


Bottlenosed dolphin



Common porpoise





- All four species have been reported in the past on the Romanian shore. At the moment, the seal is missing from the Romanian coast and the three dolphin species experienced a drastic decline in the last decades of the twentieth century

# Monk seal

- It is one of the largest seals in the world, with a body length of 2 - 3 m and a weight of over 250 kg
- Under its skin, the seal has a layer of fat of 5 cm, which helps maintain the internal temperature.
- On average, the monk seal lives for 20 years.



# Harbour Porpoise

- It is a sociable animal that lives in small groups of 2 to 5 specimens
- The average weight of the Harbour Porpoise is about 40 kg
- The colour ranges from black-gray glossy on the back to white-gray on the abdomen





# The common dolphin

- Groups of 10 to 15 individuals, couples or isolated individuals approach the coast, especially in the summer, in August.
- This species has a supple body with a length of 1.8 - 2.6 m and a weight of 75 kg



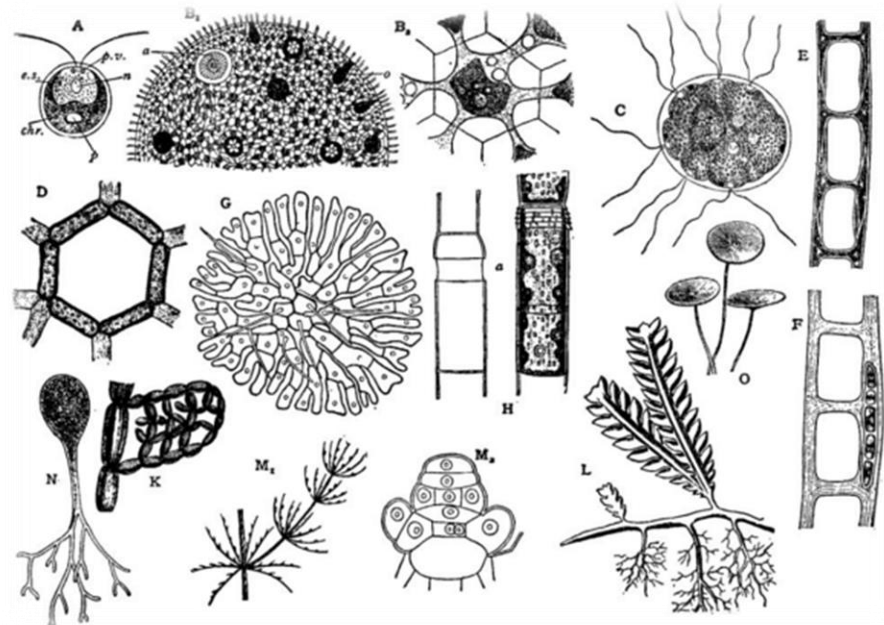
# The Bottlenose dolphin

- The dolphin has 40 to 52 well-sharpened teeth on each jaw
- The weight of mature specimens varies between 136 and 635 kg
- The lifespan is about 40 - 45 years



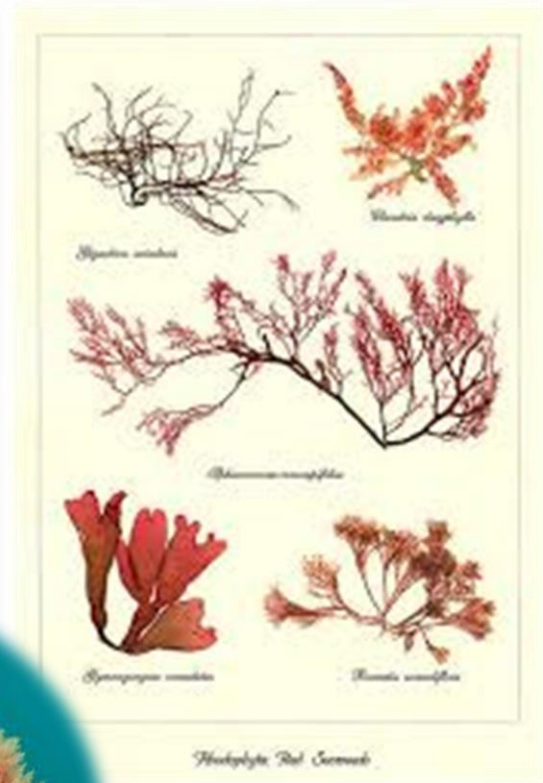
# Marine vegetation

- The most popular components of marine vegetation are algae.
- There are three large groups of algae:
  - 1.) Chlorophyta: it is distinguished by the presence of chlorophyll a and c next to which there are different types of pigments: yellowish, yellowish-brown, brown





2.) Rhodophyta: characterized by the presence of chlorophyll a and d, as well as the presence of red pigment.



- 3.) Clorophyta:
- is characterized by the presence of chlorophyll a and b.
- The Green pigment predominates due to chloroplast.
- Reproduction is mainly sexual







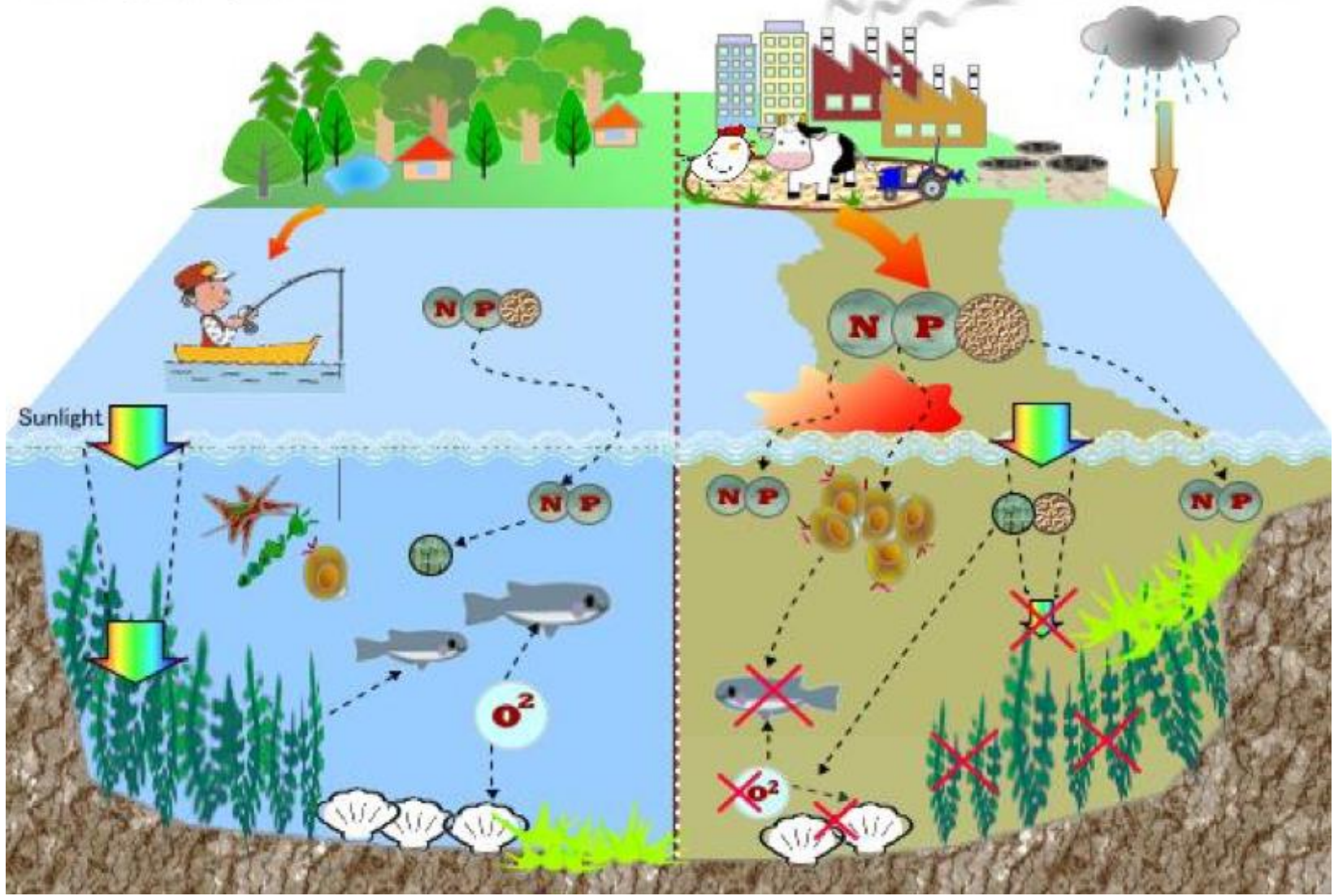
- The increasing amount of nutrients (Nitrates and Phosphates) that reach in the Black Sea water due to the extensive use of agricultural fertilizers and leads to the **explosive propagation of alga.**





Healthy ecosystem

Eutrophic ecosystem

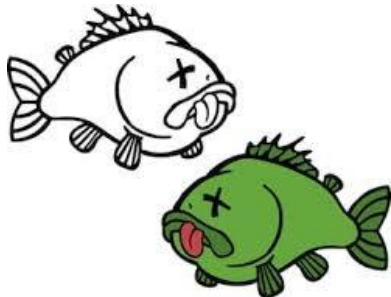


# Effects of algae propagation in the black sea

- The massive consumption of the oxygen from water



- The extinction of plant structures and animal populations



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- The appearance of algae waves on the shore



# Bibliography

- <https://bit.ly/38OqAnP>
- <https://ecomareaneagra.wordpress.com/ecosistemul/>
- <https://bit.ly/39VnpuY>
- <https://bit.ly/2vQtdaq>
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- <https://bit.ly/2vYJwlh>
- <https://ecomareaneagra.files.wordpress.com/2018/11/etajul-supralitoral.jpg>
- <https://bit.ly/2HKHliM>
- <https://bit.ly/2T86i2f>
- <HTTPS://BIT.LY/2WWSVUH>
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- <https://bit.ly/2ufXBdE>
- [https://en.wikipedia.org/wiki/File:Chondrus\\_crispus\\_-\\_K%C3%B6hler%E2%80%93s\\_Medizinal-Pflanzen-034.jpg](https://en.wikipedia.org/wiki/File:Chondrus_crispus_-_K%C3%B6hler%E2%80%93s_Medizinal-Pflanzen-034.jpg)
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