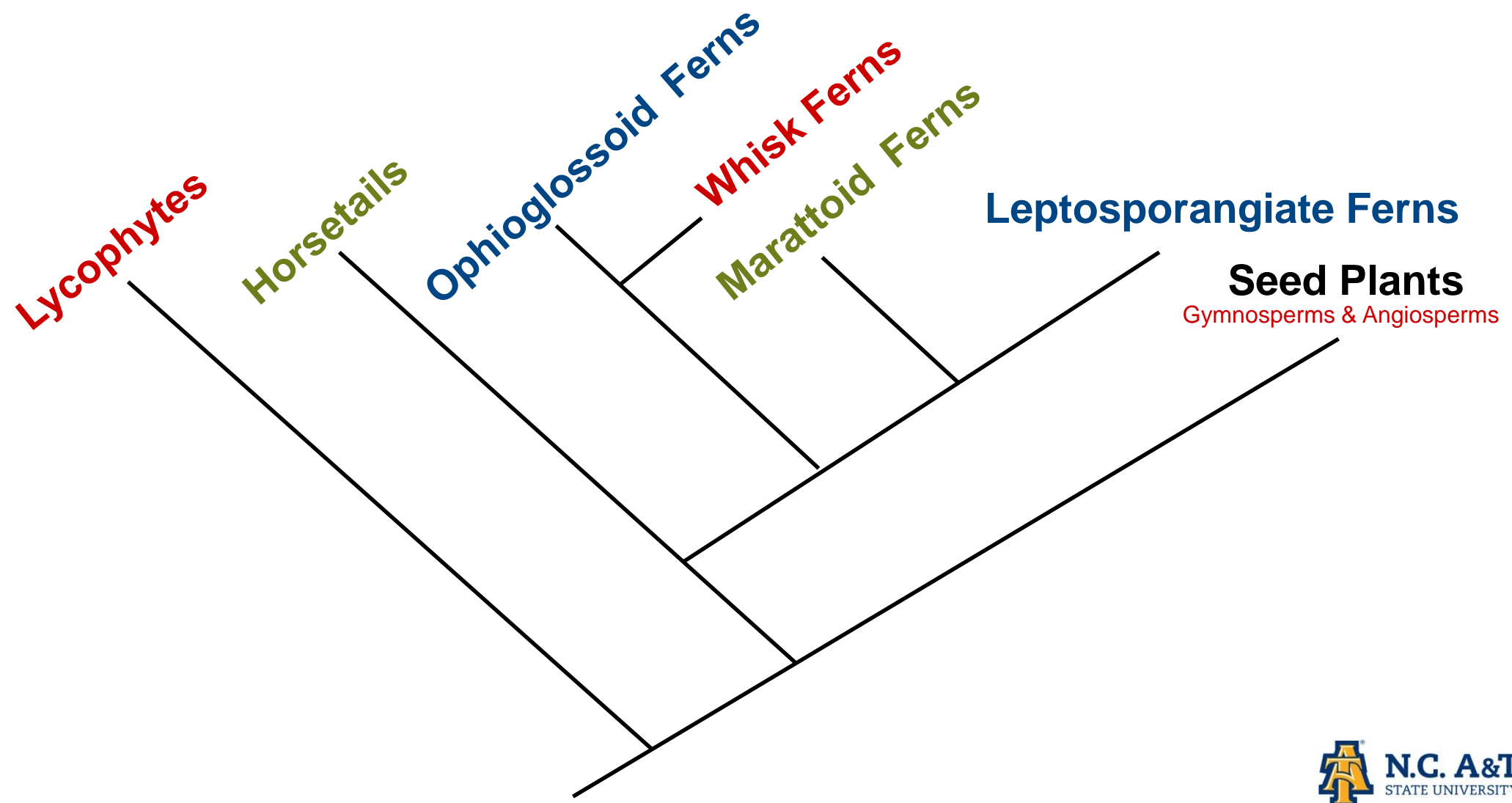


# Seedless Vascular Plants





# Lycophytes

## Club Mosses, Spikemosses, and Quillworts

*Diphasiastrum digitatum*



Alan Cressler  
widflower.org

*Bryodesma tortipilum*



Pteridoportal.org

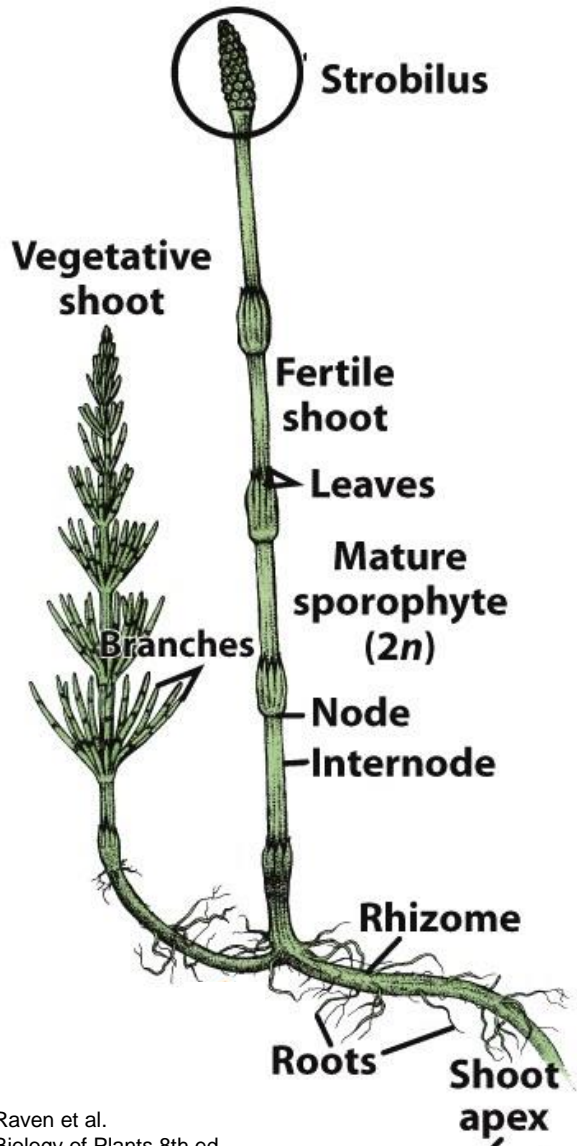
*Isoetes engelmannii*



Alan Cressler  
widflower.org

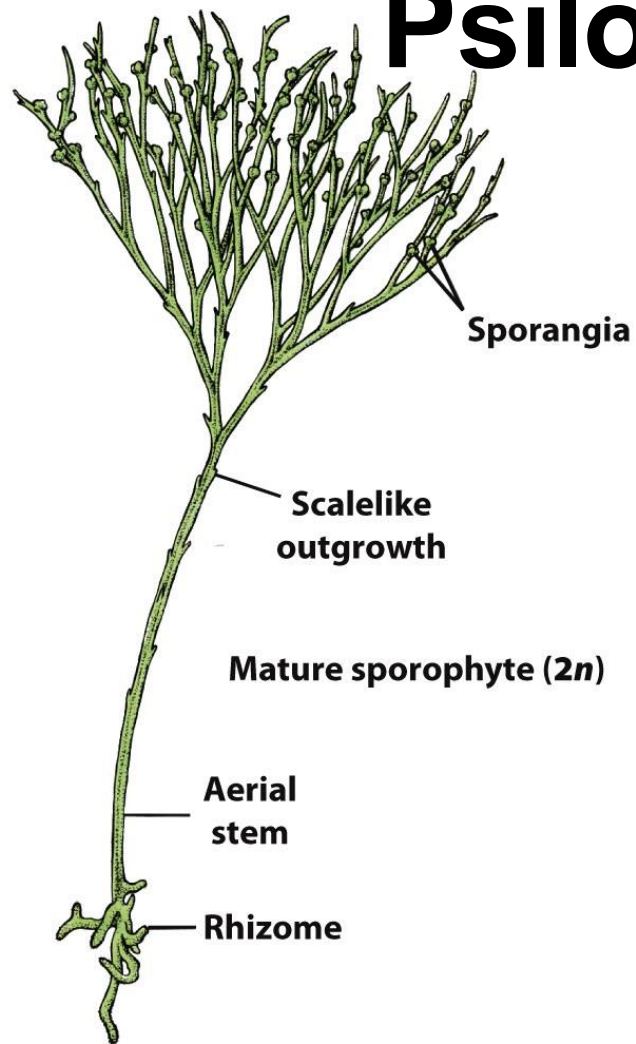
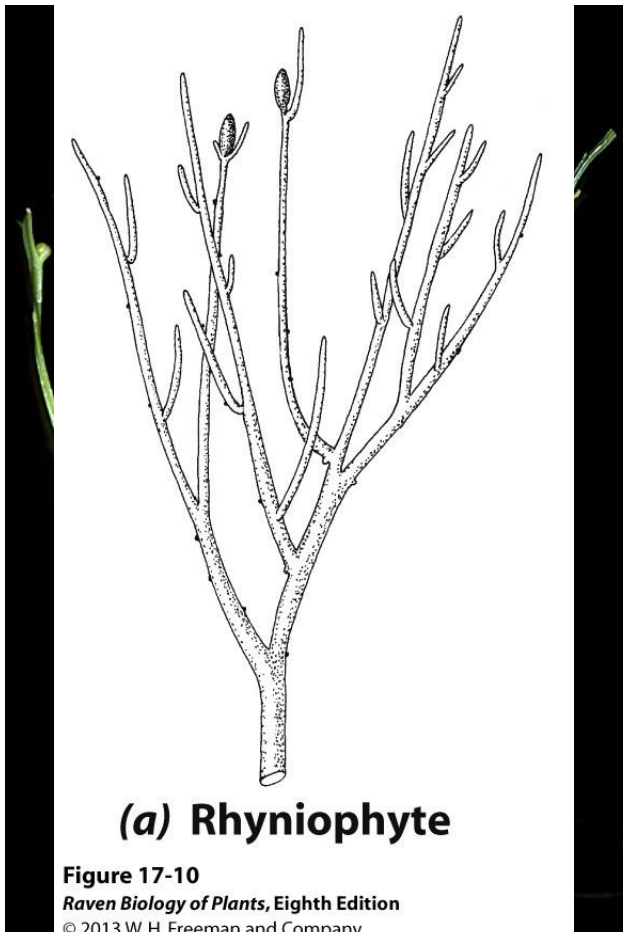


# Horsetails *Equisetaceae*, a.k.a. Scouring Rushes



*Equisetum hyemale*

# Psilotopsid Ferns



**Whisk Fern**  
*Psilotum nudum*

**Adder's Tongue Ferns**  
*Ophioglossum engelmannii*



# Fern Morphology

Michael G. Simpson  
Plant Systematics, 3<sup>rd</sup> Ed.



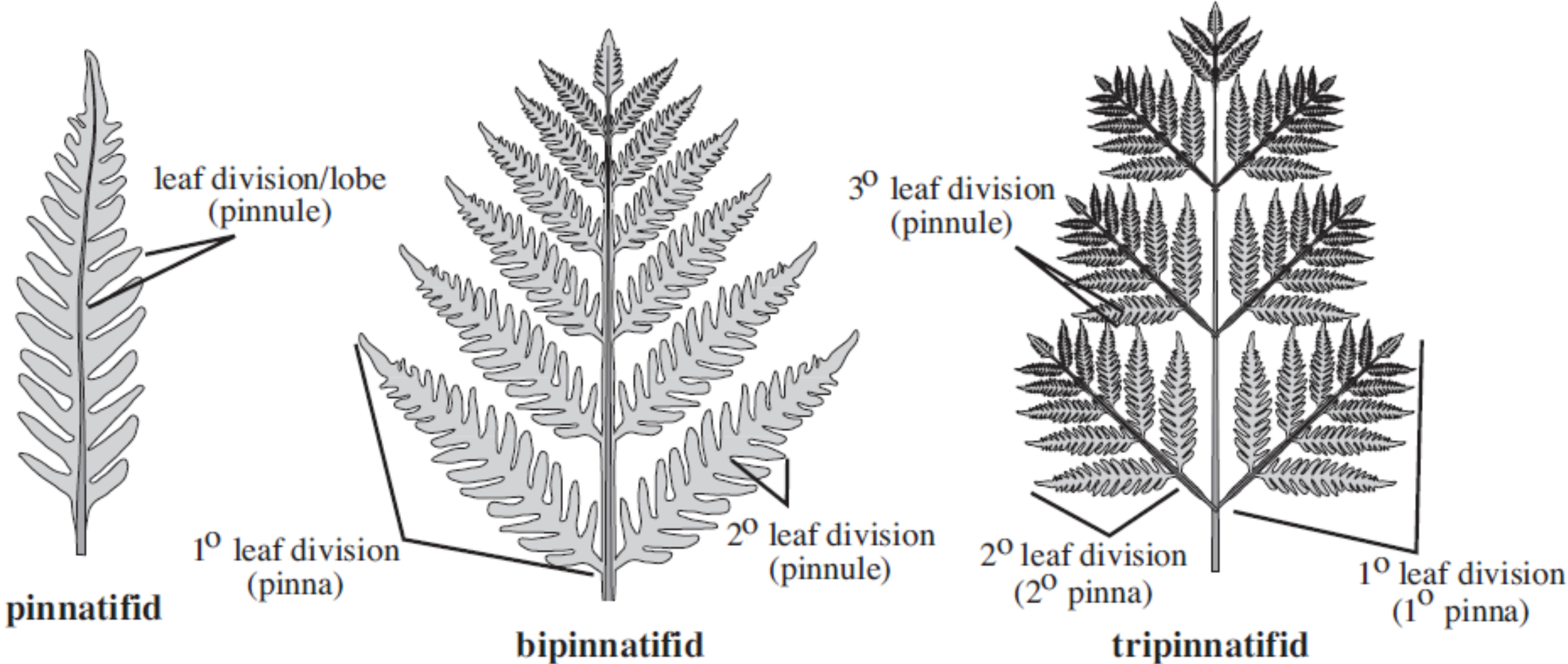
**Fiddleheads unfurl into fronds**



**Rhizomes**



# Frond Morphology





# Fern Sporangia Morphology

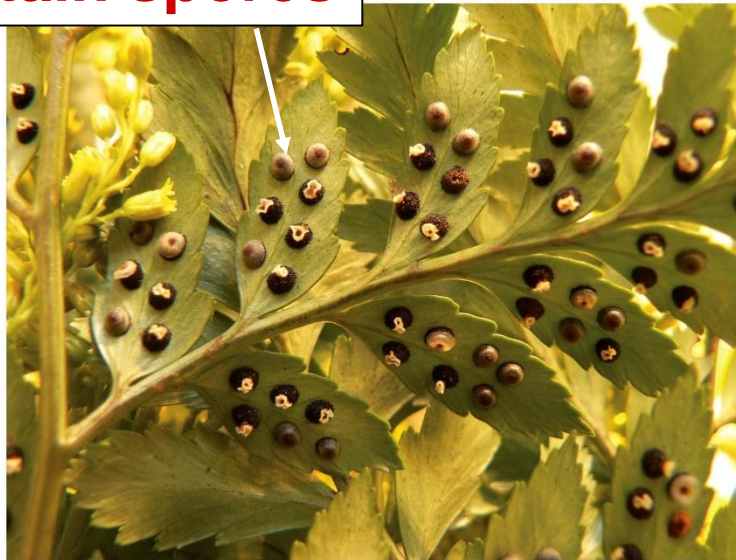


**Sori contain spores**



**Figure 17-32b**  
*Raven Biology of Plants, Eighth Edition*  
© 2013 W.H. Freeman and Company

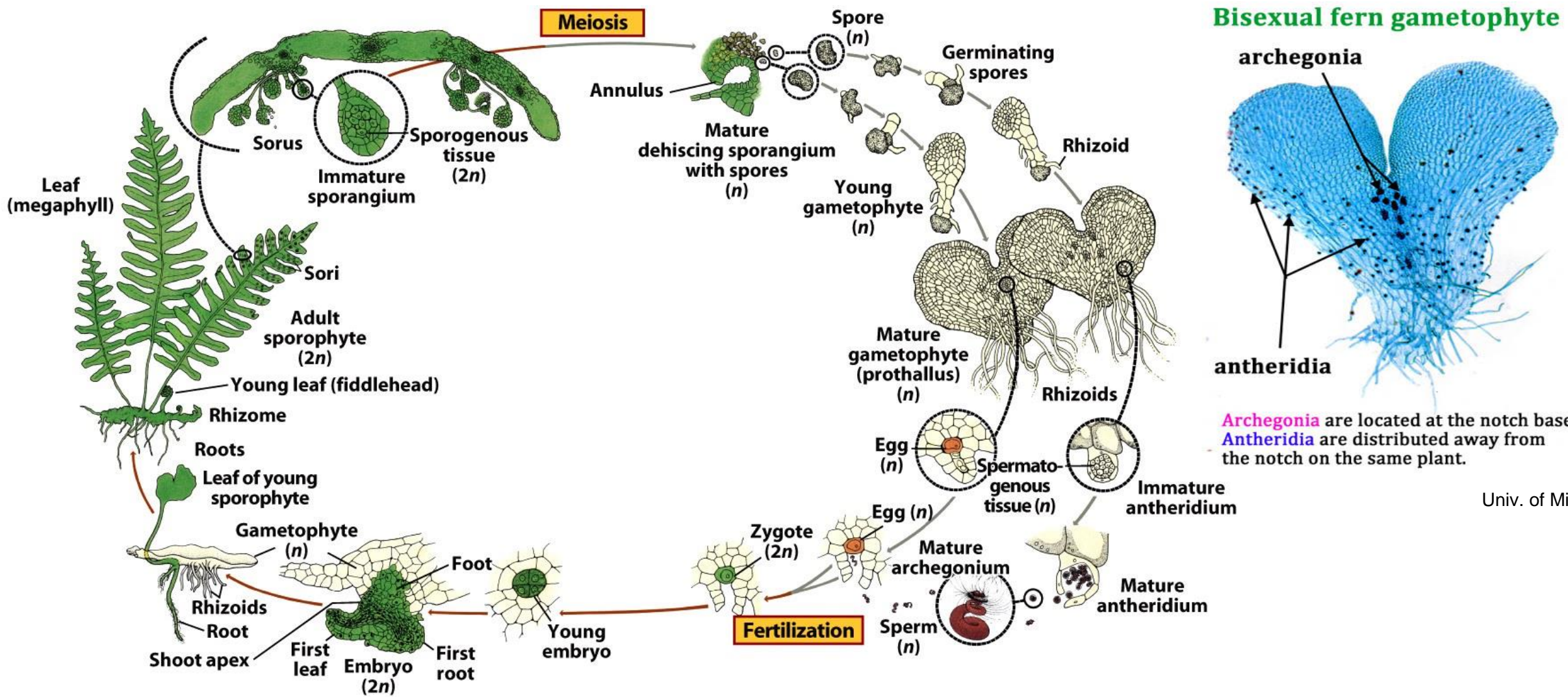
**Figure 17-32a**  
*Raven Biology of Plants, Eighth Edition*  
© 2013 W.H. Freeman and Company



**Figure 17-32c**  
*Raven Biology of Plants, Eighth Edition*  
© 2013 W.H. Freeman and Company



# Fern Reproduction



Univ. of Miami

**Figure 17-35**  
*Raven Biology of Plants, Eighth Edition*  
© 2013 W.H. Freeman and Company



# (True) Fern Diversity

8500+ Species Worldwide

70<sub>ish</sub> Species in NC



**Southern Maidenhair Fern**

*Adiantum capillus-veneris*



**Evergreen Woodfern**

*Dryopteris marginalis*



# (True) Fern Diversity

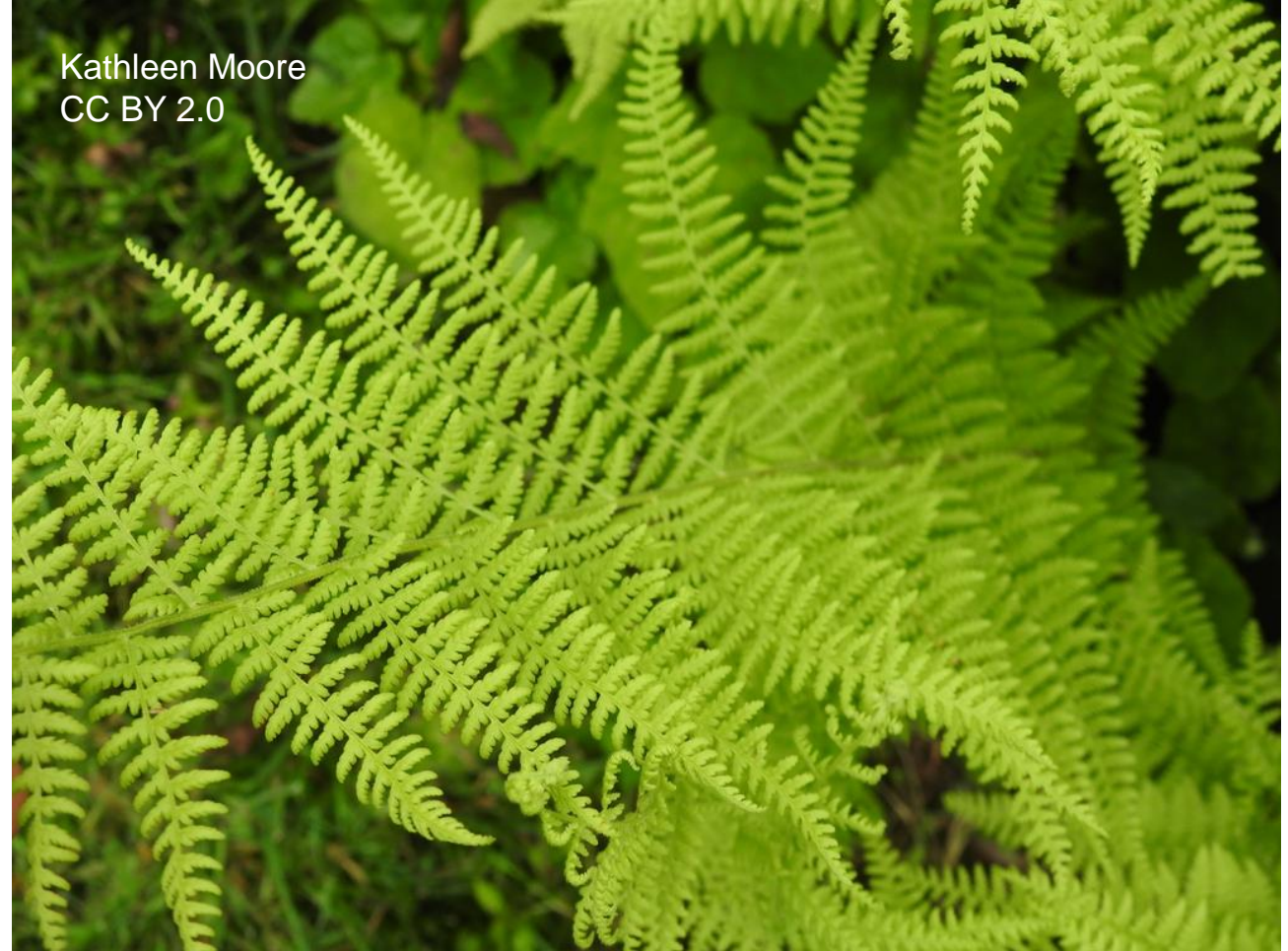
See more here: [https://plants.ces.ncsu.edu/find\\_a\\_plant/?tag=fern](https://plants.ces.ncsu.edu/find_a_plant/?tag=fern)



NatureServe  
CC BY 2.0

## Cinnamon Fern

*Osmundastrum cinnamomeum*



Kathleen Moore  
CC BY 2.0

## Hay-Scented Fern

*Dennstaedtia punctilobula*



# (True) Fern Diversity



Kahuroa  
Wikimedia Commons

**Mamaku**

*Cyathea medullaris*

**Tree Ferns**



Texas A&M AgriLife Extension

Texas A&M AgriLife Extension

**Mosquito Fern**  
*Azolla caroliniana*

