

## Chapter 30 Plant Bio Diversity

- Plasmodium spp (species)
- → Plasmodium falciparum
- bitten by an Anopheles mosquito
- transfer parasites in saliva
- severe fever/headache
- 4-6hr long, recur every 1.5 days
- death can occur w/in days\
- 250 million years cases - 1 milli die → deaths can be ^ as 10% of cases results in death-most often children 1/5 children deaths
- historically, chloroquine was used
- selected for resistant malarial parasites
- indoor spraying of insecticide, long-lasting insectidal nets

### 1<sup>st</sup> 3-Algae-Protists

- then move from H<sub>2</sub>O to land

### What is a plant?

- Autotrophic plants → Photosynthesis for the C + E needs → selective pressure has enhanced this process
- → chlorofil a,b → pigments enhancing energy production

### Heterotrophic plants:

- venus fly traps
- a few strictly heterotrophic plants
- parasites on other plants
- very complex life cycles
- → all follow "alternation of generation"
- possess cell walls
- ^ rigidity of plants
- cellulose, lignin (structural polysaccharids)
- multi-cellular
- eukaryotic → have both chloroplasts + mitochondria
- 1 billion years for land plants to appear likely derived from aquatic protists

### Green algae

Chlorophytes → uni-multi-cellular ulva

Charophytes → Chara: skunkweed → closed living relative of land plants based on genome analysis

### Challenges- water → land

- being able to get nutrients
- dehydration- getting H<sub>2</sub>O (roots, rhizoid)
- -retaining H<sub>2</sub>O chydophobic, waxy coating on leaves/ stan + storage in roots
- structure
- new diseases
- lots of herbivores
- less protection to sunlight + other, atmospheric characters
- no organic water soil

Charophytes- MC green algae

→ water *challenging* → Land

-free- floating      -gravity-based environ.  
environ.

Capturing      /      retaining H<sub>2</sub>O

-roots, rhizoid      -hydrophobic waxy coating on leaves/ stems  
                                 -storage in roots

- structural stability → GRAVITY
- → rigid cell walls
- → incorporating cellulose/ lignin (woody tissue)

Nutrient Uptake

- where will C,N,P come from
- → relationships w/ N-fixing bacteria
- → roots for uptake
- facing herbivores (eating live plant tissue)/ granivores → seed-eaters
- → plants have toxins 2<sup>o</sup> cpds (secondary compounds)
- thorns, spines
- protective seed coverings
- grasses grow better/ faster when faced w/herbivory
- Seasonal change → adapt life cycles to periods of dormancy (winter) and rapid growth (spring, summer)

Plant Life cycles

- alternation of generations
- common to all plants, multi-cellular green, red, brown algae

Diploid vs Haploid

- with respect to chromosome #

For Humans

- we each have 46 chromosomes
- Diploid # of chromosomes

Diploid:  $2n = n(\text{mom}) + n(\text{dad})$

- each mom parent provides a haploid (n) # of chromosomes

$2n(\text{embryo}) = n(\text{mom}(\text{egg})) + n(\text{dad}(\text{sperm})) = \text{gametes always have haploids}$

- unicellular

Plants have independent haploid & diploid life stages so alternation of generation results from

Haploid life stage (n)

→ Diploid life stage (2n)

Alternation of Generations

**Gametophyte** (haploid) n- produces egg + sperm

→ Mitosis = Egg + sperm = fertilization (joining of egg & sperm)

→ 2n (zygote)

→ 2n (embryo)

- Sporophyte (2n)- diploid
- sporangia
- 2n (spore mom cell)
- Meiosis
- O spore
- cycle back to **Gametophyte**

#### Earliest land plants

- Bryophyta (mosses, liverworts, hornworts)

#### Bryophytes

- no internal plumbing (no vascularization)
- no way of moving H<sub>2</sub>O/ nutrients around
- require moist/wet habitat
- often associated w/aquatic habitats, saturated soils

#### Bryophyta

- grow close to the ground
- no true leaves, leaf like spikes
- very simple aggregations of cells
- no true roots (hold plant in place)
- have rhizoids (absorb H<sub>2</sub>O (sponge))
- H<sub>2</sub>O is drawn into plant along single long cells

#### Gametophyte: dominate life stage (n)

#### sporophyte

- present for short period of time
- produce haploid spores (from diploid spore mother cell)
- hornworts (sporophyte → gametophyte → gametophyte → liverworts → sporophyte)
- mutualistic (+,+0 relationship w/cyanobacteria (get carbon of glucose))
- N-fixers
- atm \* N<sub>2</sub>
- → ammonia
- → increased plant growth

#### Bryophytes: Tracheophytes call other plants all have vascularization (internal plumbing)

420 million years ago → Cooksonia sp.  
possessed vascularize

- vascularization
- → plumbing in shoots/stems, roots, leaves

#### xylem

- large holes in trees → moving H<sub>2</sub>O dissolved minerals → upward
- phloem
- → smaller holes in trees → hormones, nutrients (food) moves everywhere
- once H<sub>2</sub>O gets to the leaves it can be released through transpiration.