

Ferns of the Organ Mountains



Outline:

1. What are ferns?
2. The Organ Mountains
3. Ferns in the Organ Mountains

1: What are ferns?

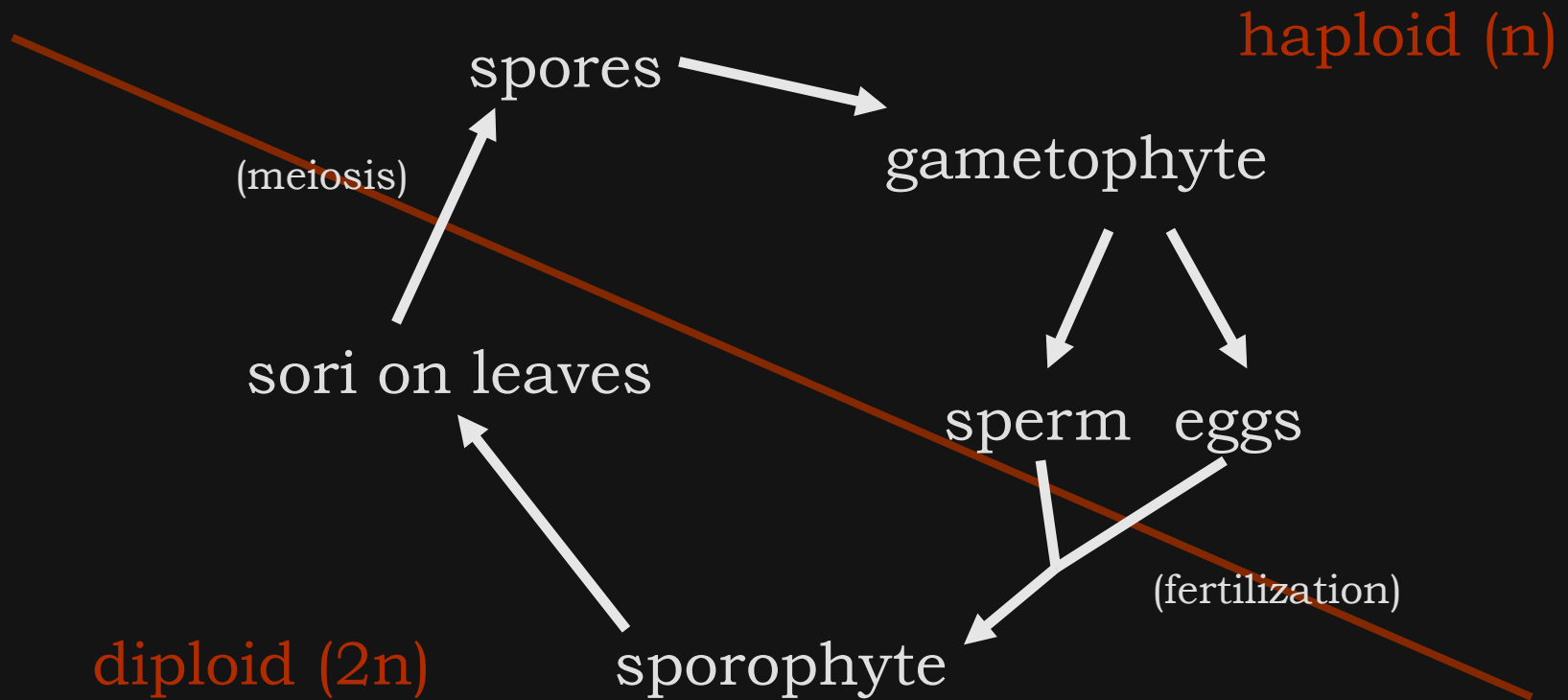
Ferns are plants that:

- have **vascular tissue** (unlike mosses and liverworts)
- have **“true” leaves** (unlike clubmosses, spikemosses, and horsetails)
- do **not have seeds** (unlike conifers and flowering plants)
- do **not have flowers** (unlike flowering plants)

Reproduction:

spores, produced in **sori**;
grow into **gametophytes**, which produces **gametes**;
gametes join, to form a **sporophyte**.

Fern life cycle



Sporophyte



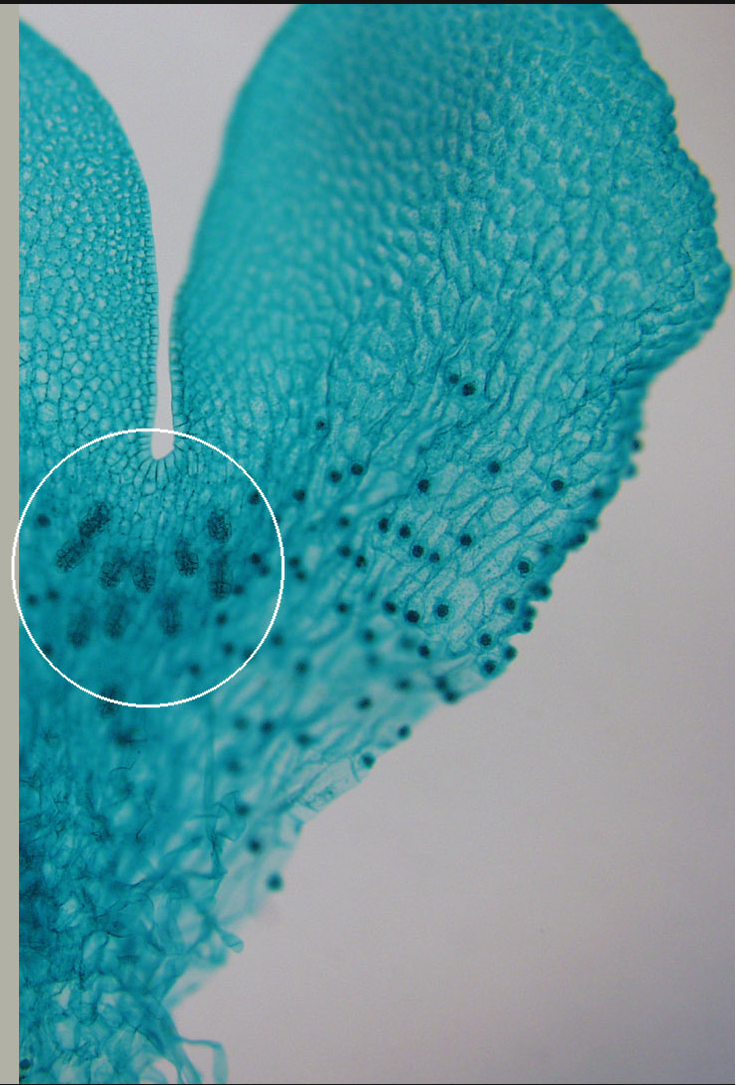
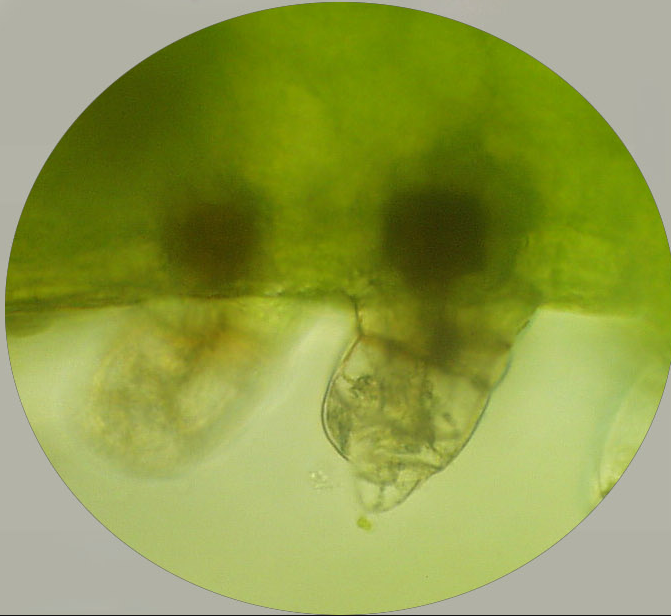
Sori



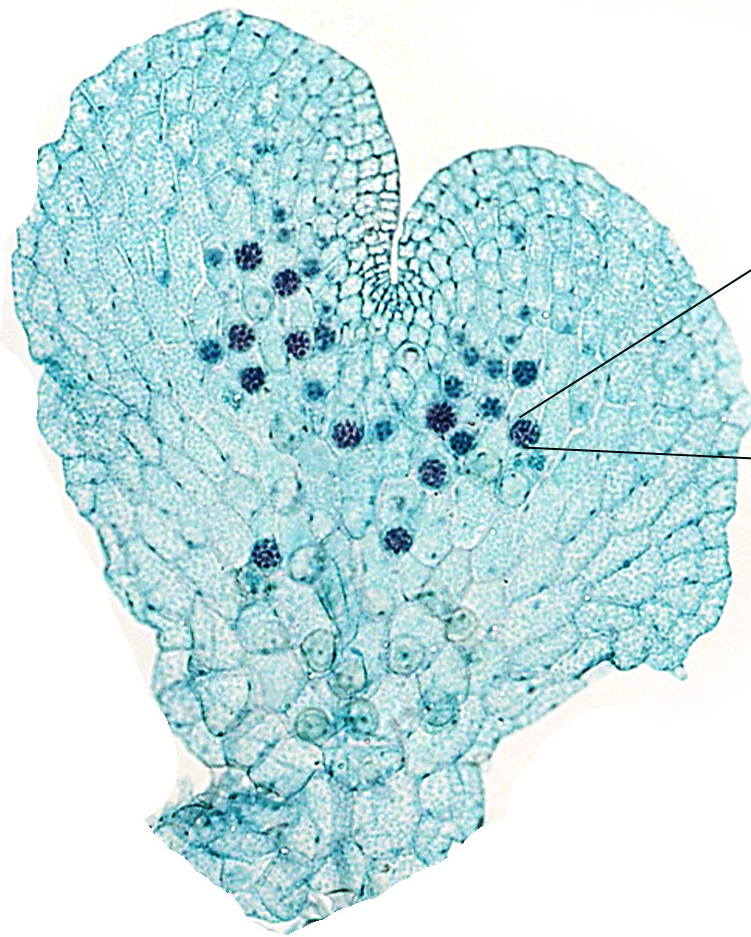
R. Moran



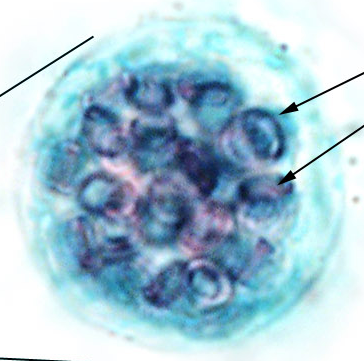
Gametophytes



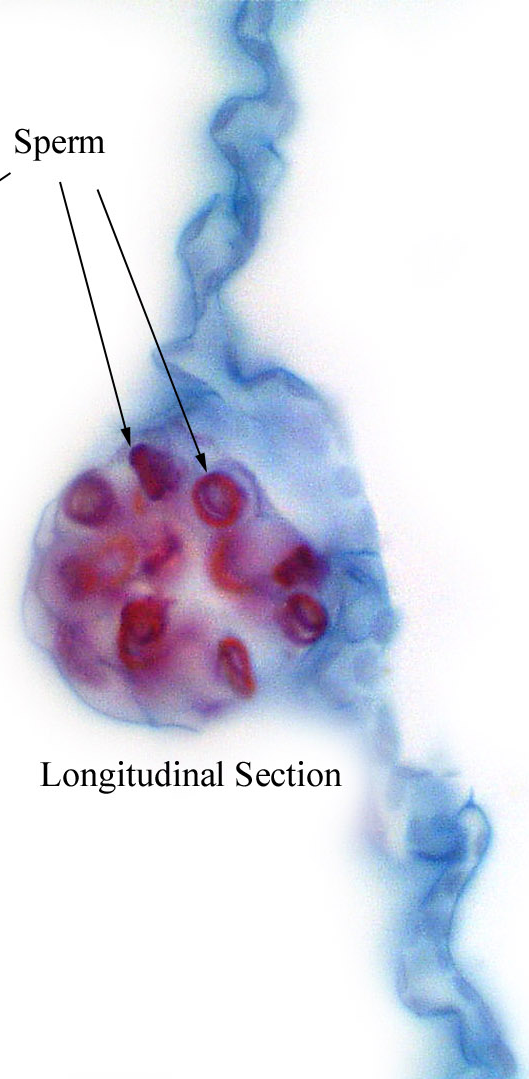
Gametophytes



Fern Antheridia

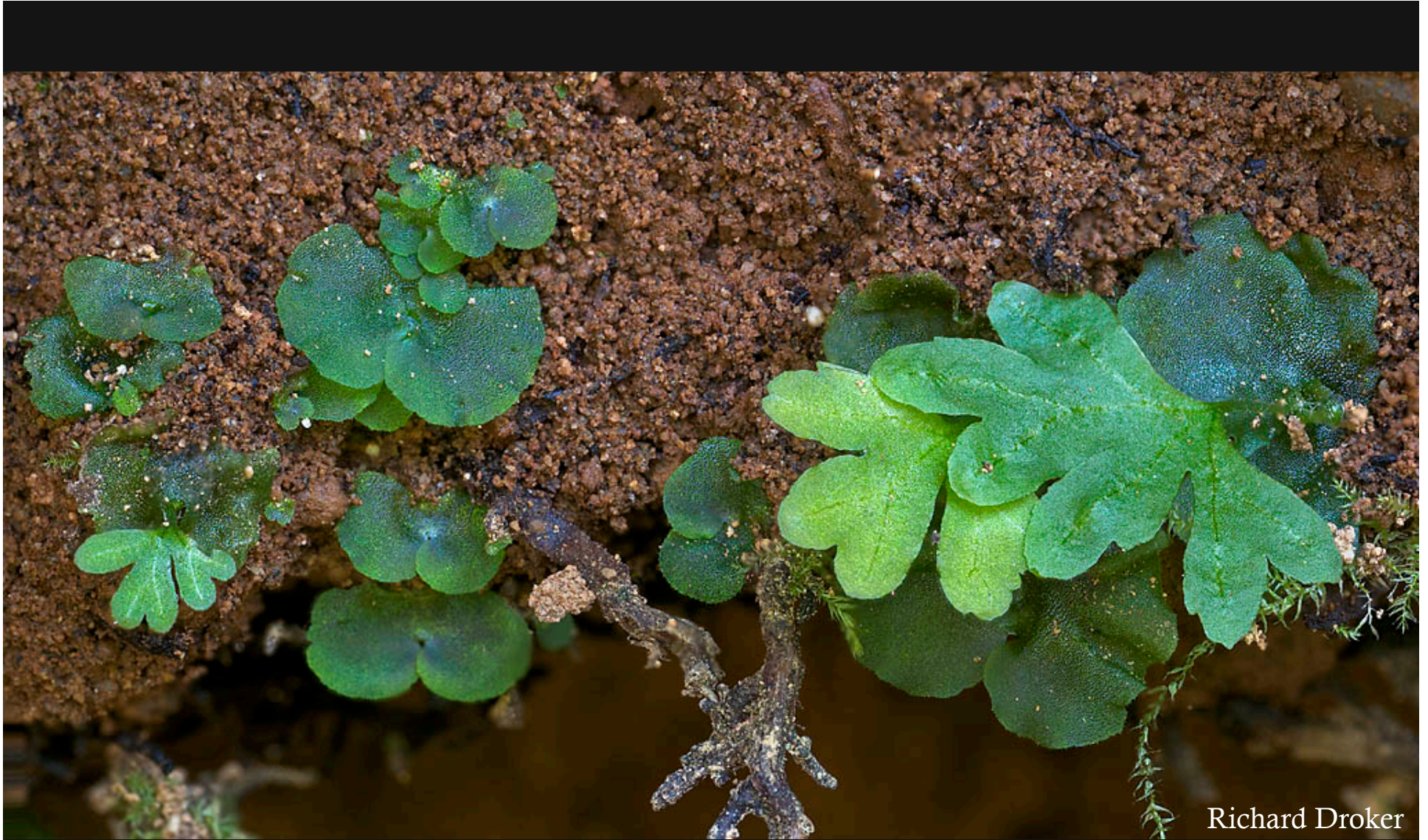


Sperm



Longitudinal Section

Gametophytes



Richard Droker

Gametophytes & sporophytes

Sori: used for **identification**.



Gametophytes: why are they important?



Ferns are a bit like amphibians.

Digression: frogs...



Adult frogs in arid areas either:
can become dormant in dry periods;
or need constant water.

Frogs, continued...

But tadpoles **need**
constant water.



Sporophytes are like adult frogs



All fern sporophytes need water for growth, but:
can become dormant;
or need constant water.

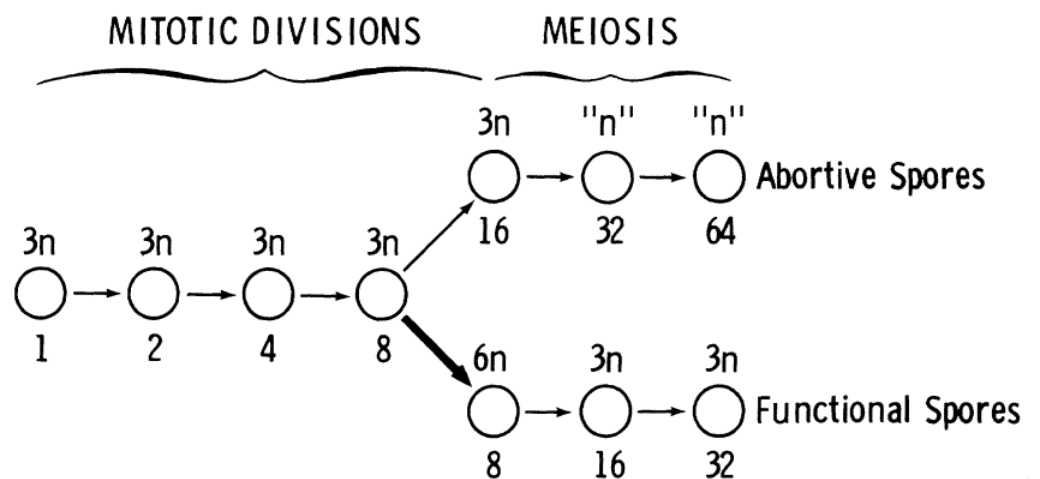
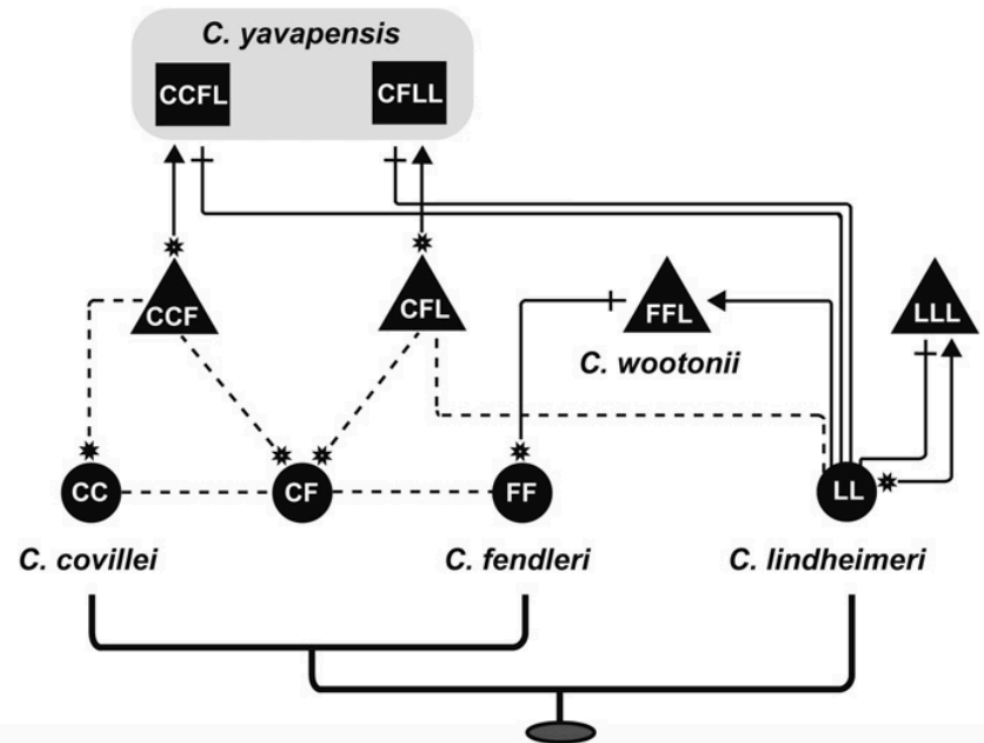
Gametophytes are like tadpoles

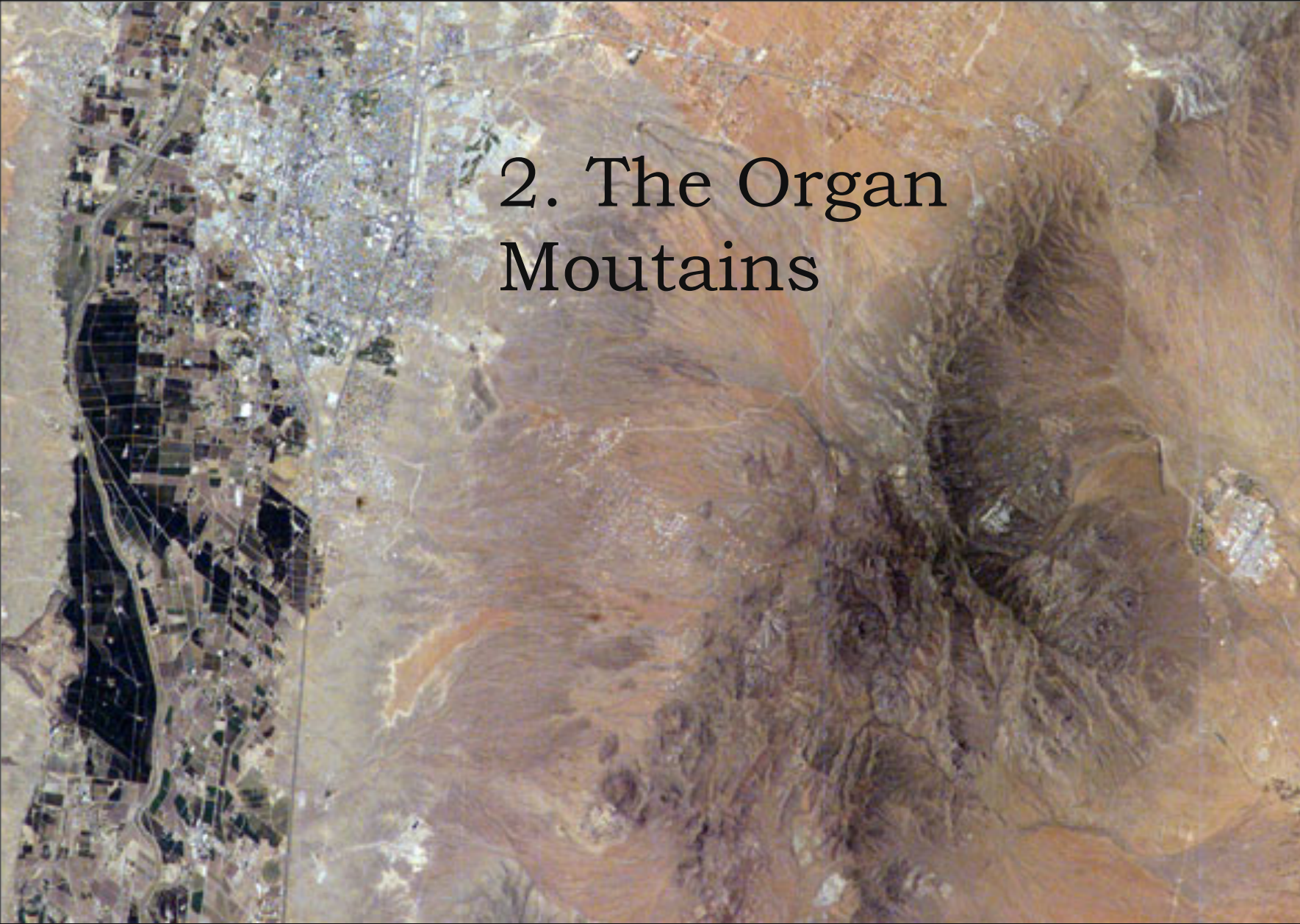


Gametophytes need constant water to survive and a film of water for fertilization

How do ferns deal with the limitations of drought-intolerant gametophytes?

1. Short-lived gametophytes.
2. Give up on sex!



An aerial photograph showing a rugged, mountainous landscape. On the left side, there is a densely populated urban area with a grid-like street pattern and various buildings. To the right of the city, the terrain transitions into a vast, arid mountain range with deep, winding canyons and ridges. The mountains are covered in sparse, dry vegetation, giving them a brownish-tan appearance. The overall scene is captured from a high altitude, providing a wide view of the geographical features.

2. The Organ Moutains

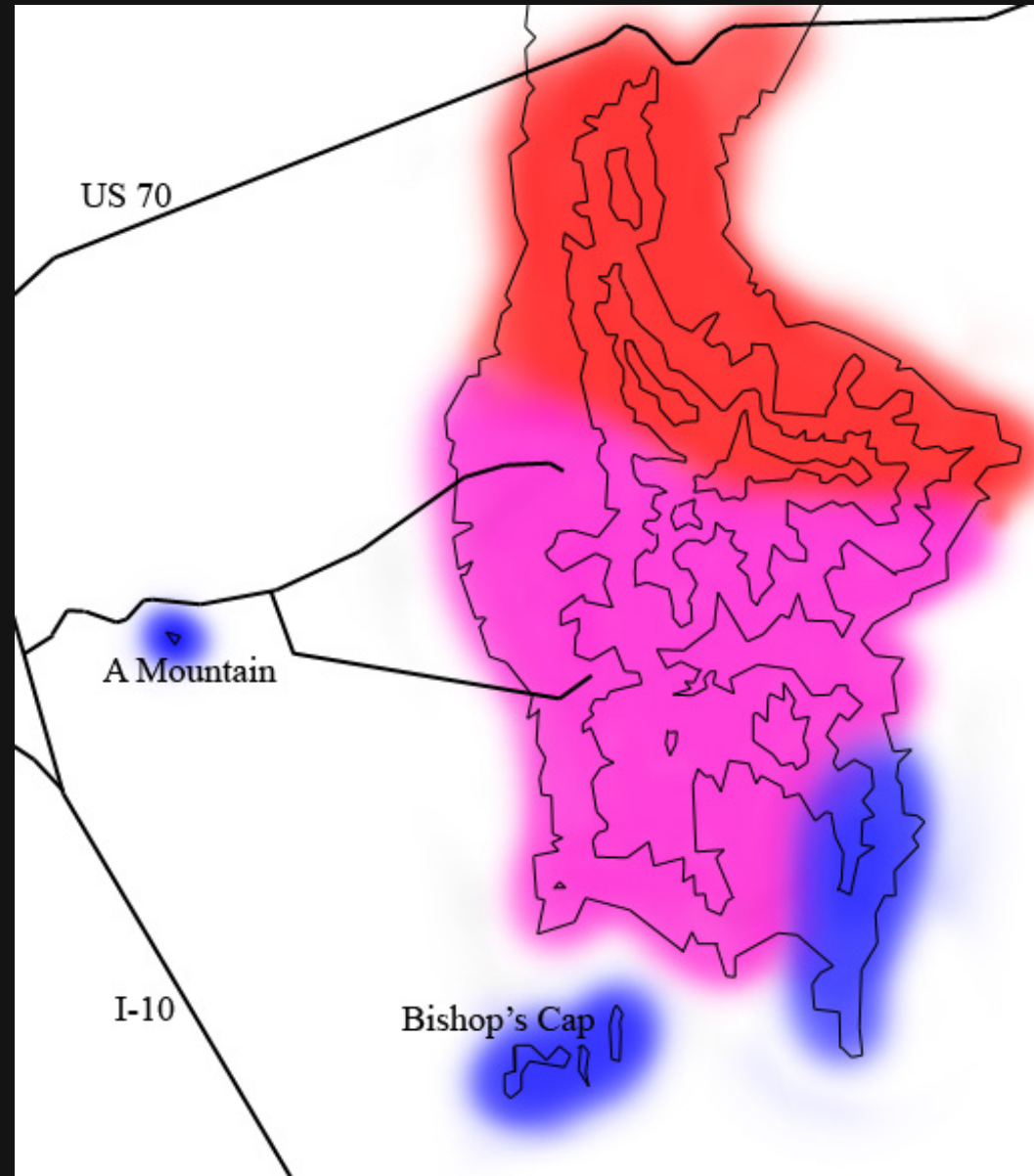
The Organ Mountains

Purple is rhyolite

Blue is limestone or
dolomite

Red is quartz-
monzonite

Different rocks,
different ferns!





The Needles: quartz-monzonite





Bishop's Cap: limestone.





La Cueva & Dripping Springs: rhyolite.



3. Ferns in the Organ Mts.

Aspleniaceae:

Asplenium resiliens
Asplenium trichomanes

Dennstaedtiaceae:

Pteridium aquilinum

Dryopteridaceae:

Cystopteris reevesiana
Dryopteris filix-mas
Phanerophlebia auriculata
Woodsia cochisensis
Woodsia neomexicana
Woodsia phillipsii
Woodsia plummerae

Pteridaceae:

Adiantum capillus-veneris
Argyrochosma limitanea
Astrolepis cochisensis
Astrolepis integerrima

Pteridaceae, cont.:

Astrolepis sinuata
Astrolepis windhamii
Bommeria hispida
Cheilanthes bonariensis
Cheilanthes eatonii
Cheilanthes feei
Cheilanthes fendleri
Cheilanthes lindheimeri
Cheilanthes tomentosa
Cheilanthes villosa
Cheilanthes wootonii
Cheilanthes wrightii
? *Cheilanthes yavapensis* ?
Notholaena standleyi
Pellaea atropurpurea
Pellaea intermedia
Pellaea truncata
Pellaea wrightiana

Ferns and geology.

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Pellaea atropurpurea
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Pellaea truncata
Pellaea wrightiana

Purple: on rhyolite; **Orange:** on rhyolite and quartz-monzonite;
Blue: on limestone / dolomite; **Green:** on all rock types

Fern families



Aspleniaceae (spleenwort family)



sori are oval or linear, with a flap (the indusium) along one side



Dryopteridaceae (shield fern family)



sori are round, with that flap (indusium), forming a shield or cup-like structure



Pteridaceae (brake family)



sori are lines along the edges of the leaflets, protected by the edge of the leaf or not



Pteridaceae, cont.

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Ferns in the Organs: limestone / dolomite





Astrolepis cochisensis (Cochise scaly cloak-fern)



Astrolepis cochisensis (Cochise scaly cloak-fern)



Astrolepis cochisensis (Cochise scaly cloak-fern)



Astrolepis integerrima (hybrid scaly cloakfern)



Cheilanthes feei (Fee's lip fern)



Cheilanthes feei (Fee's lip fern)

Ferns in the Organs: quartz monzonite





Cheilanthes fendleri (Fendler's lip fern)



Cheilanthes fendleri (Fendler's lip fern)



Cheilanthes fendleri (Fendler's lip fern)



Cheilanthes eatonii (Eaton's lip fern)



Cheilanthes eatonii (Eaton's lip fern)



Pellaea truncata (spiny cliff-brake)



Woodsia neomexicana (New Mexican cliff fern)



Woodsia neomexicana (New Mexican cliff fern)



Woodsia phillipsii (Phillips' cliff fern)

Ferns in the Organs: rhyolite





some will be the same
as on quartz-monzonite





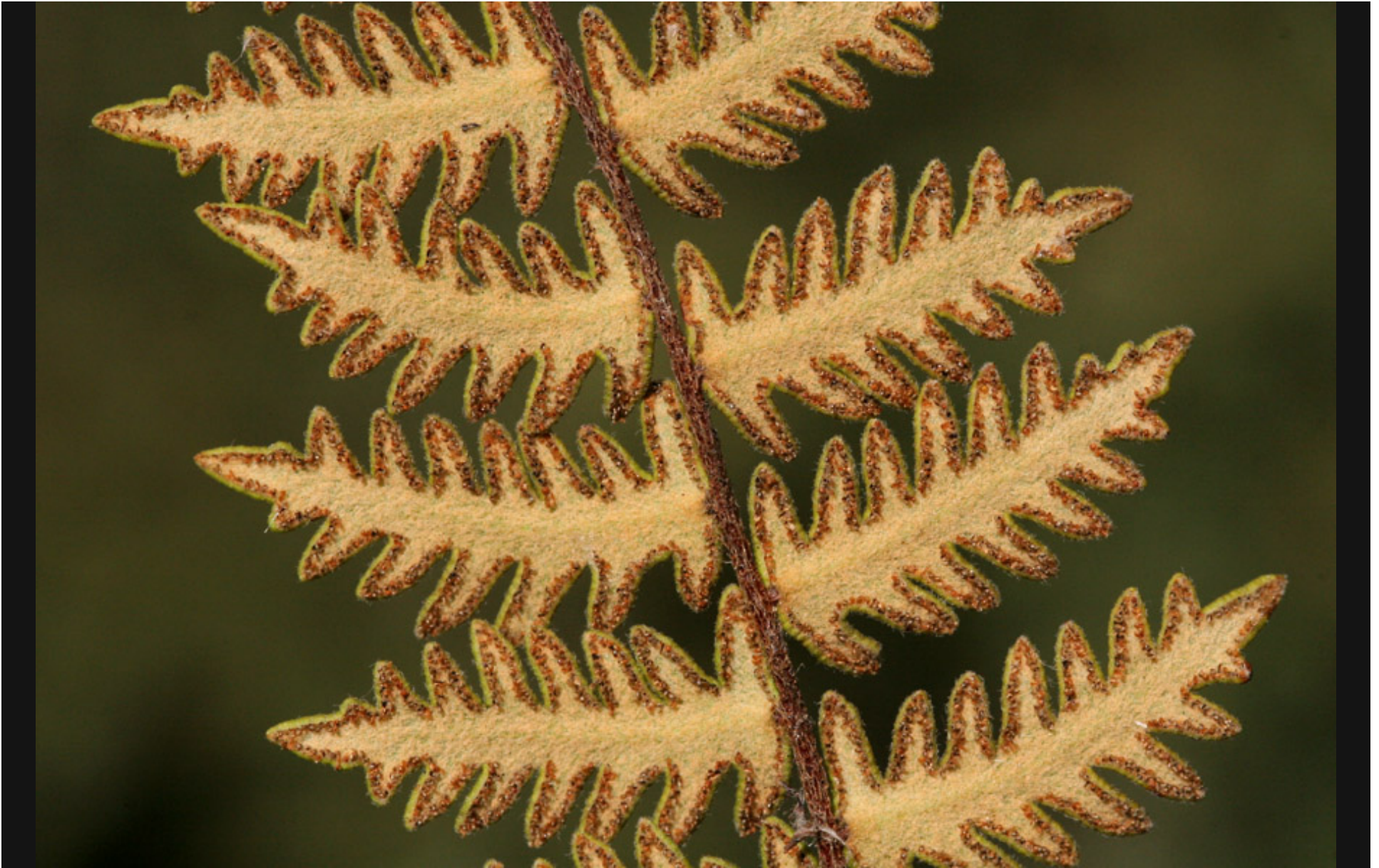
Notholaena standleyi (star cloak fern)



Notholaena standleyi (star cloak fern)



Cheilanthes bonariensis (golden lipfern)



Cheilanthes bonariensis (golden lipfern)



Pellaea atropurpurea (purple cliffbrake)



Pellaea atropurpurea (purple cliffbrake)



Pellaea wrightiana (Wright's cliff-brake)



Pellaea wrightiana (Wright's cliff-brake)



Astrolepis sinuata (wavy scaly cloakfern)



Phanerophlebia auriculata (eared veinfern)



Asplenium resiliens (maidenhair spleenwort)



Asplenium trichomanes (maidenhair spleenwort)



Asplenium trichomanes (maidenhair spleenwort)



