

# SEEDLESS VASCULAR PLANTS

## Ferns and allies

### Characteristics

No seeds

Vascular tissue present

Xylem

Conducts water and minerals up from soil

Phloem

Transports organic nutrients

\_\_\_\_\_ is dominant

true leaves, stems, and roots

Spore bearing leaves called \_\_\_\_\_

Water needed for fertilization

### Advantages of dominant sporophyte

Sporophyte has vascular tissue

Diploid

Functional gene can \_\_\_\_\_ faulty one

Greater possibility for \_\_\_\_\_

Increased variety and complexity

### Origin and traits of vascular plants

Fossil evidence dates back to 420 mya

Branched sporophytes

Terminal sporangia

Sporophyte \_\_\_\_\_ on gametophyte

### Evolution of Roots

Roots

\_\_\_\_\_ vascular plants

\_\_\_\_\_ water and nutrients from the soil

May have evolved from subterranean stems

### Evolution of Leaves

Leaves

increase the surface area of vascular plants

capture more \_\_\_\_\_ for photosynthesis

two types

#### Microphylls

leaves with a \_\_\_\_\_

#### Megaphylls

leaves with a highly \_\_\_\_\_ vascular system

### Evolution of Leaves

According to one model of evolution

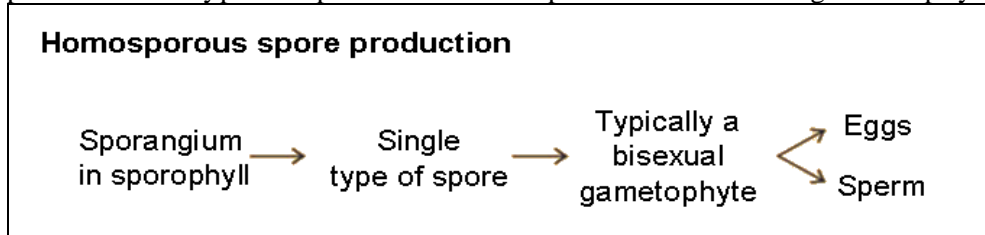
Microphylls evolved first, as outgrowths of stems  
**Megaphylls**,  
 branched vascular systems  
 may have evolved by the fusion of branched stems.

**Sporophylls and Spore Variations**

**Sporophylls**

Are modified leaves with sporangia  
 Most seedless vascular plants  
 Homosporous

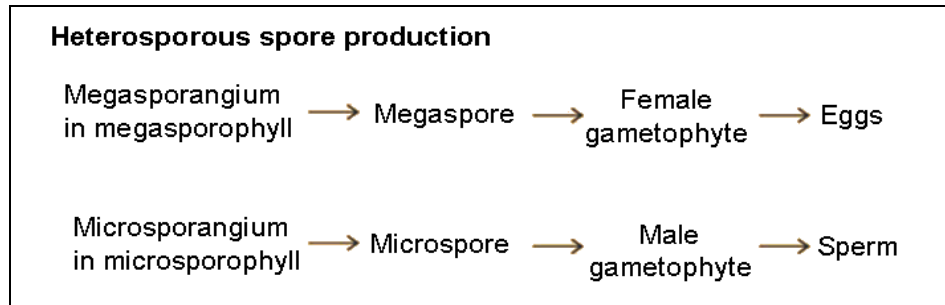
produce one type of spore that develops into a bisexual gametophyte



All seed plants and some seedless vascular plants

Heterosporous

two types of spores that give rise to male and female gametophytes



**Classification**

**Phylum Lycophyta**

Club Mosses  
 spike mosses  
 quillworts

**Phylum Pterophyta**

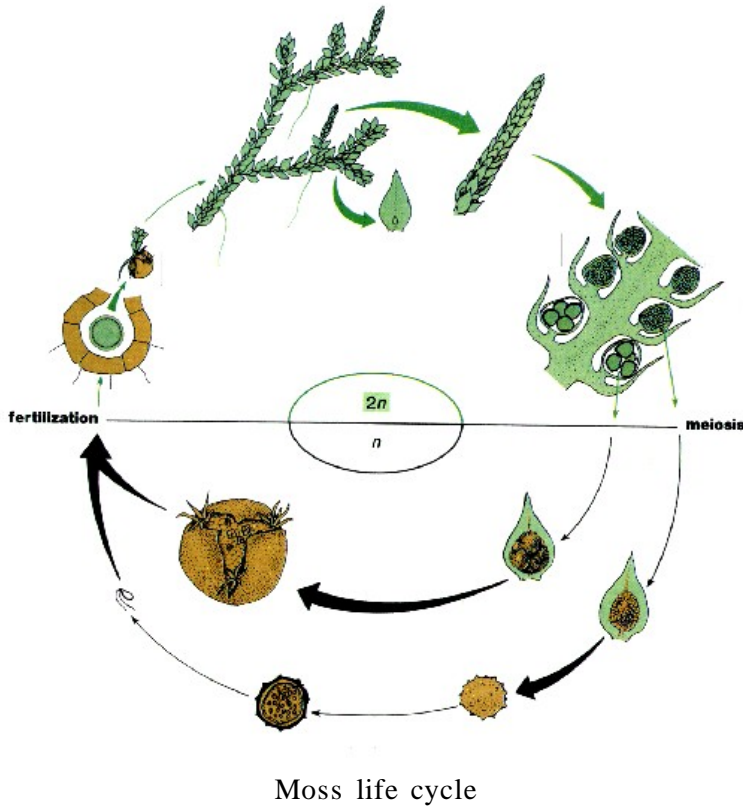
Ferns  
 Whisk Ferns  
 Horsetails

**Phylum Lycophyta**

Club mosses spike mosses and quillworts  
 1200 species  
 Most \_\_\_\_\_ of vascular plants  
 True leaves

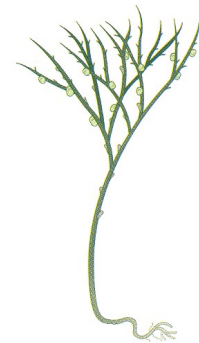


- Microphylls
- Scale-like
- True stem
- Branched rhizome
- Strobilus
- Small gametophyte



**Phylum Pterophyta**  
**Psilophytes**

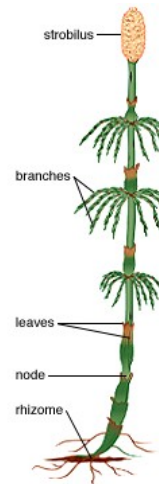
- Resemble \_\_\_\_\_
- Location  
Arizona, Texas, Florida, Louisiana, Hawaii, Puerto Rico
- No roots or leaves
- Sporangia on \_\_\_\_\_
- Homosporous
- Small independent underground gametophyte



*Psilotum*

**Sphenophytes**

- Horsetails and scouring rashed
- Live in moist habitats
- One living genus  
*Equisetum*
- Rhizome produces aerial stem



- Branches in nodes resemble horse's tail
- tiny scale-like leaves
- ribbed stems
- contain silica deposits

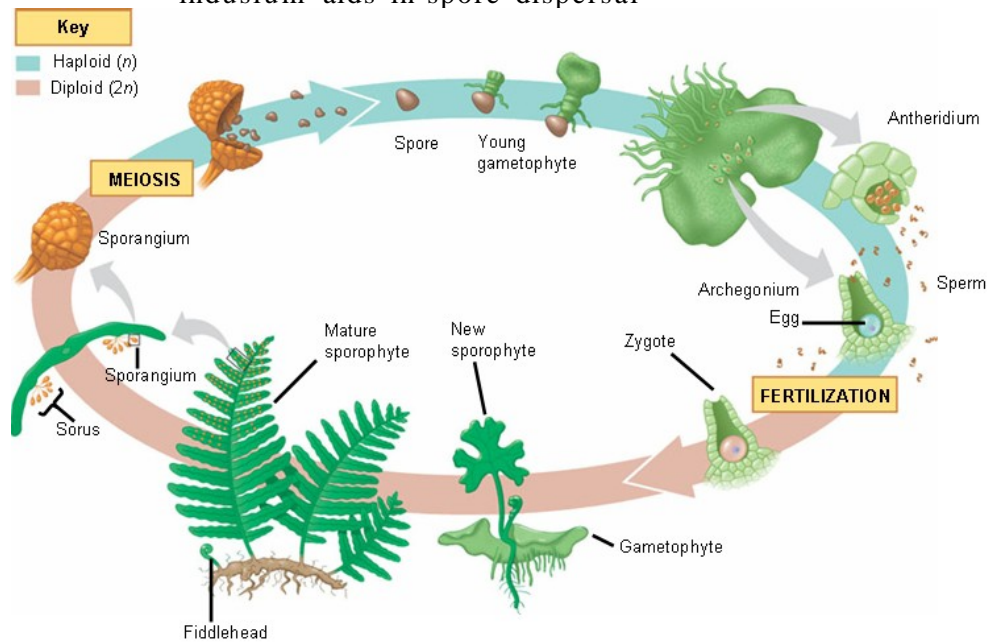
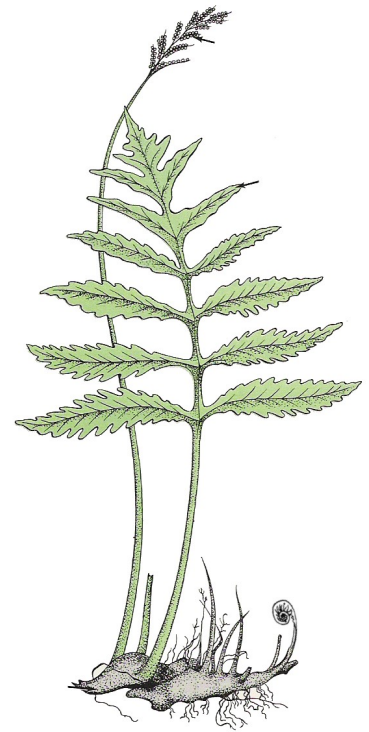
**Phylum Pterophyta**

- 12,000 species
- 1/2 inch to 80 feet high
- wetter tropical and temperate habitats
- Ferns
- megasporophylls
- leaves with more than one vein

**Characteristics**

- frond
- young leaf
- fiddlehead
- Leaf structure
- Rachis
- blade may be entire or contain pinnae
- stem grows horizontally
- roots adventitious
- Reproduction

- meiosis occurs in sporangia
- sporangia may be on back of fronds, or special reproductive frond
- indusium aids in spore dispersal



Fern Life cycle (figure 29.12 in book)

**Sporangia**

**Gametophyte**

Prothallus

no roots but root-like rhizoids  
no stems  
no leaves  
archegonium

antheridium

### **Fern prothalus**

#### **Sporophyte**

Fertilization results in zygote  
zygote grows into embryo  
embryo develops into new sporophyte  
new sporophyte grows from archegonium of gametophyte  
sporophyte become independent of gametophyte

### **Similarities to higher plants**