

21-3 The Ferns and the First Vascular Plants

I. Introduction to Tracheophyta

A. “True” Land Plants because they: *have evolved ways of freeing themselves from dependence upon wet environments*



Intro to Plant Evolution

1. **Read** the short reading on the following website and answer the "**Review Questions**" on the bottom of the page.
2. **Make Notes** list of 8-10 points of what you learned - Point form is fine.



How did they do it?

1. Vascular tissues: 2 types:

a) **Xylem**: moves water from roots to rest of plant

b) **Phloem**: transports nutrients & photosynthetic products

2. *Tracheid* cells in xylem have thick, strong walls that help plants *stand up against gravity*

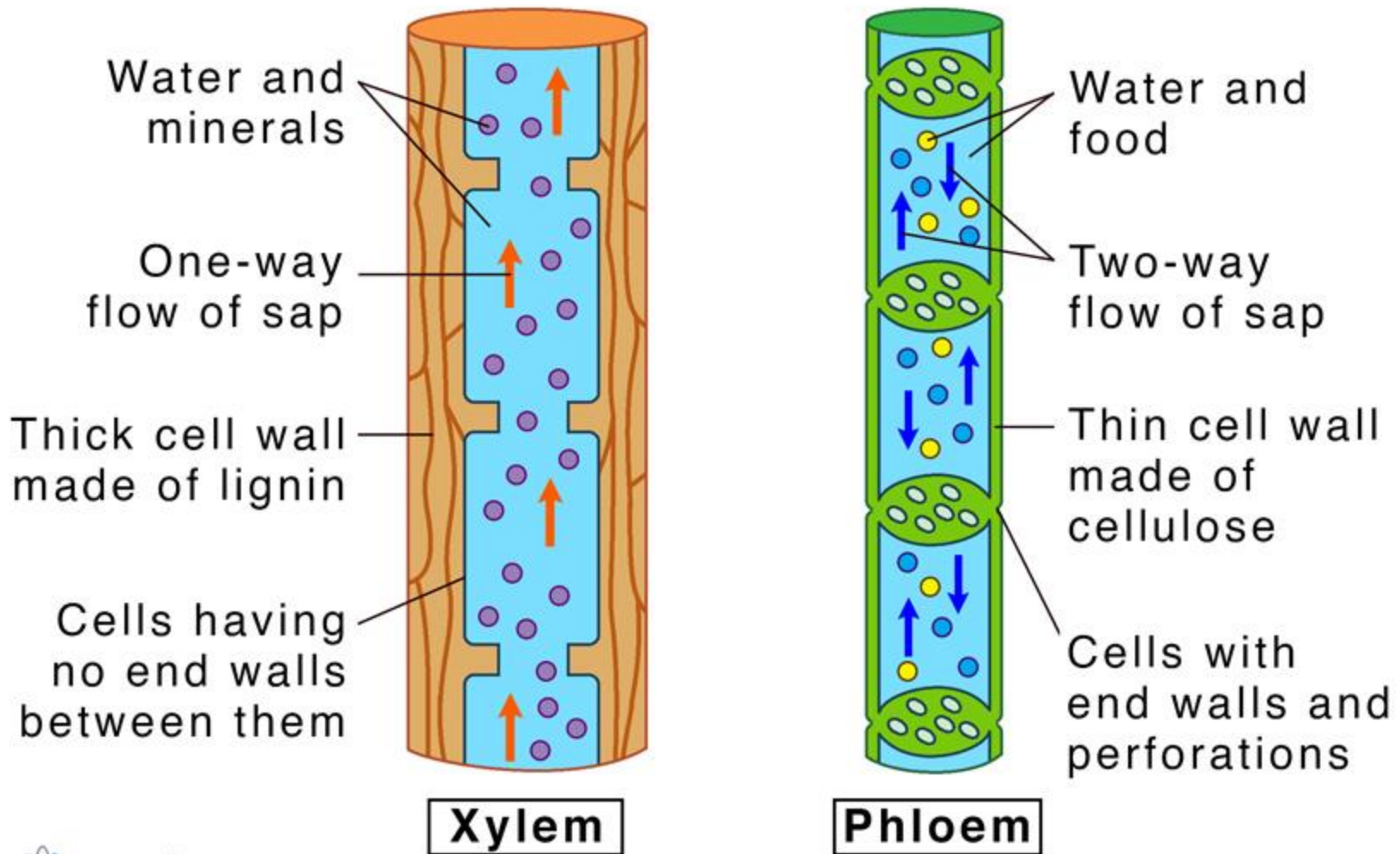
3. True roots have transport tissue in a central *vascular cylinder*

4. True leaves have:

a) *veins (def'n): bundles of vascular tissue*

b) *cuticle (def'n): waxy covering that prevents water loss*

Xylem and Phloem



II. Club Mosses and Horsetails

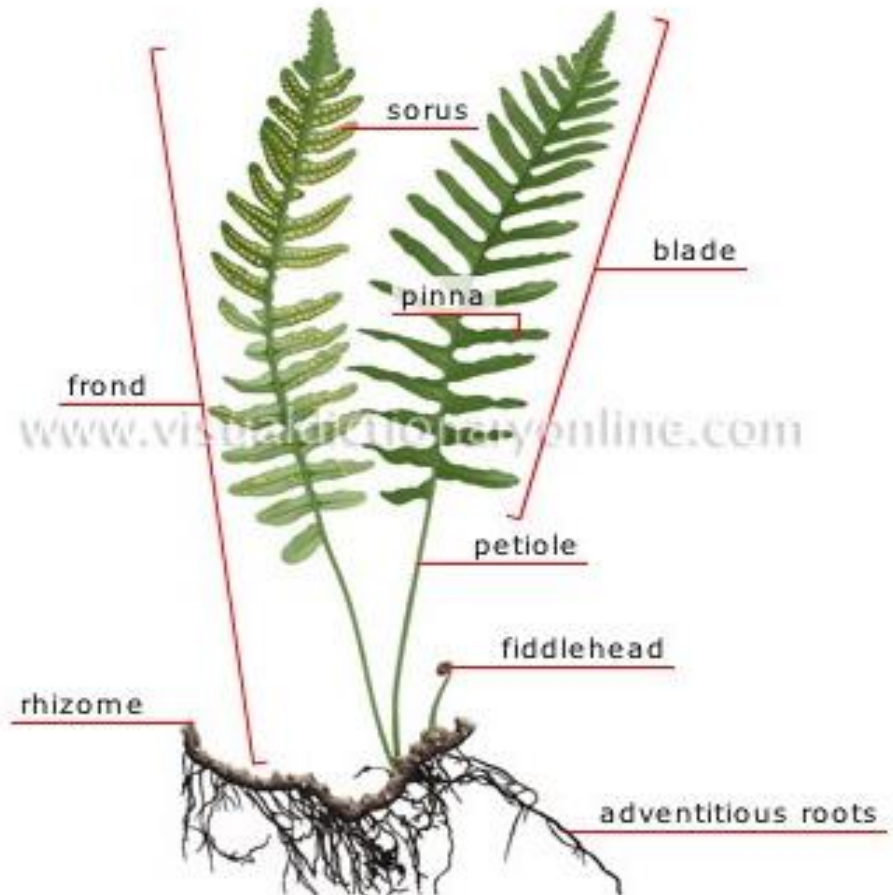
- A. The only living descendants of *large, ancient landplant groups*
- B. Some grew up to *40 m tall!*



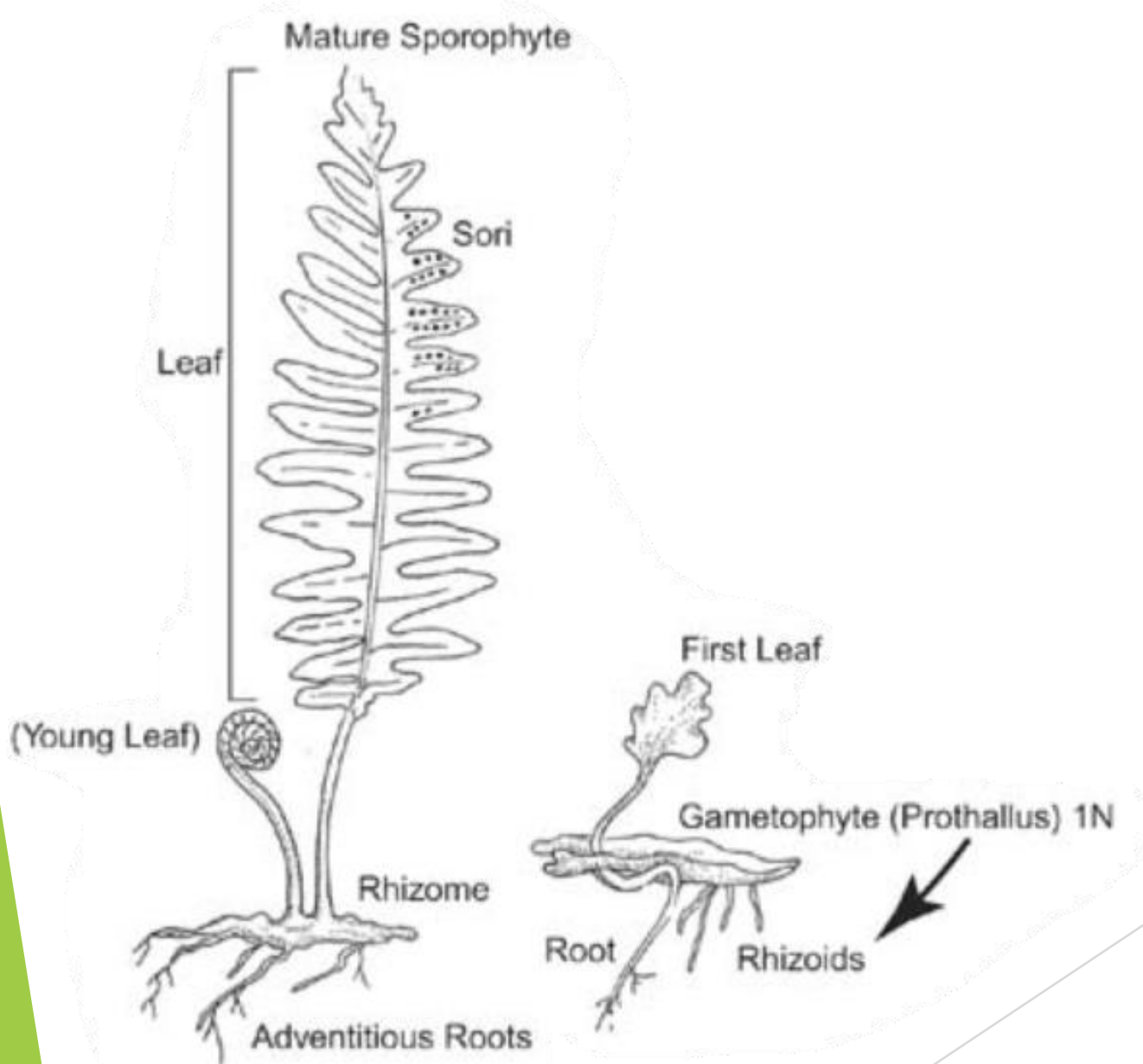
III. Physical Characteristics of Ferns

A. Organs:

1. Have true *vascular tissues*
2. True roots
3. Underground stems called *rhizomes*
4. Large leaves called *fronds*



III. Structure of a Fern



B. Size & Habitat

1. Up to *1 metre* tall in North America
2. Found in *wet, or seasonally wet* places (e.g. rainforests of *Pacific Northwest*)

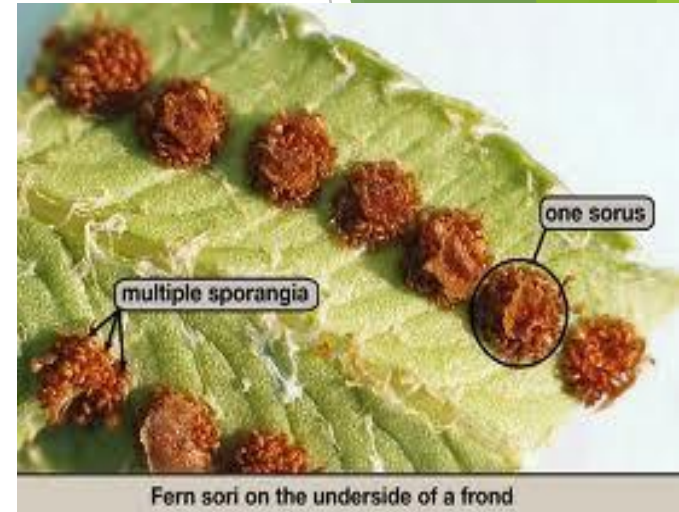


IV. Alternation of Generations in Ferns

A. Life Cycle Stages:

1. Spore Production/Release:

- Adult sporophytes produce haploid *spores* on *underside* of **fronds**
- Formed in tiny containers called ***sporangia***
- Sporangia cluster together in groups called **sori**
- When *ripe*, spores released; carried by *wind, water*

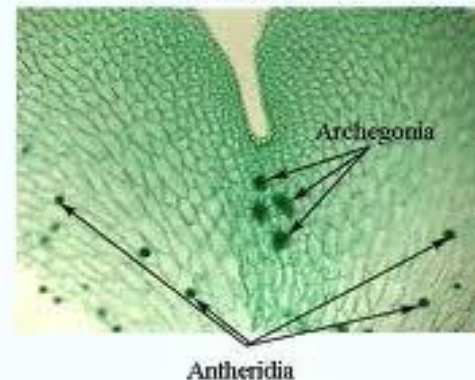


2. Growth

- a) Spores develop into *haploid* (1n) *gametophytes*
- b) Grow into small, heart-shaped *prothallium*
- c) *Antheridia* and *archegonia* develop on underside of **prothallium**



Fern Prothallus
100x



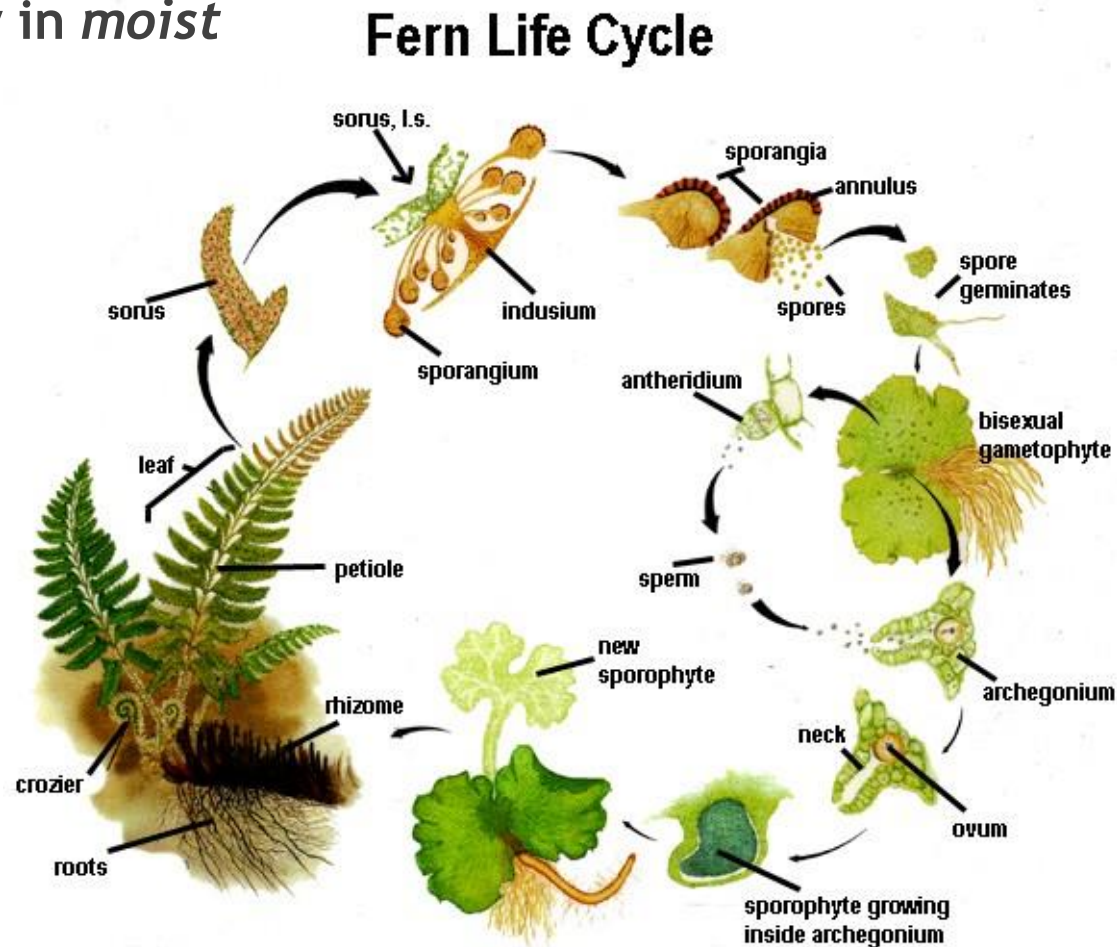
3. Fertilization

- a) Antheridia release *sperm*
- b) Sperm must swim through *a film of water* to an *archegonium*
- c) Each archegonium contains one *egg*
- d) Fusion of gametes produces a *diploid (2n) sporophyte*



B. Summary:

1. Sporophyte is a *well-developed land plant with true vascular tissue*
2. Gametophyte can only grow in *moist areas*
3. Sex still requires *water*



21-4 Where Mosses and Ferns Fit into the World

I. Mosses: Ecological Role

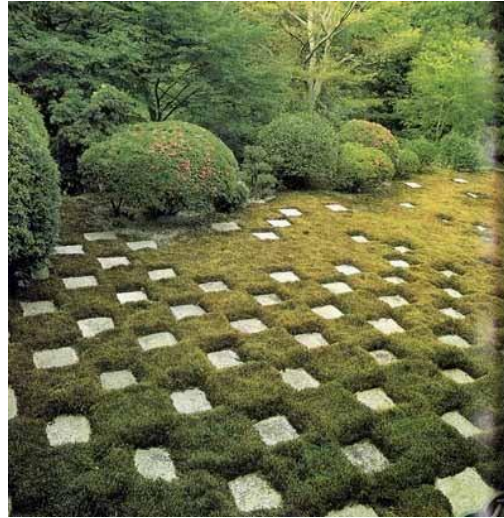
A. Common in *damp areas*



II. Mosses: Uses by Humans

A. Gardening

1. Used as plants



2. Peat moss added to soil to improve it

B. Burning sphagnum

1. Flavours *scotch whiskey*

2. Peat is used as *fuel*



III. Ferns: Ecological Role

- A. Common in the shadows of *forest trees*, because they: *require little light*

IV. Ferns: Uses by Humans

- A. Gardening

- 1. Used as plants

- B. Food

- 1. Some species eaten when young; fronds called fiddleheads

