

Lecture 10/30/2014

Remember- Zooplankton are floating "animals" but they are protists.

Choanoflagellates

- Characterized as "zooplankton"
- Strictly marine
- Unicellular/colonial organisms
- Heterotrophs- (rely on organic carbon that they take in) Feed on protists (phytoplankton) and prokaryotes

Oomycetes- water mold (lack chitin so not fungi)

- Common in aquatic, wet soil
- Heterotrophs- **osmotrophy**- release enzymes into environment when they encounter organic matter (food) → enzymes then break down organic matter (external digestion) → Products of digestion absorbed by water molecules
- Forage on crops
Ex: *Phytophthora infestans*- Caused great Irish potato famine. Fed on potato plants which destroyed the main crop of Ireland. ~1 million deaths and 1-2 million people left Ireland

Protists are organized by their structure and function

Attached Protists

- Attached to some substrate → rocks, soil, sand, etc.
- Often critical components of food webs → provide food/habitat (structure)
 1. Ex: Green Algae (chlorophyta)
 - Multicellular- subdivision of labor among cells
 - Autotrophs

Found in freshwater (chara) and marine systems (Ulva or sea lettuce)

2. Brown Algae (Stramenopila)
 - 99% are marine, multicellular, and autotrophs
 - Often dominant organism in ecosystems
 - Have gas bladders- act as buoys holding up kelp in H₂O column
 - Holdfast- the anchors that keep kelp in place (NOT roots)

Period of Kelp Forests disappearing → sea urchins love to eat kelp and sea otters love to eat sea urchins → sea otters were killed off and urchins were able to multiply and destroy large portions of kelp forests.

Sea otters= **keystone species**- when you pull species out everything collapses

- Kelp forests → increased bio diversity
- Shark, dolphins, whales, etc can all live in kelp forests
- Healthy kelp forests = increase food/structure

3. Red Algae (Rhodophyta)

- Red: pigments allow them to live at deeper ocean depths than other algae
- Autotrophs- still need light
- Red pigments allow them to use the few light wavelengths hitting these depths
- Found in deep water coral reefs → provide food/structure
- Used in sushi → "nori" = "seaweed"
- Agar: used as growth medium for microbes
- Carrageenan- food additive → used to gel/solidify foods

Plasmodial Slime Molds

- Terrestrial- found on forest environment/ grasslands
- Heterotrophs (osmotrophs)
- Feed on decaying organic matter (plants, animals, anything really), fungi
- Huge, unicellular organism - also multinucleate

Shares a common cytoplasm which makes it efficient in moving inner material

Mobile

- Reproduce through **sporangia** → loaded with spores then pops and spores are spread by wind to a new location (very long-lived) → Once condition (temperature/moisture/food source is right
- They move (like amoeboid) towards food source
- Once they get there the whole organism begins to grow through energy, nutrients (carbon, nitrogen, phosphorous) taken in through osmotrophy and whatever they dissolve on one side goes to the other.
- Because they are so efficient at finding and moving organic matter, they are used in research on logistics/transportation

Ex: Shinkansen train system

Simulate Japan's topography and use food as stops on train route. Then the slime mold was put into the simulated Japan and they observed how it moved. The slime mold showed them the most effective routes (look like vein structures)

Video for this experiment can be viewed here <https://www.youtube.com/watch?v=BZUQQmcR5-g>