Survey of Bio.
Wk. 13

Thripp
Survey
Pg. 1

MON, 2009-11-23, 8-9:20 AM: Cutting down trees is bad if done in excess — the ecosystem may not recover.
Plants are multicellular eukaryotic organisms that perform photosynthesis — however algae are excluded because they are underwater and don't have a waxy cuticle
All plants have a cuticle.
Leaves perform photosynthesis. — have stomata for gas exchange
All plants have embryos retained in the mother.
All plants evolved from green algae. Some green algae mutated a waxy cuticle to survive on land.
Green algae = charophyceans (not plants — Protista)

Bryophytes, ferns, gymnosperms, & angiosperms are all plants.

- Bryophytes: avascular, flagellated sperm, centrioles
- ferns, gymnosperms, & angiosperms: vascular
- gymnosperms & angiosperms: seeds
- angiosperms: flowers

Grass & spanish moss are angiosperms — flowering plants.
* Bryophytes (mosses) are the first land plants but are avascular.
They have no vein system for water & mineral transport.
→ waxy cuticles & retention of embryos = Plantae!
defining chacteristics of plants → requires water to swim in
Bryophytes have flagellated sperm (not pollen) & lack a vascular system. || Alternation of Generations: gametophyte
(1N) g: gametophyte = make haploid (1N) gametes by mitosis
g: generation
sporophyte. (2N) g: sporophyte = make spores (1N) by meiosis
The gametophyte makes gametes by mitosis.
The haploid gametophyte is larger in bryophytes.
The diploid sporophyte is smaller in bryophytes.

MON, 2009-11-23, 8-9:20 AM:

Spores are not seeds — they are generations.
The sporophyte plant (2N/diploid) makes spores by meiosis.
The spores themselves are 1N/diploid and they make new gametophytes, which then make eggs or sperms which swim through moisture to find eggs. The zygote grows into a sporophyte, the 2N sporophyte plant releases 1N spores, which plant themselves & become new mosses.

Antheridia = male sperm
Anther = male

FERNS (pteridophytes) = first plants to evolve a vascular
#2 system. Xylem carries water, phloem carries sugar.
↳ roots to leaves ↳ leaves to plant

vein in ferns, gymnosperms & angiosperms

Ferns are seedless! They have centrioles, and flagellated sperm.

Ferns are the only seedless vascular plants.
The fern is the diploid sporophyte.
Diploid sporophytes make haploid spores by meiosis, which are tiny. They make the gametophyte generation.
Ferns formed swampy forests across Europe, Asia, & North America ☺ 350M years ago, which become fossil fuels (coal, oil, etc.)

#3 Evolution of the seed: gymnosperms were the first seed plants (angiosperms also), and the first pollen plants (angiosperms also) — good for dry sex.
☺ Female pine cones are large & hard, male pine cones are tiny. Any pine cones you pick up are female.
Evergreen trees = gymnosperms
Deciduous trees = angiosperms

Mon, 2009-11-23, 8-9:20 AM:

Pollen grains are male gametophytes.

Gymnosperms have 3 terrestrial adaptations:
pollen, the seed, reduced gametophyte generation

The seed has a food source — itself.

* Mosses: sporophyte dependent on larger gametophyte
* Ferns: large sporophyte & small, independant gametophytes
* Seed plants: reduced gametophyte dependent on larger sporophytes
  ↳ gymnosperms & angiosperms

☺ Ferns are great because you can grow the diploid or the haploid.

We evolved from Protista & plants evolved from Protista.
Plants keep the gametophyte generation because they can't move
☺ Some giant sequoia redwood trees are heavier than 12 space shuttles.

A pine tree is a sporophyte which makes cones (male & female) with gametophytes, which fertilize each other & make a new tree.
Inside the pollen grain is a sperm nucleus which fertilizes the egg cell in the female gametophyte without water or flagella.

A seed consists of a plant embryo packaged along with a food supply within a protective coat.

#4: Angiosperms (flowering plants) include corn, rice, & wheat, providing nearly all our food.

Angiosperms — flowering plants. Gymnosperms = evergreen pine trees.

Ferns	FOOD	Gymnosperms	Ferns	Mosses
Bryophytes	Flowering Plants	pine nuts	sump	no food
	oranges, wheat, corn, rice	?	frond	
	grapes, asparagus, ?bamboo?		fiddle head	
			soup	

MON, 2009-11-23, 8-9:20 AM:

Angiosperm Life Cycle: Dominant generation is the sporophyte
Bees move pollen from flower to flower.
Anther makes pollen. Ovule develops into seed. Ovary develops into a fruit around the seed.
A pollen tube grows down to the flower's ovary (after it has been fertilized) to provide sperm. The ovule becomes a seed

TUE, 2009-11-24, 9:30-10:50 AM:

Bryophytes (mosses) → Pteridophytes (seedless vascular plants — ferns) → Gymnosperms → Angiosperms (flowering plants)
↳ (conifers — evergreens)
Ferns: Vascular system: food & water transport
* System of veins. Most bryophytes are very very small.
← moss (bryophyte)

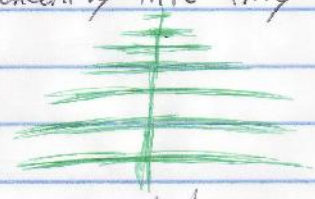
Terrestrial = land
Retention of embryo = first in plants, good for land } started w/
Waxy cuticle = first in plants, prevents water loss } bryophytes
Frogs can throw eggs & sperm in the water & don't assist.
Mosses have flagellated sperm & are avascular. ← both are bad for land
This means they lack 2 terrestrial adaptations: pollen & veins.
Bryophyte = moss (gametophyte — dominant (large) generation)
Sporophyte plant = smaller in mosses — make spores by meiosis.
Gametophytes are haploid so they can't have meiosis
Sporophytes are diploid so they produce haploid spores by meiosis
The spores plant & grow into gametophytes which send out eggs & sperm, respectively, on rainy days. The sperms fertilize the eggs to make new sporophytes which make spores by meiosis to make new gametophytes.

TUE, 2009-11-24, 9:30-10:50 AM:

Xylem carries water in the plant vascular system
Phloem carries food (sugar) — think ph for f in food
Ferns are seedless vascular plants. The bottom side of the leaves are the structures that make spores.
Antheridium make sperm on ferns. The fern is a sporophyte.
The sporangium on the underside of the fern leaves release spores which grow independently into tiny archegonium (w/ photosynthesis).

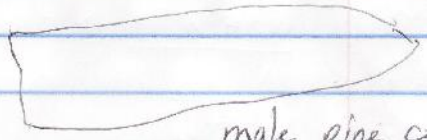
← actual size

gametophyte fern (tiny) — makes sperm or eggs to fertilize each other in moisture to make new sporophyte ferns



sporophyte (dominant larger generation)

First seed plants were gymnosperms. (conifers)
↳ includes Evergreens



male pine cone (actual size)

Any pine cone you pick up off the ground is female (larger)

Mosses = huge gametophyte → ferns = small gametophyte
→ gymnosperms & angiosperms = tiny pollen grain gametophyte
Gymnosperms' 3 adaptations: reduction of gametophyte, evolution of pollen (no flagellated sperm or water needed), the seed
However pollen is costly to make & it goes out in a wide radius.
Angiosperms pay bees to transport their pollen w/ a little sugar.
Male pine cones produce a couple of cells that are pollen, which have sperm nuclei which fertilize the egg cell in the female gametophyte (pine cone example).
Gametophytes produce eggs & sperm by mitosis.
* Sperm nuclei in pollen are not called sperm cells because they have no flagella

TUE, 2009-11-24, 9:30-10:50 AM:

Angiosperms		
Fruits	Corn	Vegetables
Kiwi	Wheat	Cabbage
Citrus	Rice	Broccli
Apple pears		Cullifloweer

Most of our food comes from angiosperms. More efficient water transport & the evolution of the flower are why angiosperms succeed.

Small gametophytes are in flowers in angiosperms.

- Anther: makes pollen.
- Ovary: fruit develops from ovary.
- Ovule: develops into seed.
- Petal: to attract insects like bees (because of color / beauty)

The seed is enclosed within an ovary in angiosperms unlike in gymnosperms which have naked seeds.

A fruit is a ripened ovary — it helps protect the seed and increases seed dispersal. Plants don't care about animals. Animals take fruits somewhere else to eat them — the seeds get distributed & grow.

Fruit = ripened ovary

Dry fruit = hard & ugly — not meant to be ate

Fleshy fruit = soft & tasty — meant to be eaten (with seeds) by animals — seeds exit & are fertilized.

Plants reproduce & change despite being stationary — by spores & seeds. Pollen grains must go from anther to stigma by wind, or by insects (birds, bees, ants, flies, etc.)

Kingdom Fungae digest molecules externally — they are decomposers.

Fungi are chemoheterotrophs — they feed their mitochondria by digesting organic molecules. They do this externally (decomposed)

☺ The mushroom we see is a big reproductive structure — roots underground are digesting organics in the dirt.

TUE, 2009-11-24, 9:30-10:50 AM:

☺ 30% of fungi are parasites

They are also used in food, beer, wine, antibiotics, cheese, yeast.
Alexander Fleming discovered penicillin from fungi in 1929.
— it was a miracle drug for curing gram-positive bacterial infections. — i.e. syphilis & gonorrhea, pneumonia.
Molds are microscopic fungi. The first antibiotic was isolated from a fungus (penicillin). Fungi defeat bacteria in this case (like pulling out a rifle)

☺ green algae are closest to plants

Gymnosperms have no fruit.

Green algae are multicellular & haploid

WED, 2009-11-25 8-9:20 AM:

The anther makes the pollen grains.
The ovule makes the seeds, the ovary makes the fruit.
A pollen grain is a male gametophyte (reduced = small)
In bryophytes the haploid is dominant. gametophyte
In all later plants, the diploid is dominant. sporophyte
The seed is enclosed in an ovary in angiosperms
A fruit is a ripened ovary which protects the seed & increase seed dispersal.
Fruit is costly for plants to make. Squirrels may bury fruit for winter and not find it — then it will grow.

FRUIT = ripened ovary		Vegetables	The stamen is in between the sepals = remenants of old flower.
apple	berries	celery, potato, radish, carrot, spinach	
peach	citrus		
cherry	tomato		
grape	cucumber		

WED, 2009-11-25, 8-9:20 AM:

Dry fruits vs fleshy fruit
↓ ovary dries out — animals don't want to eat this.
↳ ovary thickens & becomes delicious for animals to eat & disperse the seeds

☺ Botanists think biology is all about plants.

Plants reproduce & change by sending out seeds or spores or fruits or flagellated sperm (mosses & ferns).

Flies get covered in pollen from a flower & take it to other flowers. Feeding a bird is rarer because they are warm-blooded & require more energy.

☺ Belladonna = pupil dilator ☺ Saving 10% of the tropical rainforests will save 50% of the species.

Fungi decompose organic materials.  ← fungi decompose underground

Fungae & Animalia are chemoheterotrophs.

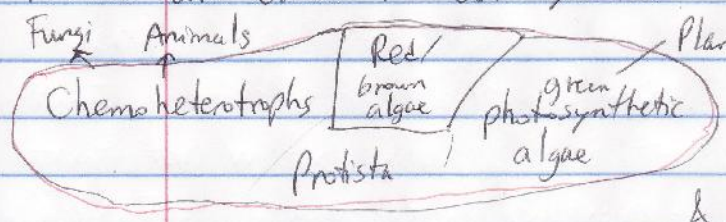
They use organic compounds for food & energy.

The mushroom is a spore-producing reproductive structure.

Fungi = brewers' yeast, yeast, mushrooms, penicillin

Fungae are closer to animalia than plantae — Kingdoms

Archea are closer to eukarya than bacteria — Domains



Blue cheese = fungus

Truffule = fungus

Fungi = food in baking & brewing beer/wine.

Molds are microscopic fungi that live everywhere — even in your toothbrush. Alexander Fleming discovered fungi (penicillus) killed bacteria — in 1929.

WK. 13

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WED, 2009-11-25 8-9:20 AM: Fungi compete with bacteria by producing ANTIBIOTICS.

For bacteria an hour is 3 generations!

streptococcal blood poisoning can be treated w/ antibiotics

Some bacteria make chemicals to kill other bacteria.

The first antibiotic was isolated from a fungus — we can stop bacteria w/ antibiotics but not viruses since they use our ribosomes.

penicillus fungus defeats bacteria

staphylococcus (spelling?)

Mosses are the first plants w/ gametangia & the waxy cuticle

Ferns are the first vascular plants.

Gymnosperms are the first seed plants.

Angiosperms are the first flowering/fruit plants.

QUIZ

1N Gametophytes make gametes 1N by mitosis. 1

2N Sporophytes make spores 1N by meiosis. $\frac{1}{2}$

gametes are egg or sperm — since the parent is haploid the plant is a walking egg or sperm & must make eggs or sperms by MITOSES

~~Waxy cuticle~~	Moss	Ferns	Gymnosperms	Angiosperms
Waxy cuticle & retains embryo?	Yes	Yes	Yes	Yes
Gametophyte dominant?	Gametophyte Yes	Sporophyte No	Sporophyte No	Sporophyte No
Vascular?	No	Yes	Yes	Yes
Fruit?	No	No	No	Yes
Water?	Yes	Yes	No	No
Sperm?	Yes	Yes	No	No
Pollen?	No	No	Yes	Yes

Thripp
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WED, 2009-11-25, 8-9:20 AM

Ch. 17 | There are about 10^{18} arthropods on Earth (billion·billion).

☺ Whales are 100 ft long. (up to)

☺ Reptiles can survive on less than 10% of the calories as mammals of the same size

☺ We began life in the Precambian seas as protista.

☆ Animals are eukaryotic multicellular, chemoheterotrophic organisms that obtain energy & carbon by ingestion of organic molecules (a.k.a. compounds).

(Fungi digest food externally.
Animals digest food internally.)

Most animals reproduce sexually — i.e sperm + eggs.

☺ Use starfish eggs to study early embrionic division.

☺ 545M years ago, animals diversified rapidly.

Multicellularity (sponges) is a dead end

Protista → true tissues → bilateral → body cavity
→ no body cavity
→ radial

pseudocoelom
true coelom

coelom from cell masses

coelom from digestive terms

END

Happy Thanksgiving