

Moss & Fern



Hapu'u Tree Fern



Sphagnum palustre
(clones, no spore stage)

NONVASCULAR BRYOPHYTES

VASCULAR SEEDLESS PLANTS

VASCULAR SEED PLANTS



Hornworts

Liverworts

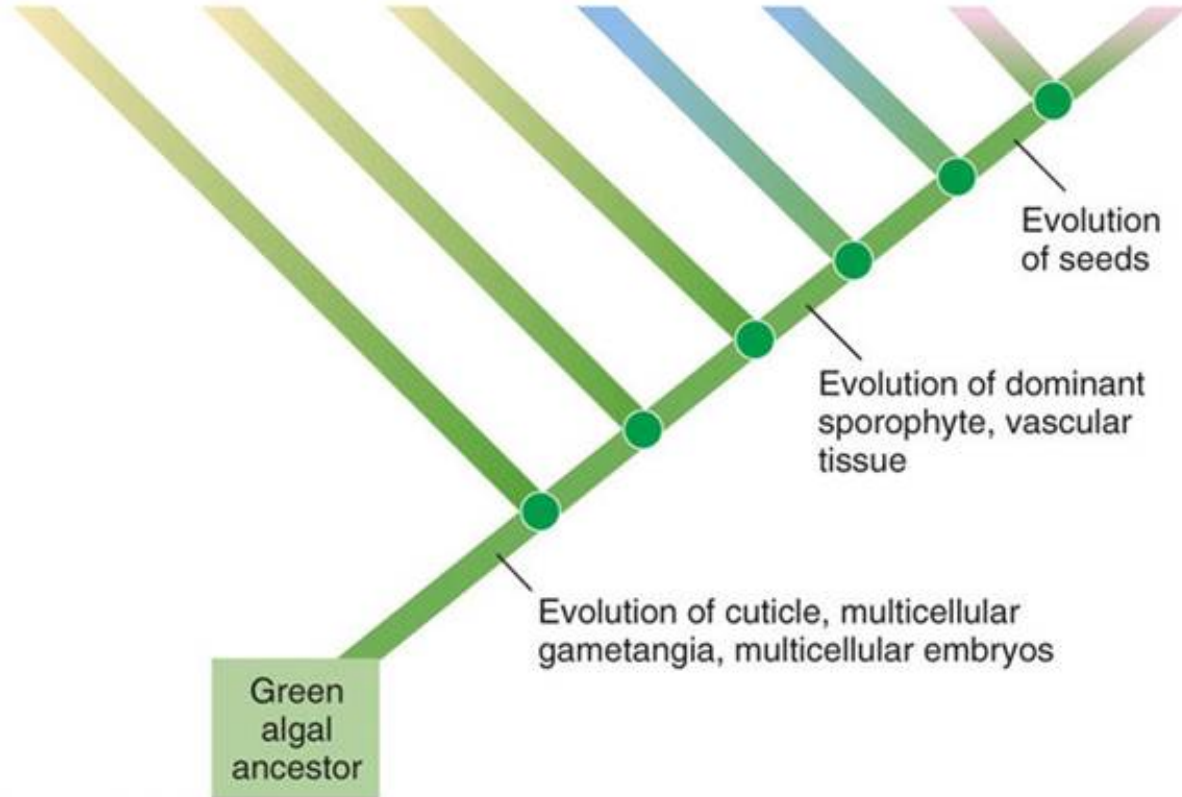
Mosses

Club mosses

Ferns

Gymnosperms

Angiosperms



Supergroup Archeplastida

Kingdom Rhodophyta (red algae)

Viridiplantae

Kingdom Chlorophyta (green algae)

Kingdom Charophytes

Kingdom Plantae (embryophytes)

Kingdom Plantae (embryophytes)

1. **Non-vascular plants**

Division Bryophyta (mosses)

Division Hepatophyta (liverworts)

Division Anthocerotophyta (hornworts)

2. **Vascular plants**

A. No seeds :

Division Lycophyta (club mosses)

Division Monilophyta (ferns, horsetails, whisk ferns)

- Class Psilotopsida- whisk ferns
- Class Equisetopsida- horsetails
- Class Polypodiopsida - ferns

B. Production of seeds :

1) No flowers : Gymnosperms

Division Pinophyta (Coniferophyta)- (conifers)

Division Cycadophyta (cycads)

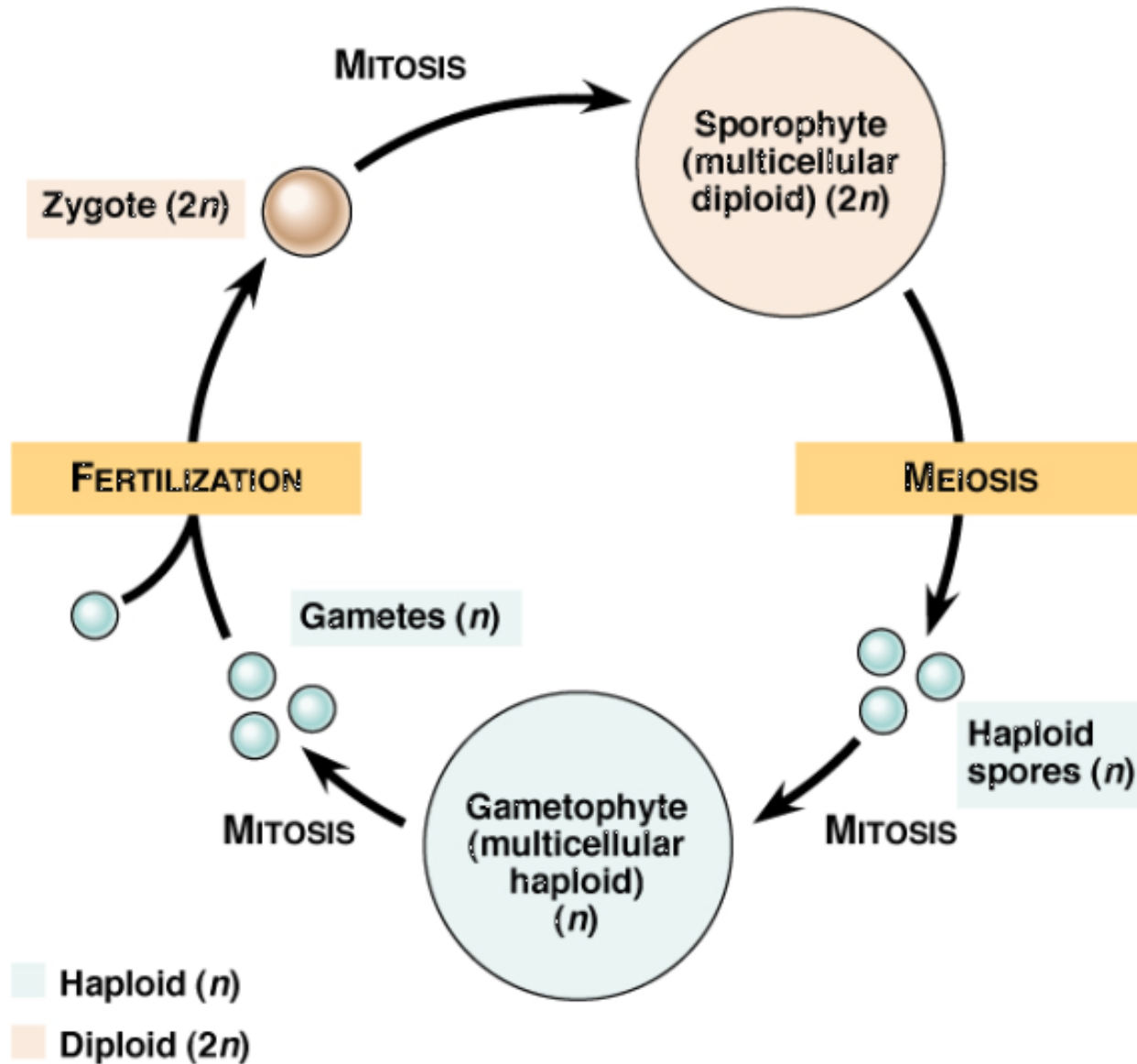
Division Ginkgophyta (ginkgo)

Division Gnetophyta (gnetae)

2) Flowers : Angiosperms

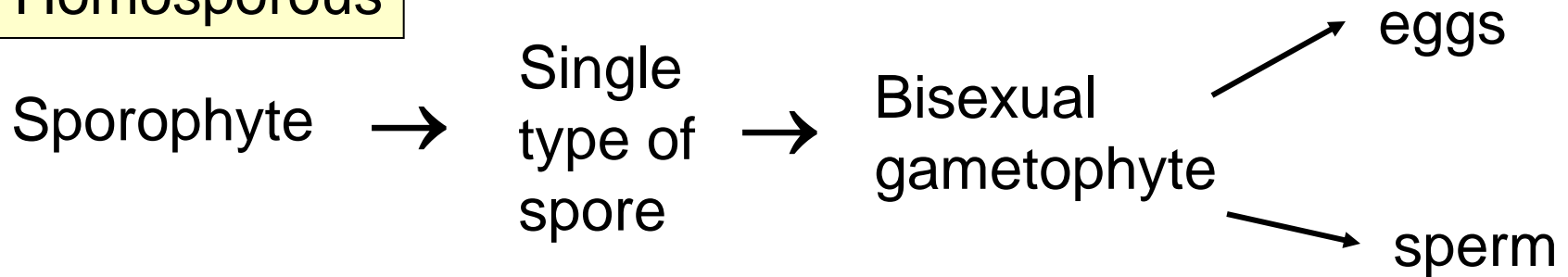
Division Anthophyta (flowering plants)

Typical Plant Life Cycle

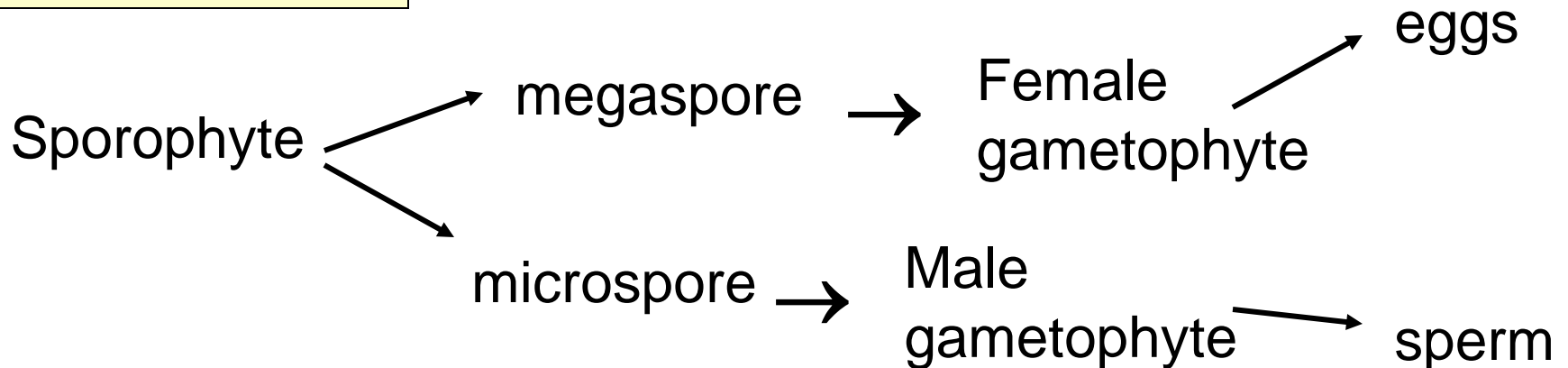


Homosporous vs. Heterosporous Plants

Homosporous



Heterosporous



Bryophytes

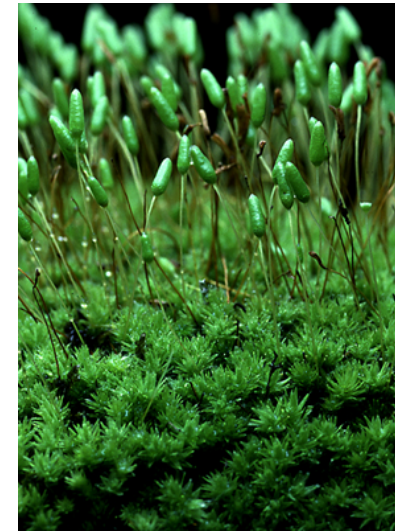
- phylum Hepatophyta - liverworts
- phylum Anthoceroophyta - hornworts
- phylum Bryophyta - mosses



liverwort



hornwort

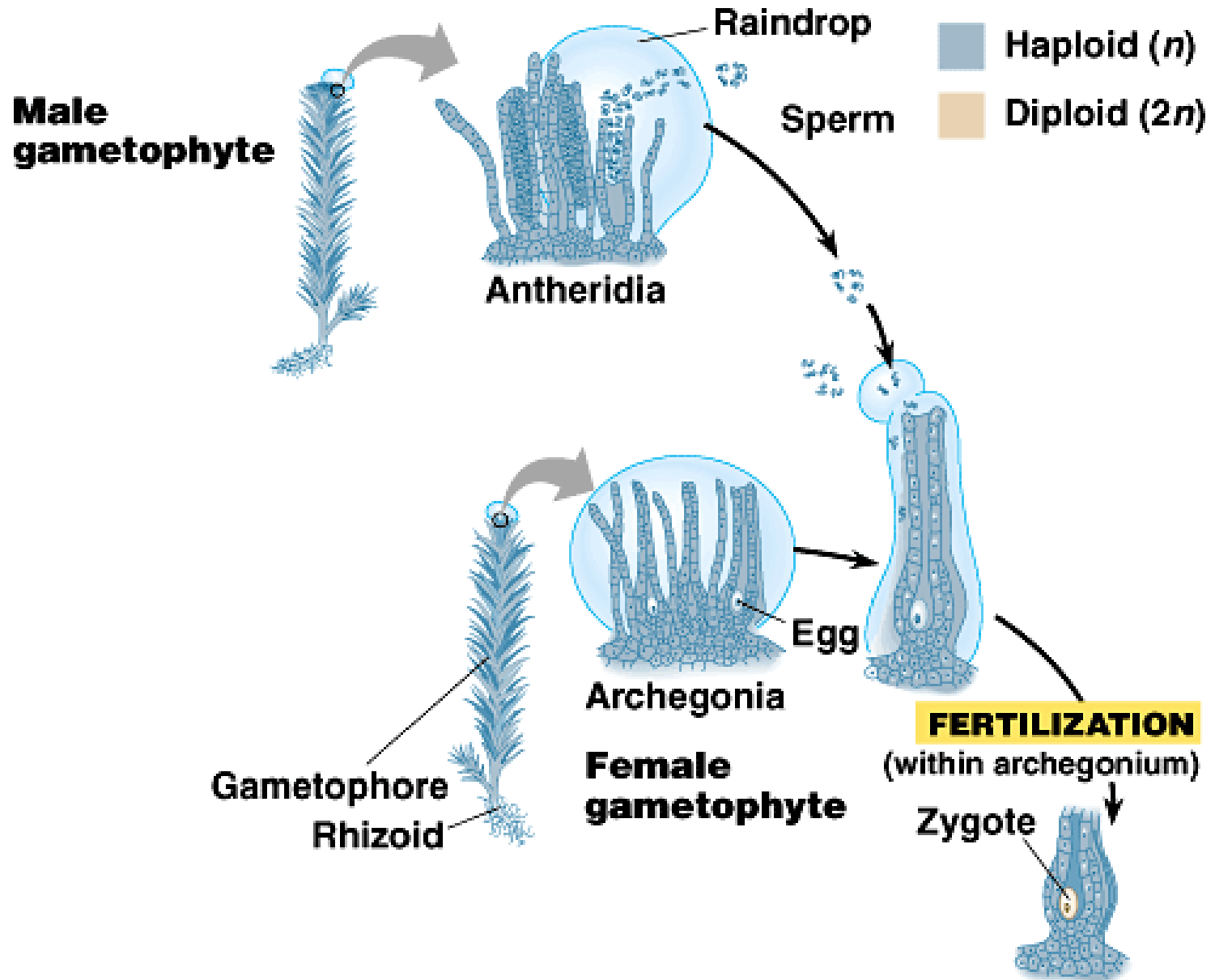


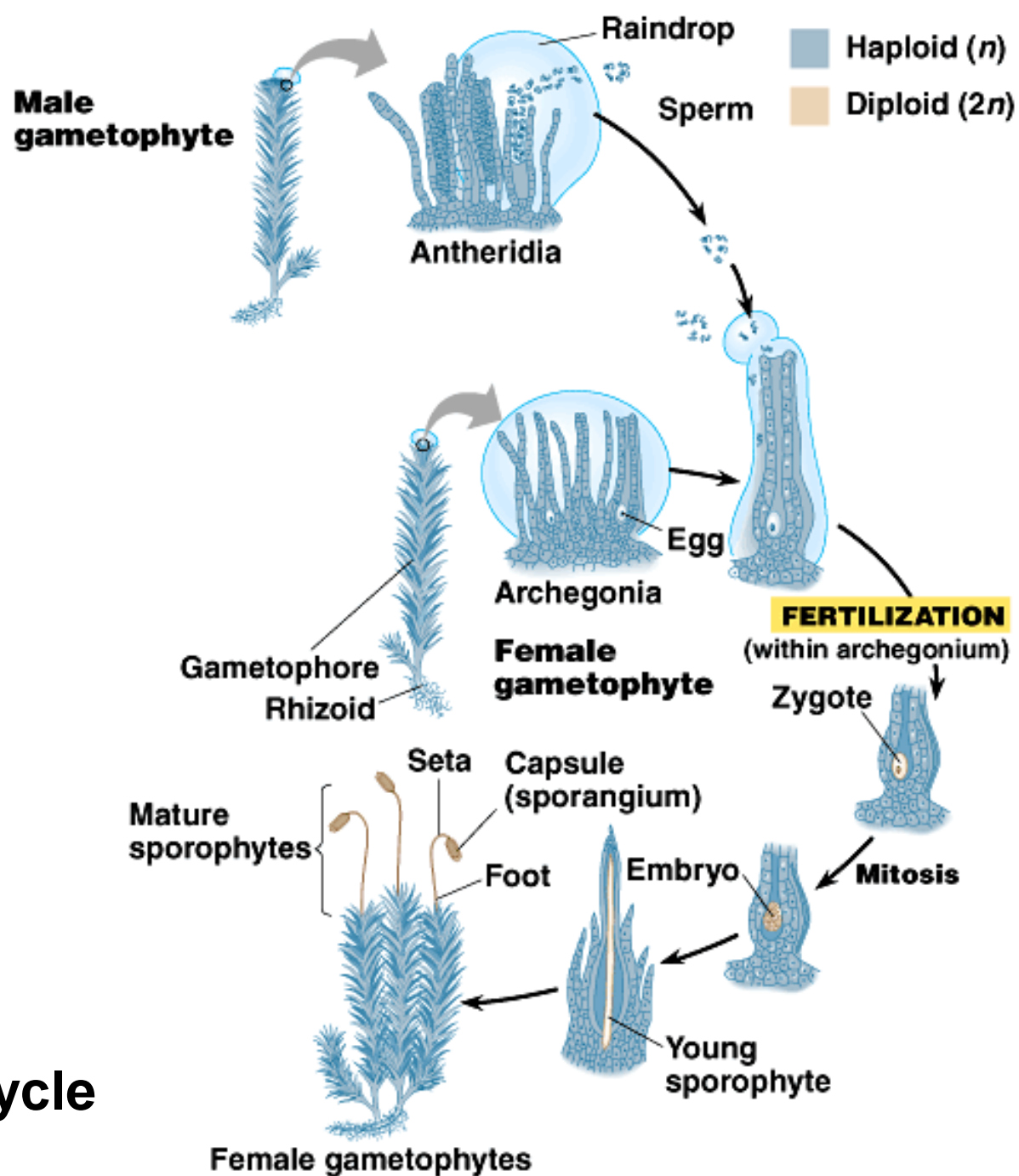
mosses

Phylum Bryophyta

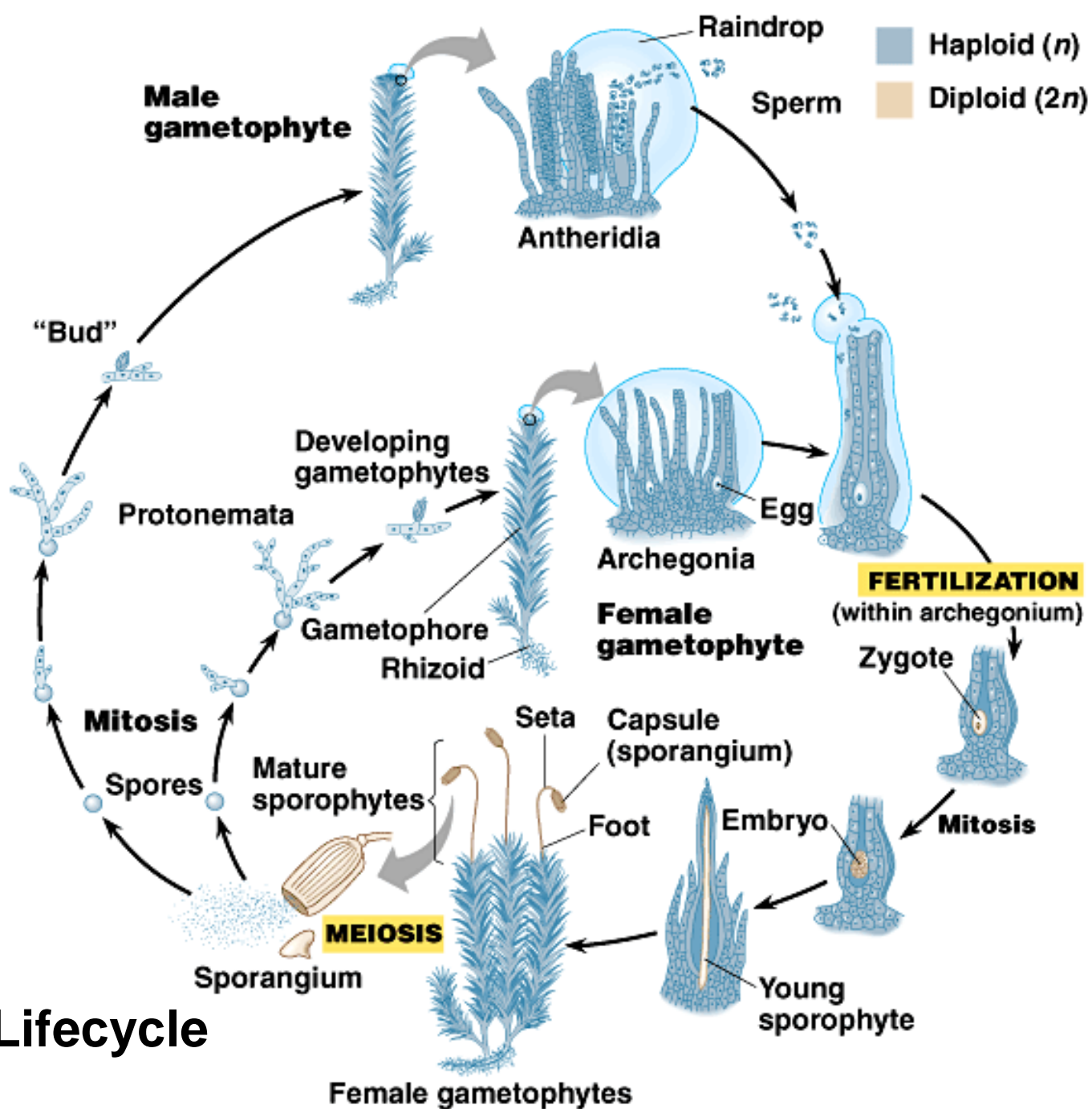
- **Gametophyte dominant**
- **Lack vascular tissues**
- **Homosporous**
- **Possess waterproof cuticle**
- **Dispersal by windblown spores**
- **Swimming sperm**

Moss Lifecycle





Moss Lifecycle



Moss Lifecycle

Female gametophytes

Alternation of Generations: Mosses

Fuzzy, green, vegetative covering frequently found on rocks in cool, moist habitats = haploid, **GAMETOPHYTE** stage of moss life cycle



Alternation of Generations: Mosses

Polytrichum commune,
hairy-cap moss



Capsule



Seta

Sporophyte
(a sturdy
plant that
takes months
to grow)

Gametophyte

leafy, haploid
gametophyte
with
emerging
diploid
sporophyte

Moss Archegonia

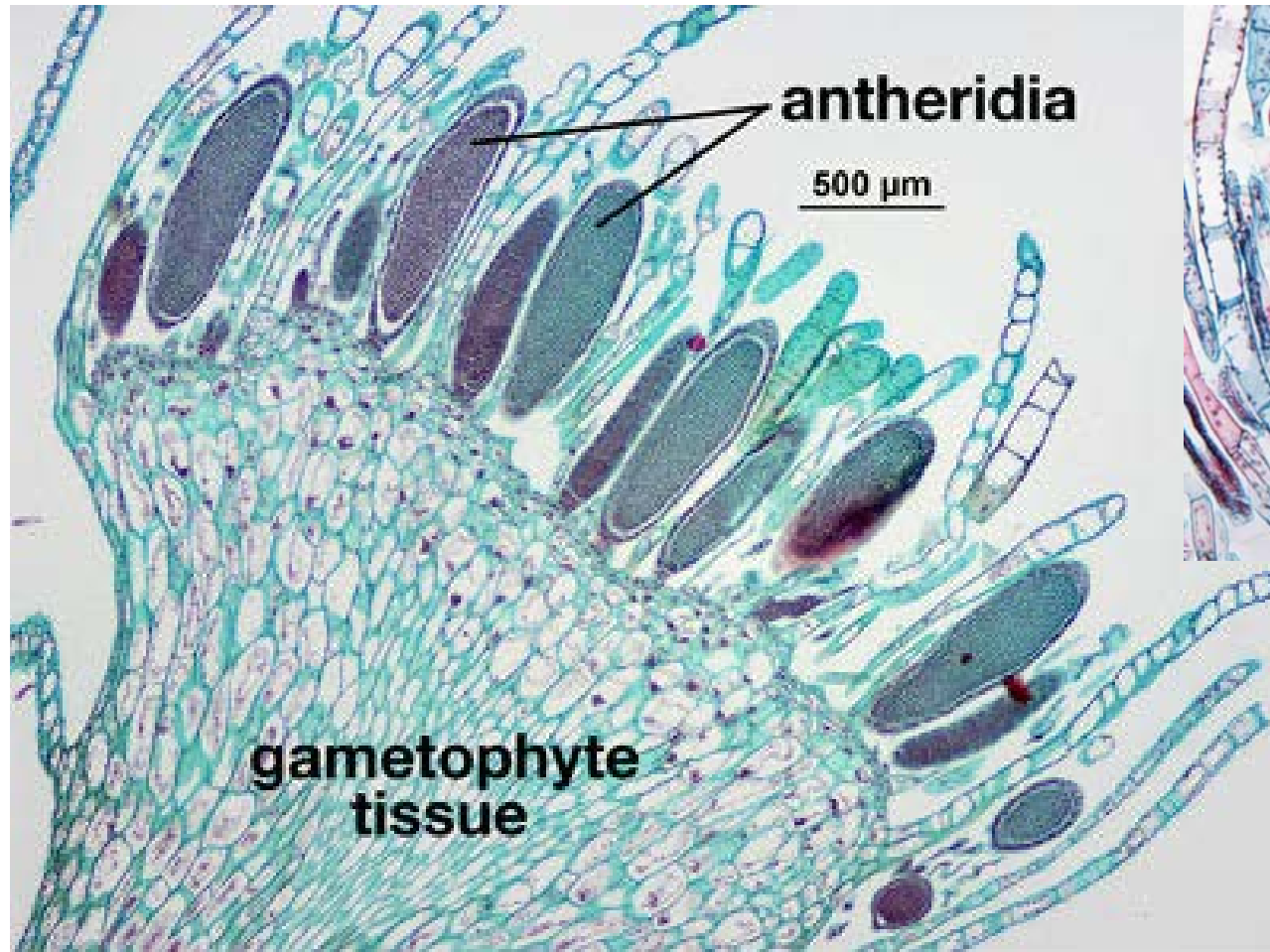
neck canal
egg cell
venter



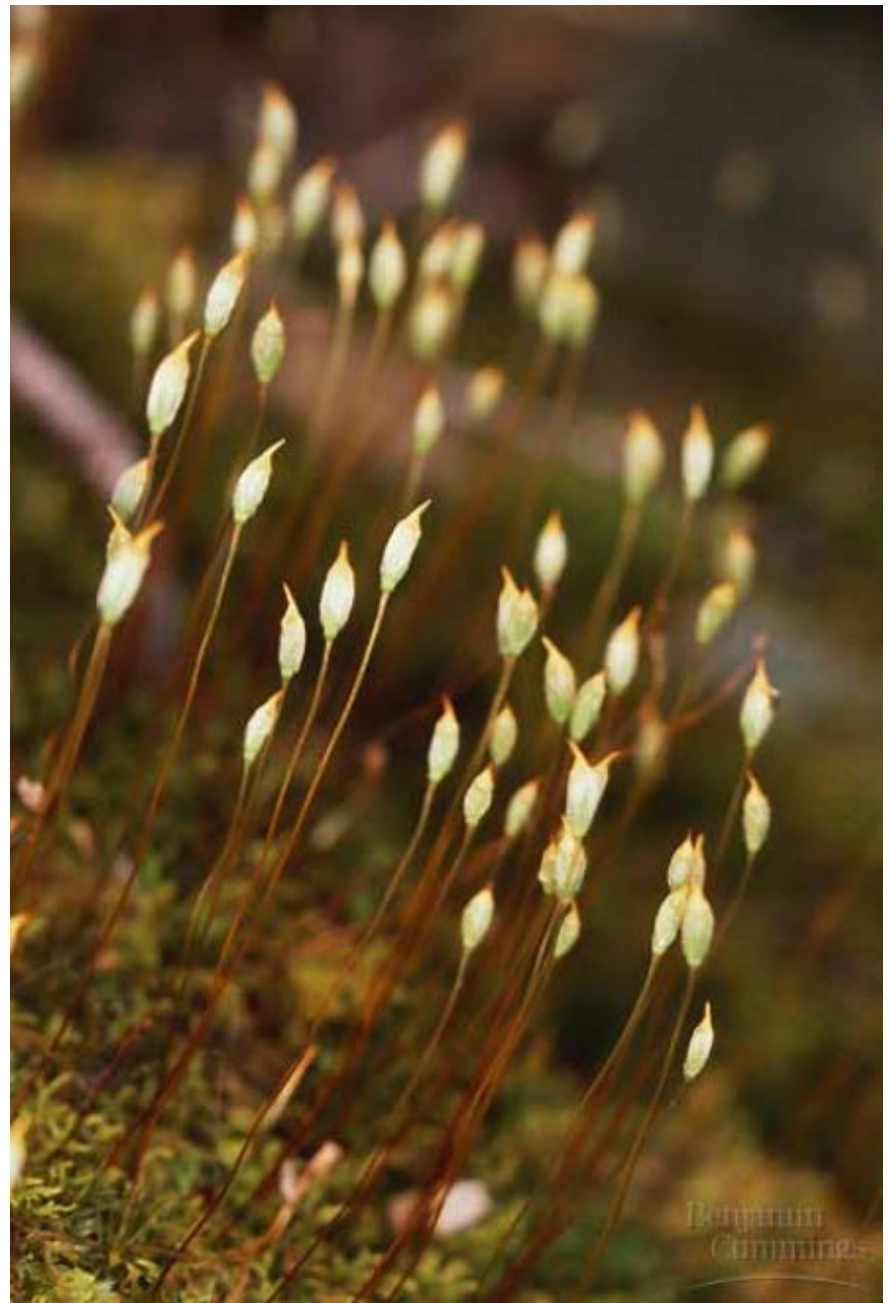
Moss Archegonial Head X 100



Moss Antheridia



Sporophytes



Moss Sporangium



Moss spores



Moss Protonema



Division Lycophyta (club mosses)

Division Monilophyta

(ferns, horsetails, whisk ferns)

Class Psilotopsida- whisk ferns

Class Equisetopsida- horsetails

Class Polypodiopsida - ferns

Division Lycophyta



club mosses

Class Polypodiopsida (Pterophyta)



fern

Class Equisetopsida



horsetails

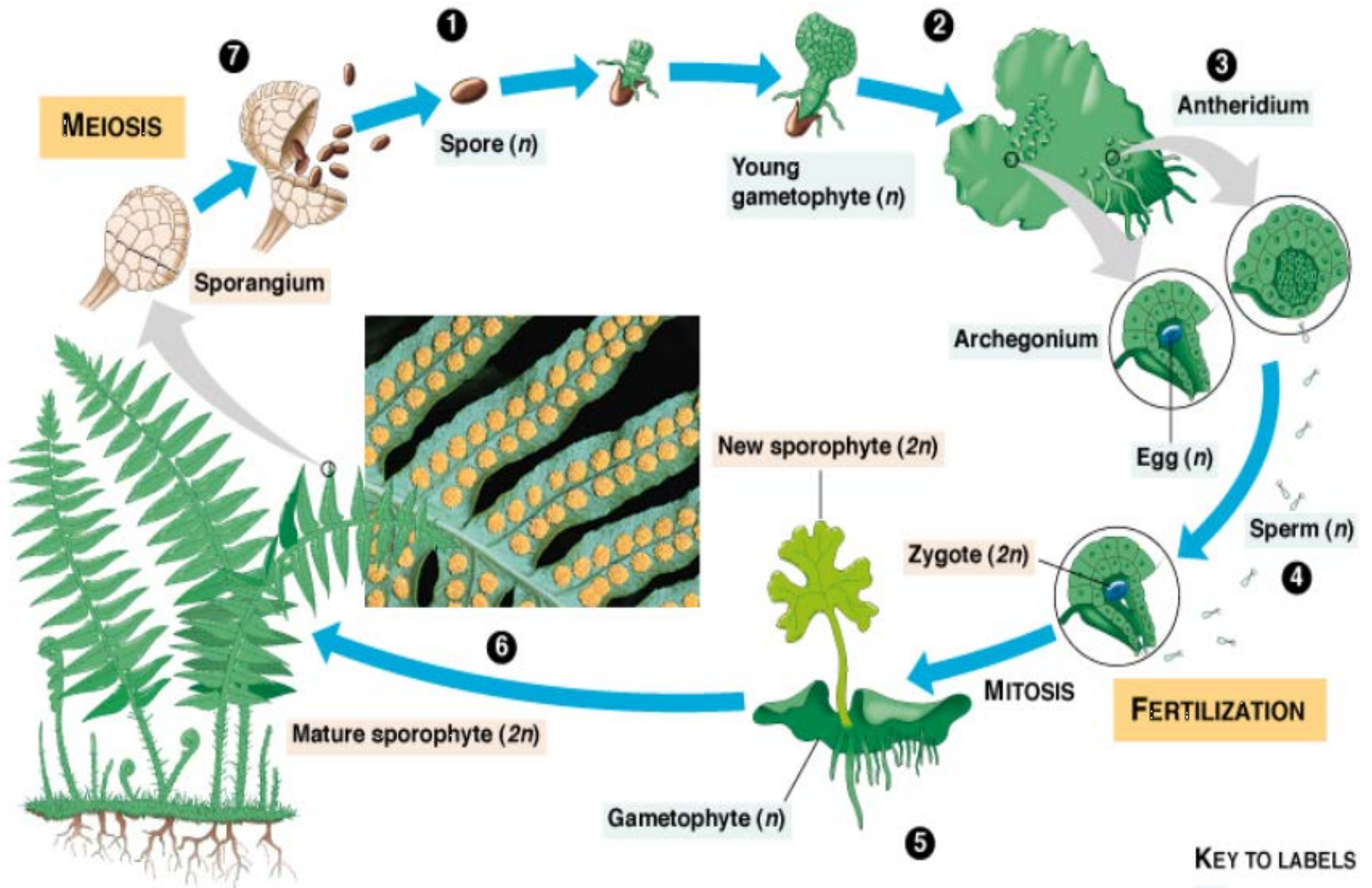
Class Psilotophyta



Whisk fern

Division Pterophyta: Ferns

- **Sporophyte dominant**
- **Possess vascular tissues and roots**
- **Leaves are megaphylls**
- **Homosporous**
- **Possess waterproof cuticle**
- **Dispersal by windblown spores**
- **Swimming sperm**



Fern Life Cycle

Alternation of Generations: Ferns



Ferns

Sporophyte = dominant
(most conspicuous)
individual

Gametophyte = small,
fragile structure most
people (even botanists!)
never notice

Fern Sporophyte



Alternation of Generations: Ferns



Frond = diploid sporophyte

Sorus = collection of sporangia where meiosis occurs

Sori on a Fern Sporophyll



Sorus Close Up



Fern Sporangium



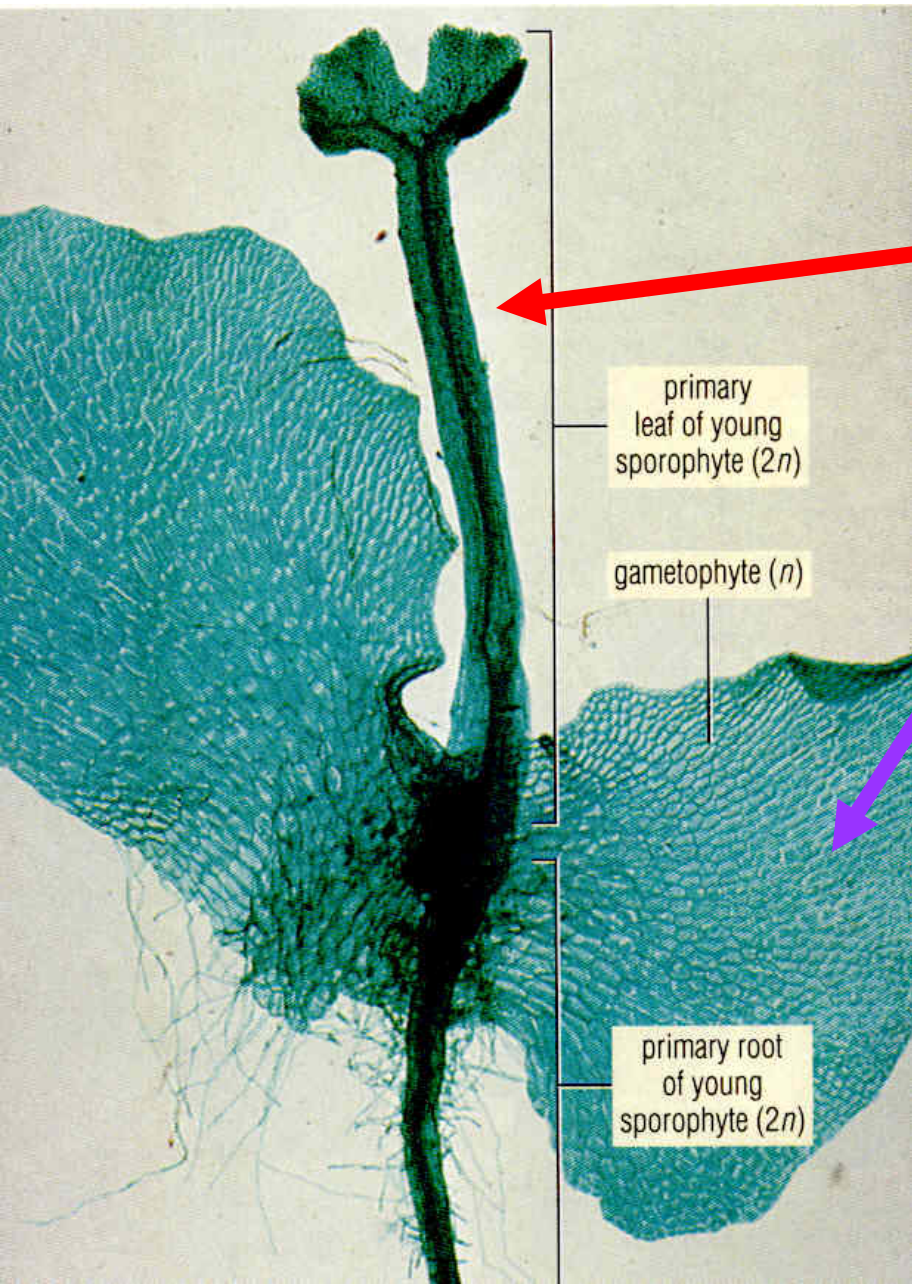
Fern Gametophytes



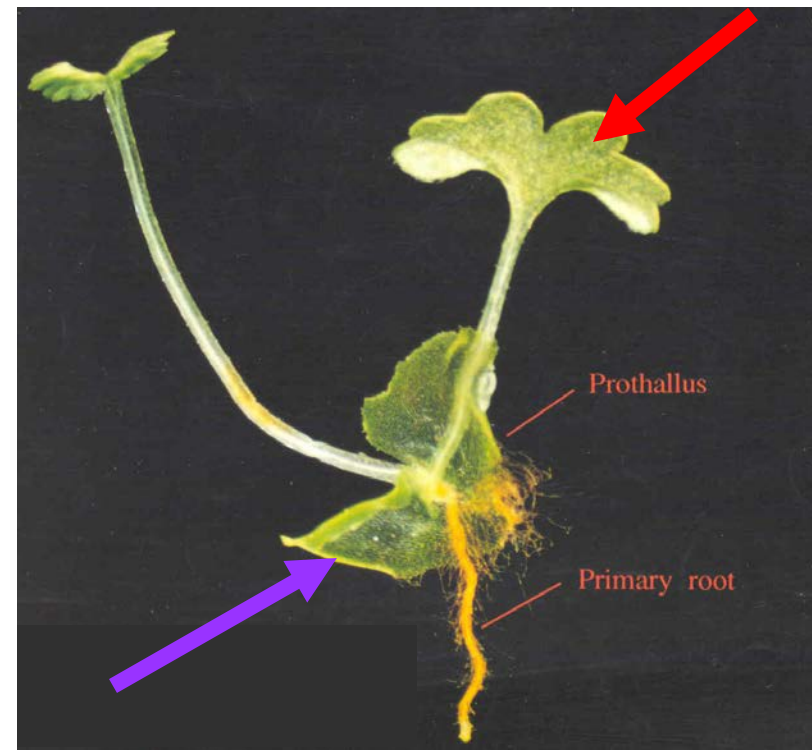
Juvenile Fern Sporophylls



Alternation of Generations: Ferns



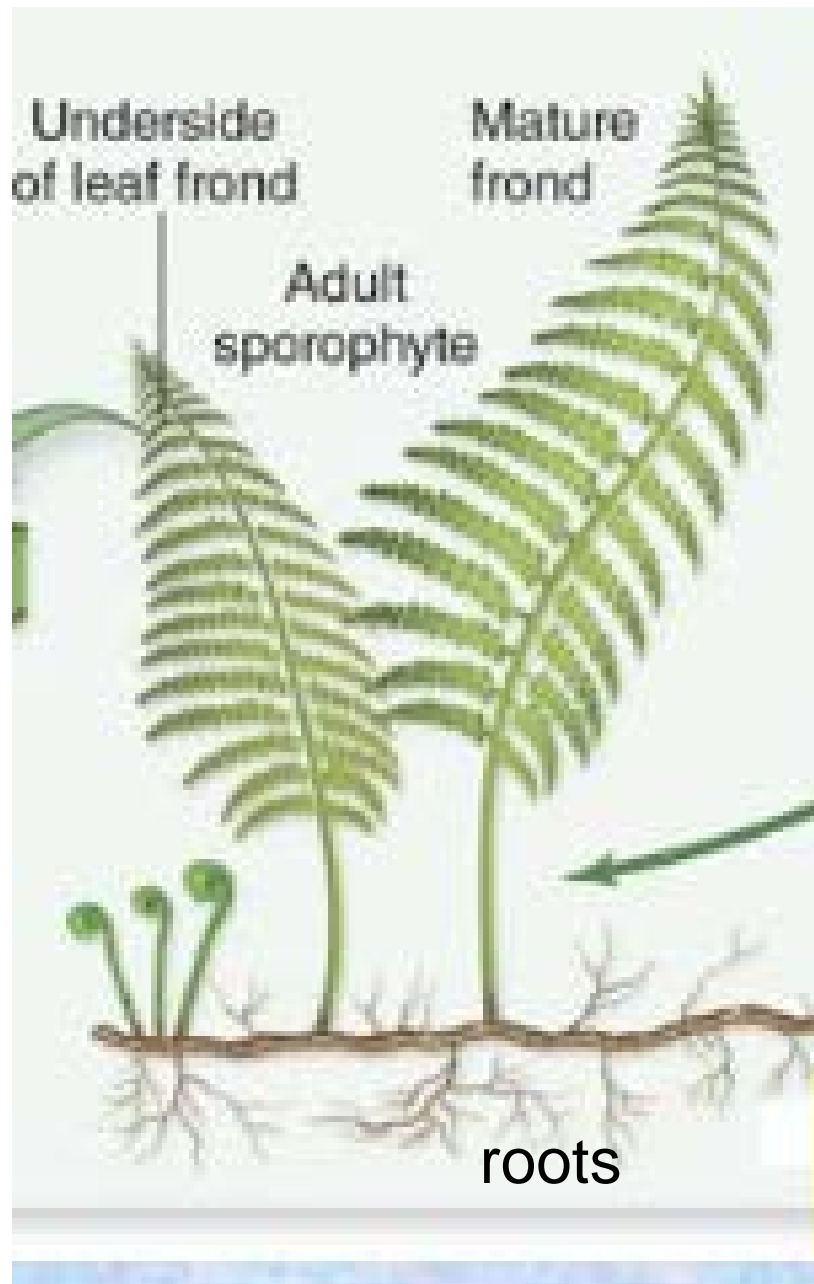
young **diploid sporophyte** beginning to grow from the **haploid gametophyte**



Alternation of Generations: Ferns

young sporophyte produces coiled "fiddleheads" that unfurl into mature fronds





rhizome

roots

Salvinia molesta-aquatic fern



Lake Wilson