(Protists continued)

Apicomplexa

- Pathogens/parasites protists
- Genus-*Toxoplasma*- "cat scratch fever"→ children's sandboxes used as litterboxes by local cats spread pathogen
- Genus- *Cryplosporidum*- water treatment plant failure causes this
- Genus- *Plasmodium*-
    - causes malaria
    - ~200 species→ 5 are significant human-effecting parasites
    - *Plasmodium falciparum*- most common in Africa
        - ~85-90% of malaria deaths worldwide
        - Requires 2 hosts:
            1) Mosquito
                a. Only single genus (*Anopheles*)
                b. These organisms don't get sick→ intermediate host is called a **vector**
            2) Vertebrate
                a. Birds of Hawaii→ avian malaria
                b. Reptiles
                c. Amphibians
        - Blood parasite- hides within blood cells which saves it from the immune system
        - Transferred through saliva of female mosquito
            - 9-30 days before it becomes effective
            - Goes through 36 hour life cycles
            - Every 1.5 days the infected get 4-6 hours of headache, sweating, shivering, and incredibly high fever
            - The high fever leads to brain damage
        - Respiratory distress and major organ dysfunction
        - ~200-250 million cases globally→ 1 in 10 people die and 1 in 5 children die
        - 1 child death every 30 seconds
        - Range of drugs used for treatment
            - This selects for resistant strains to a drug due to the effects of selection
        - Vaccine development continues…
        - LLINs- get around using drugs
            - Ross→ reduce bite rate= reduced infection
            - Developed long lasting insecticidal nets which have greatly reduced malaria prevalence/deaths
        - Where is plasmodium malaria?
            - South America, Central America, Africa, Middle East, Asia,
            - Hotspot is around the equator

- Used to be in the United States→ drained swamps
  - Can be seen in outbreaks when individuals bring parasite from other places. Why? North America still has the right kind of mosquitos

End of material for Exam 3

Plants

Helped organisms come out of water

1) Oxygen production
2) Fossil Fuels→ Peet→ fossilized plants for fuel
3) Cosmetics and pharmaceuticals
4) Clothing
5) Breakfast

Phylogeny through major evolutionary changes (flow chart)→ will be posted on Blackboard

When did they first appear?

- 5 MYA - 1 billion years after the first prokaryote
- Oldest fossils resemble green algae
- Land plants likely evolved from green algae

2 Goups in transition from H2O to Land

Likely driven by green algae

1) Charophyta (skunkweed)
2) Chlorophyta (Ulva)

Charophyta

- Freshwater
- Genome- level analyses suggest that these are the closest living relatives

What led green algae to move to land?

- Water levels dropping
- Changes in abiotic characteristics
- Competiton
- Driven by green algae→ selection pressures associated with habit change and resource competition.

What did an early plant's metabolic needs look like?

- Autotrophy- energy in carbon necessary for growth/reproduction
- Heterotrophs- organic carbon for energy
    - Example: Venus fly trap
    - Mixotrophs- use autotrophy and heterotrophy
    - Strict heterotrophs- NO autotrophy
        - Example: Parasitic plants

Shamrocks, trees, roses→ autotrophs

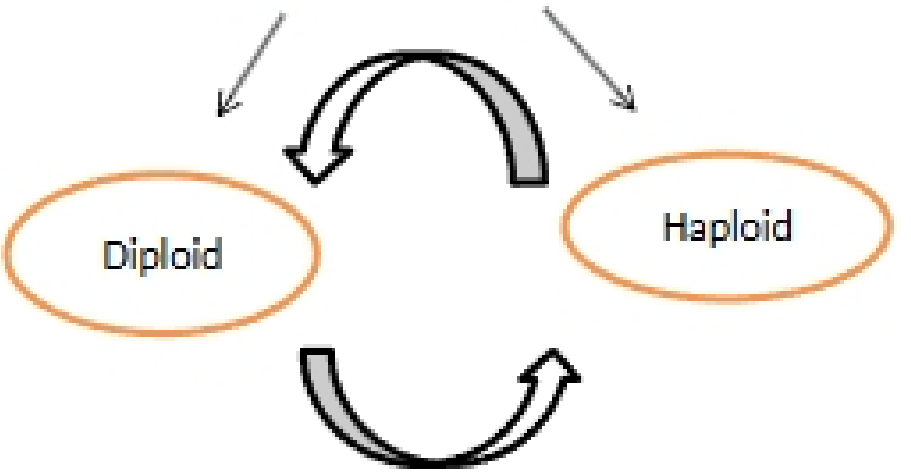
Heterotrophs and autotrophs→ Pitcher plants- produce nectar and bugs are attracted and trapped in nectar with down pointing hairs so bugs can't climb out.

Parasitic Plants→ beech drops- parasites of roots as beech trees

Reproduction of Plants= Complex

Complex Life Cycle

Alternation of generations→ Independent life stages → Based on the number of chromosomes



Humans: 46 chromosomes→ diploid

Diploid: 2n = n chromosomes from mom +n chromosomes from dad

Haploid= Sperm and Eggs

Egg + Sperm = zygote (diploid embryo)

Plants have independent haploid/diploid stages:

1) Gametophyte: haploid: n → Bryophyte Dominant
2) Sporophyte: diploid: 2n→ Angiosperm Dominant

Movement from H2O →Land

- Moisture→ keeping/finding it is important
- Gravity/Support→ selects for certain structures that increase stability
- Nutrient/water acquisition