Sistemática de Criptógamas

Antocerophyta e Marchantiophyta

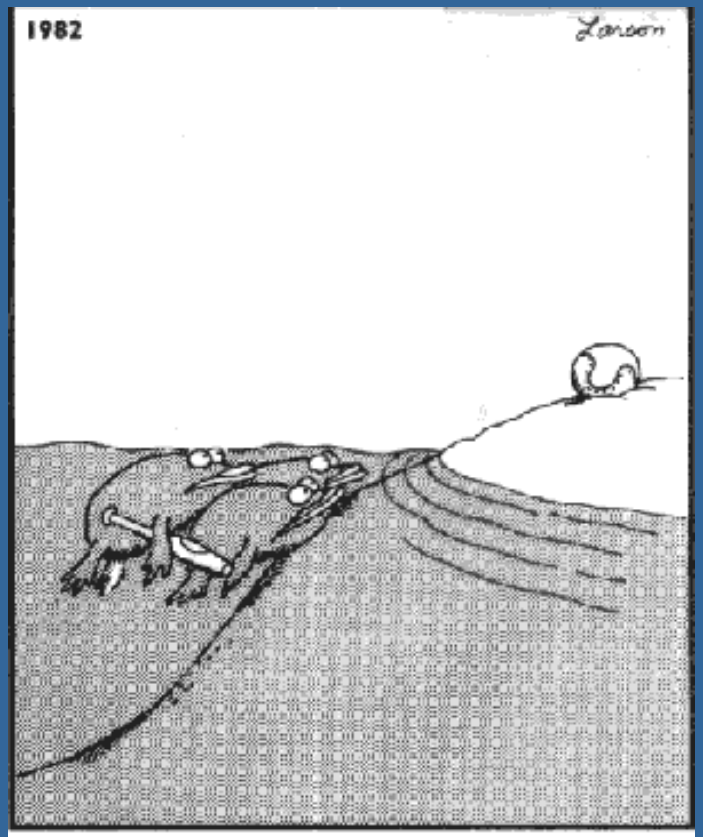
Briófitas

- 3 grupos:
  - Hepáticas (Hepatophyta)
  - Antóceros (Antocerophyta)
  - Musgos (Bryophyta)

- Água - terra
  - Transição entre algas e plantas

- Inovações:
  - Evitar desidratação

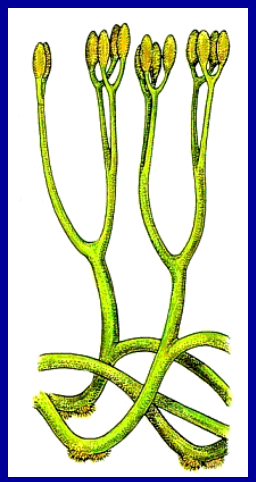
- Vestígio : necessidade de água na fecundação



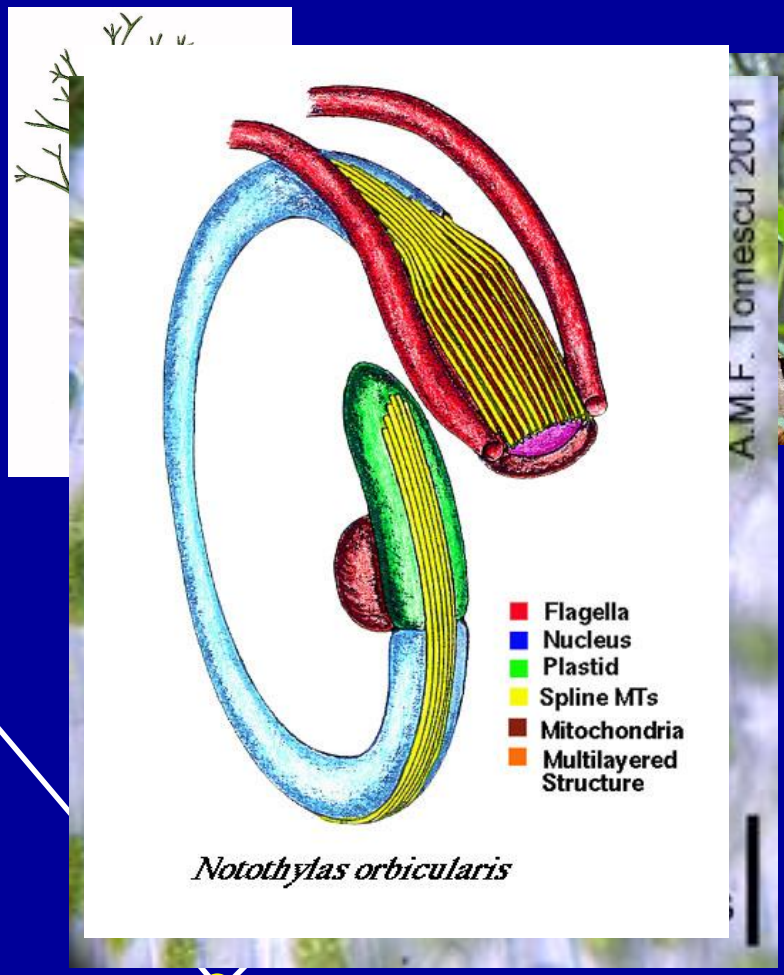
Great moments in evolution

Hepáticas

Musgos



Aglaophyton †



Anthoceros

Anterozóides simetria bilateral

425 ma

Anterozóides simetria bilateral

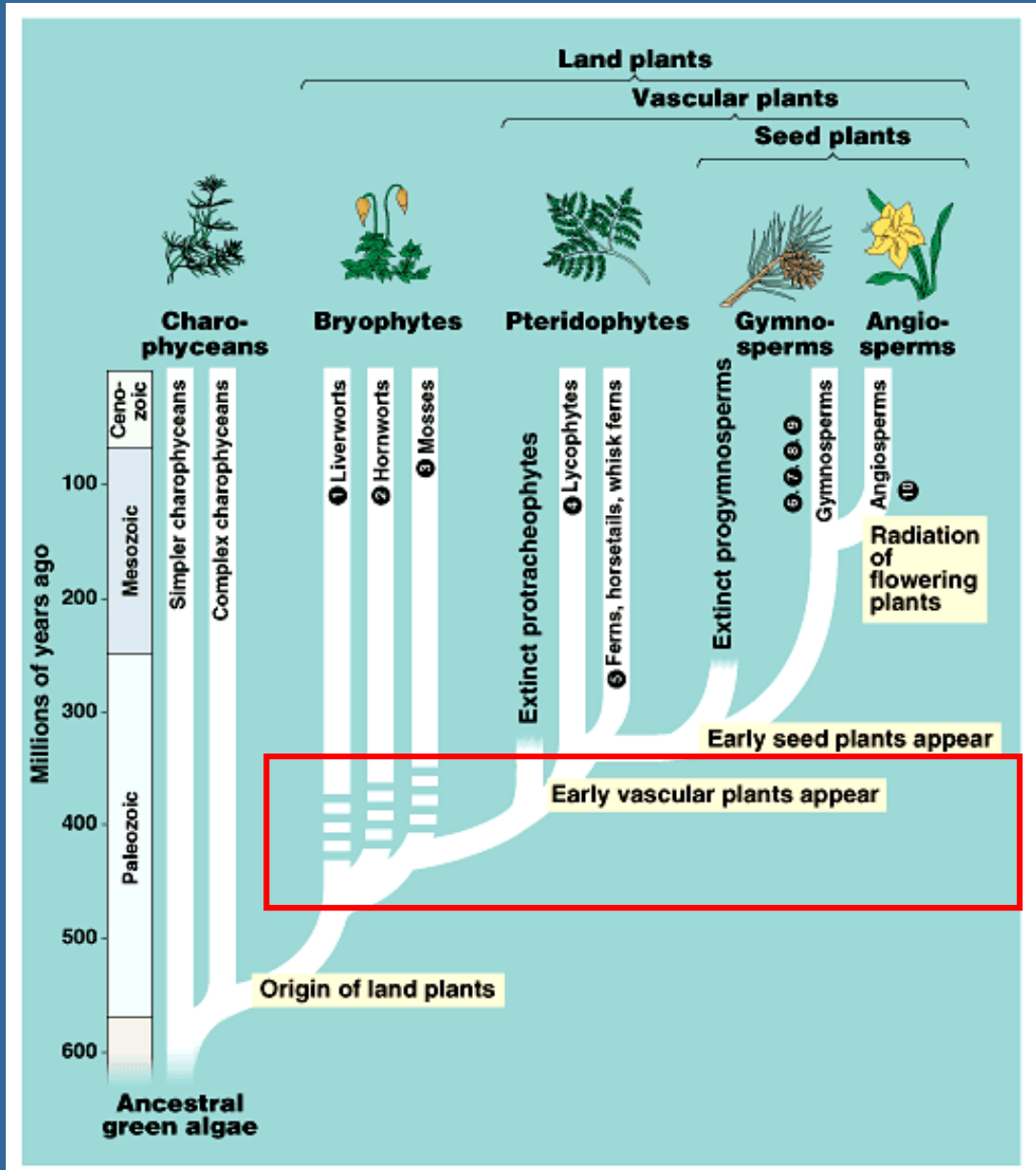
Esporofito dominante / ramificado

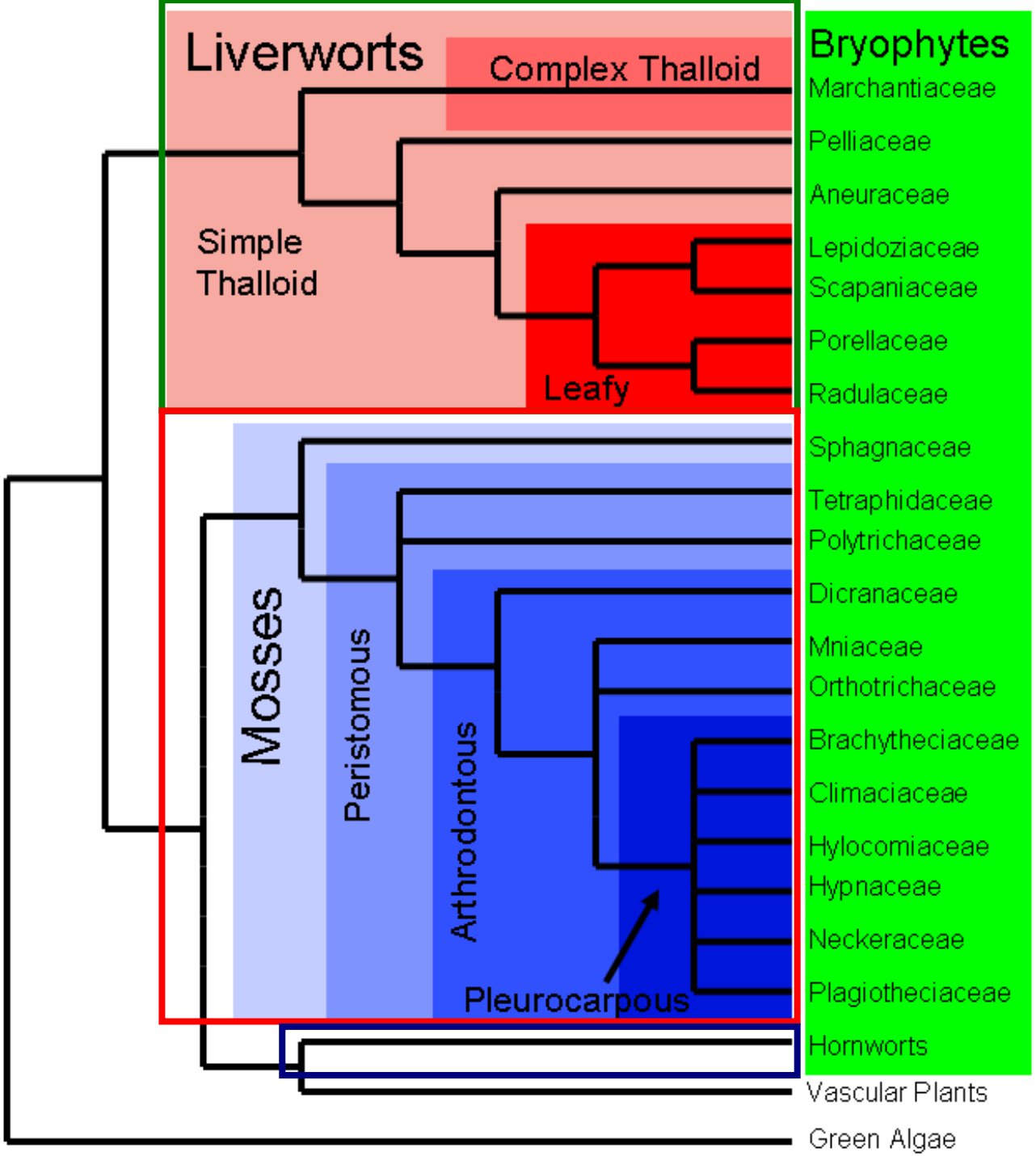
Cloroplasto com pirenóides

450 ma

Embrião multicelular

Filogenia das plantas terrestres




Liverworts
Complex Thalloid
Simple Thalloid
Leafy
Mosses
Peristomous
Arthrodontous
Pleurocarpous
Bryophytes
Marchantiaceae
Pelliaceae
Aneuraceae
Lepidoziaceae
Scapaniaceae
Porellaceae
Radulaceae
Sphagnaceae
Tetraphidaceae
Polytrichaceae
Dicranaceae
Mniaceae
Orthotrichaceae
Brachytheciaceae
Climaciaceae
Hylocomiaceae
Hypnaceae
Neckeraceae
Plagiotheciaceae
Hornworts
Vascular Plants
Green Algae

Briófitas

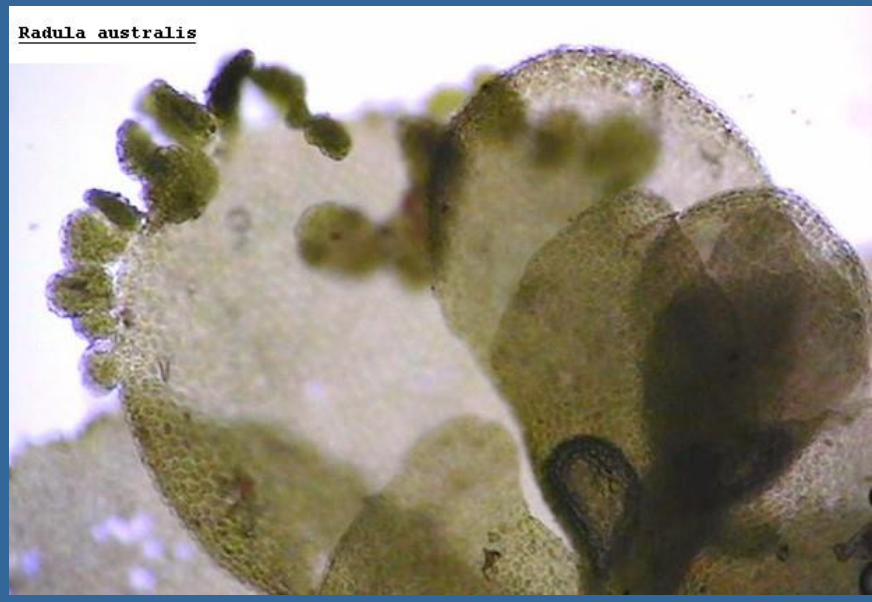
- Habitat:
  - Maioria: locais úmidos
  - Desertos e rochas
  - Regiões Árticas
- Importância:
  - Diversidade vegetal
  - Colonizadores iniciais
  - Ciclo do carbono

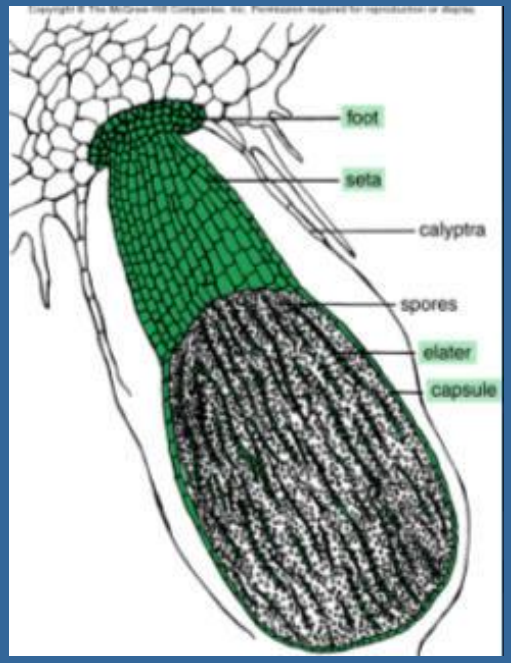
Características

- Alternância de gerações heteromorficas
- Gametófitos (n): dominantes e vida livre
- Esporófito (2n): pequeno, dependente, 1 esporângio
- Estomatos no esporofito (quando presente)
- Rizoides
- Sem feixes vasculares verdadeiros
- Ausência de xilema e floema
- Ausência de lignina

Reprodução

- Reprodução assexuada
  - Fragmentação
  - Gemas
- Reprodução sexuada
  - Anterídeos e arquegônios
  - Água para fecundação
- Embrião: dentro do arquegônio
- Esporófito: pé, haste (seta) e esporângio (cápsula)





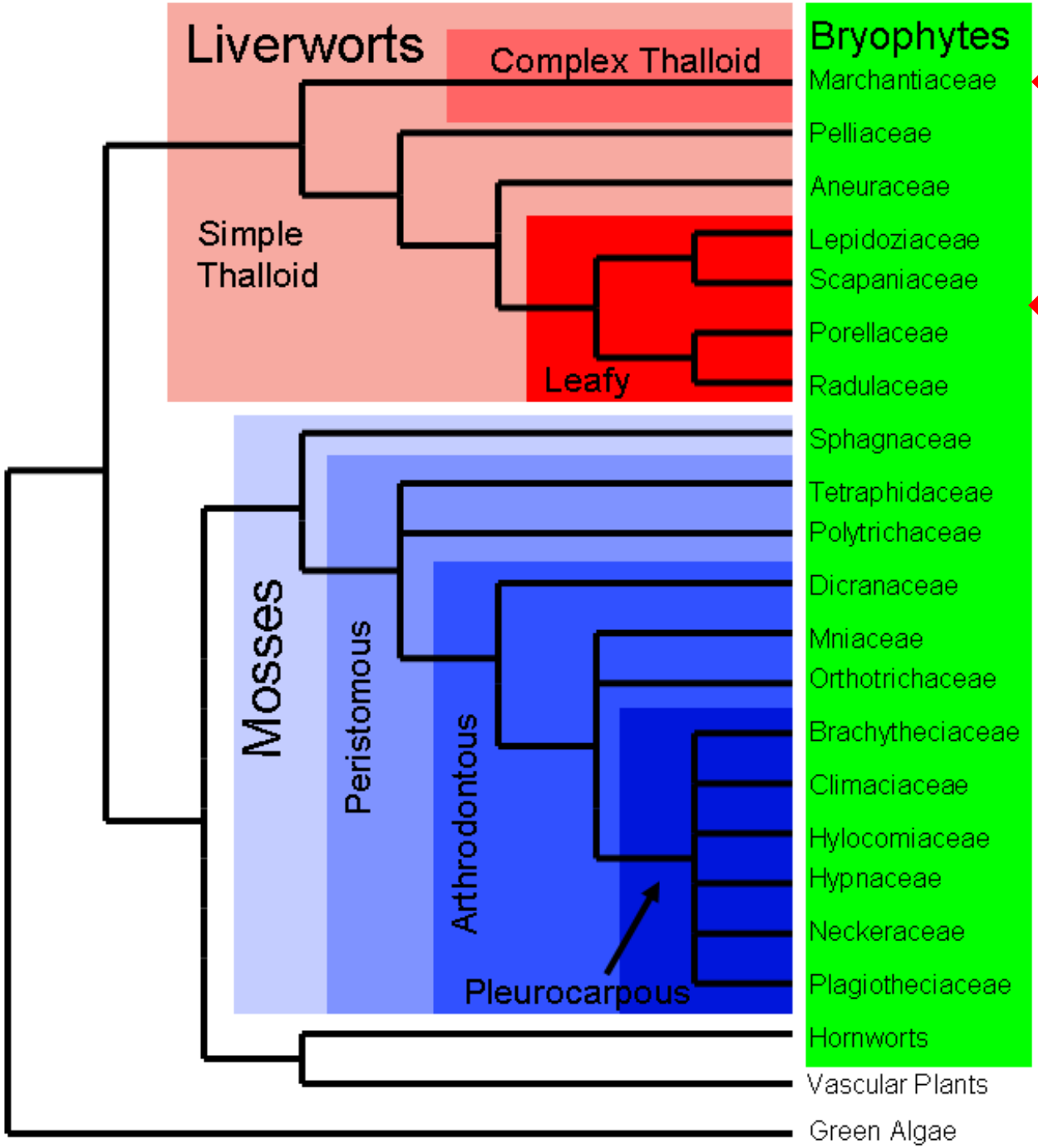

Hepatophyta

Hepáticas: Subfilo *Hepatophyta*

- 6.000 spp.
- Pequenas e inconspícuas
- Gametófito: esporos (protonema)
- Rizoides unicelulares
- Elatérios
- Corpos de óleo

- 3 grupos:
  - Hepáticas talosas complexas
  - Hepáticas talosas simples
  - Hepáticas folhosas

Cryptothallus mirabilis, © Sam Bosanquet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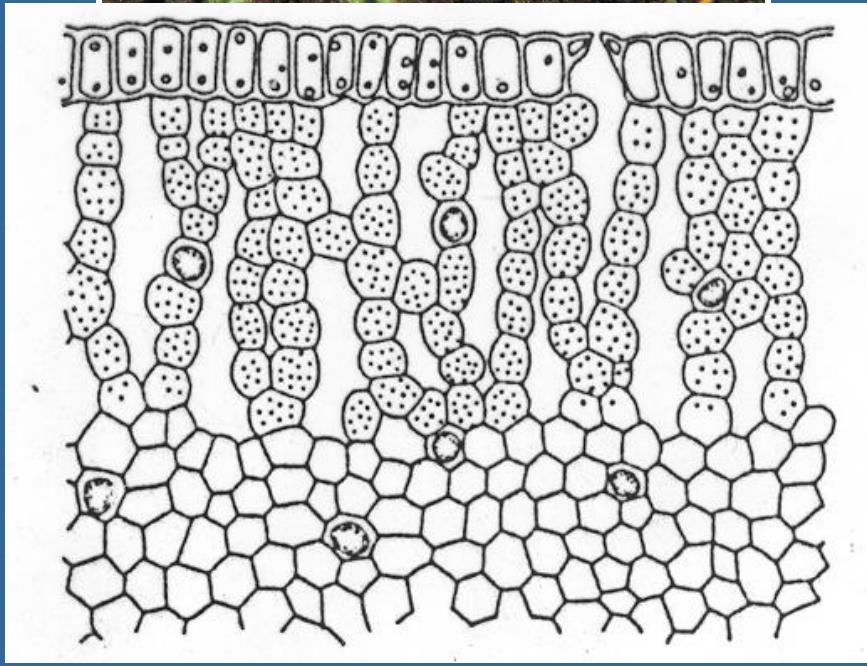
Radulaceae
Sphagnaceae
Tetraphidaceae
Polytrichaceae
Dicranaceae
Mniaceae
Orthotrichaceae
Brachytheciaceae
Climaciaceae
Hylocomiaceae
Hypnaceae
Neckeraceae
Plagiotheciaceae
Hornworts
Vascular Plants
Green Algae

Hepáticas: Subfilo *Hepatophyta*

- <u>Hepáticas talosas complexas</u>
- *Riccia, Ricciocarpus e Marchantia, Lunullaria*
- Barrancos úmidos
- Talos:
  - Superior: fina, clorofilada
  - Inferior: espessa e incolor
- Gametófito: uni ou bissexuado
- *Riccia*: Esporófito no gametófito
- Maior gênero: *Marchantia*



Marchantiales: *Riccia*

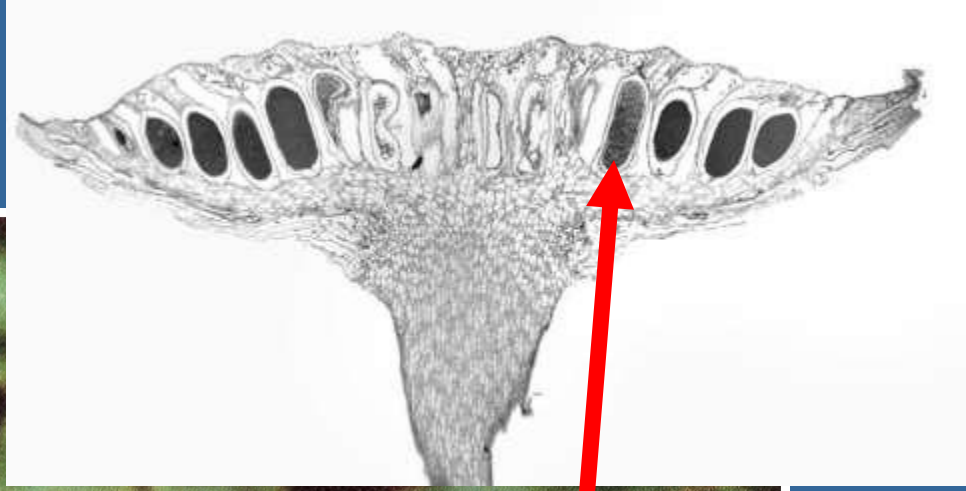
Riccia ciliata

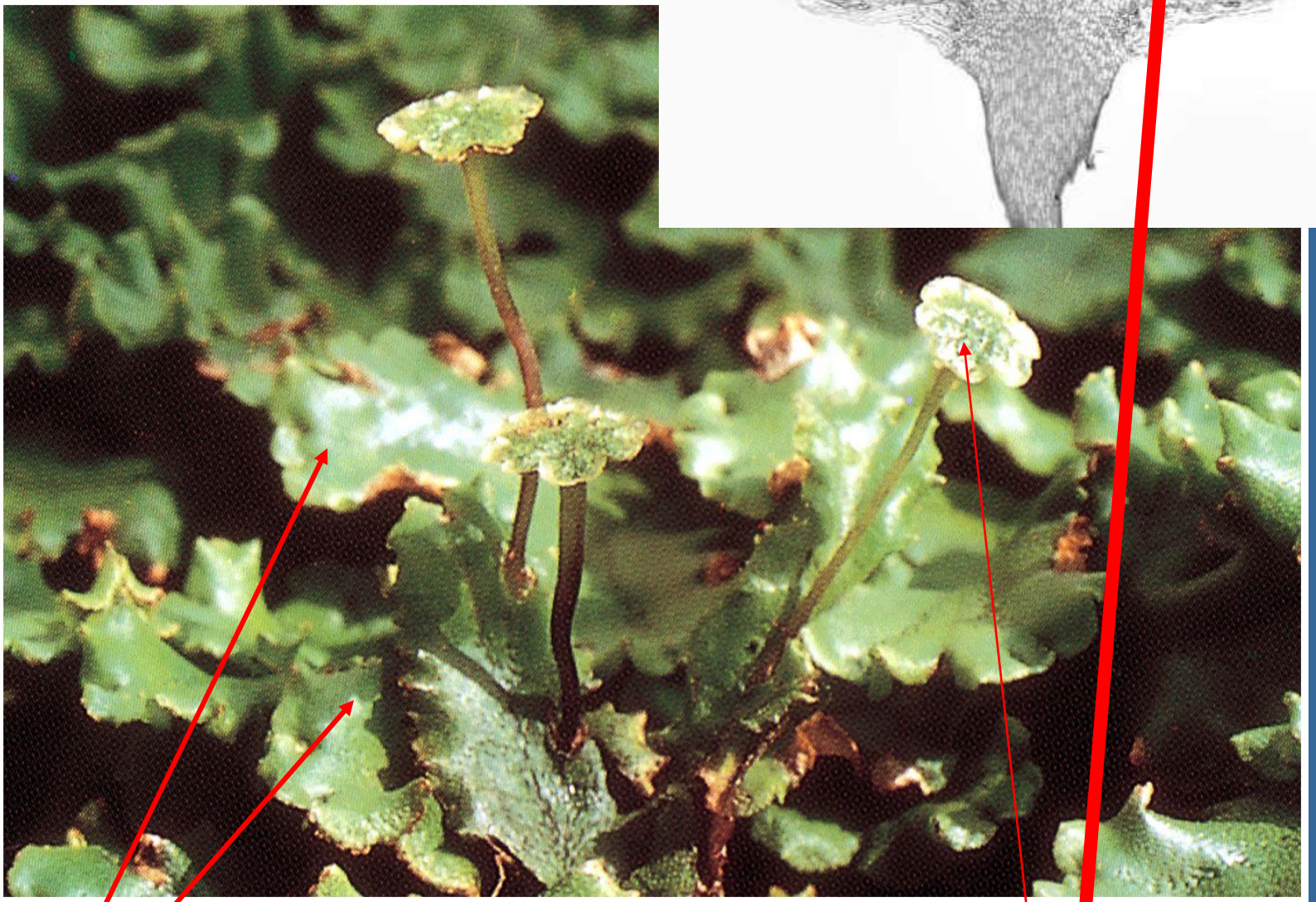

Riccia glauca


Targionia

Monocleales: *Monoclea forsteri*

Marchantia sp.





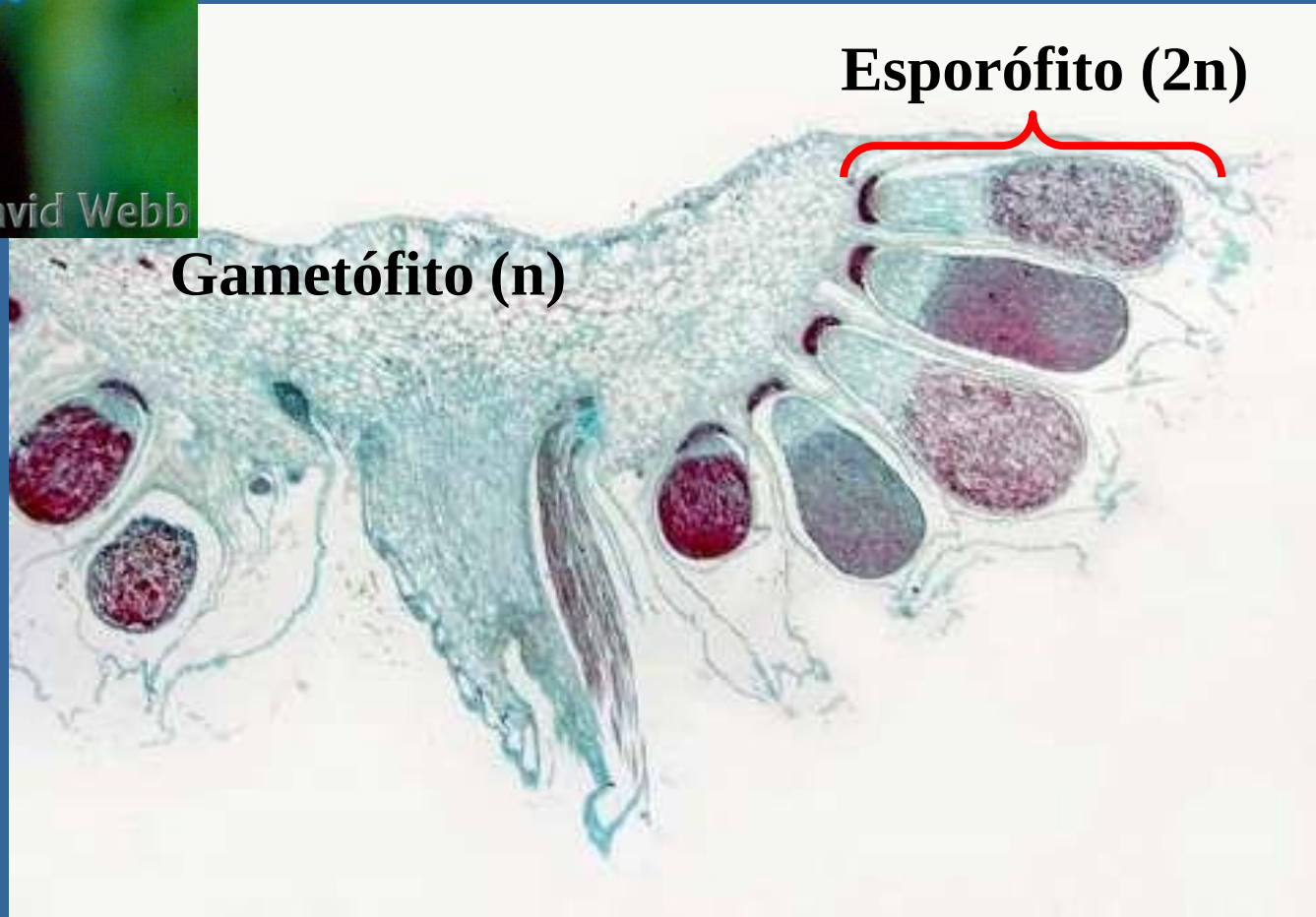
Gametófito

Anterídio

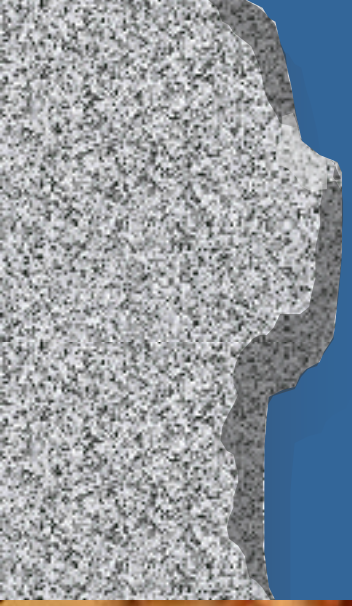
Arquegônio

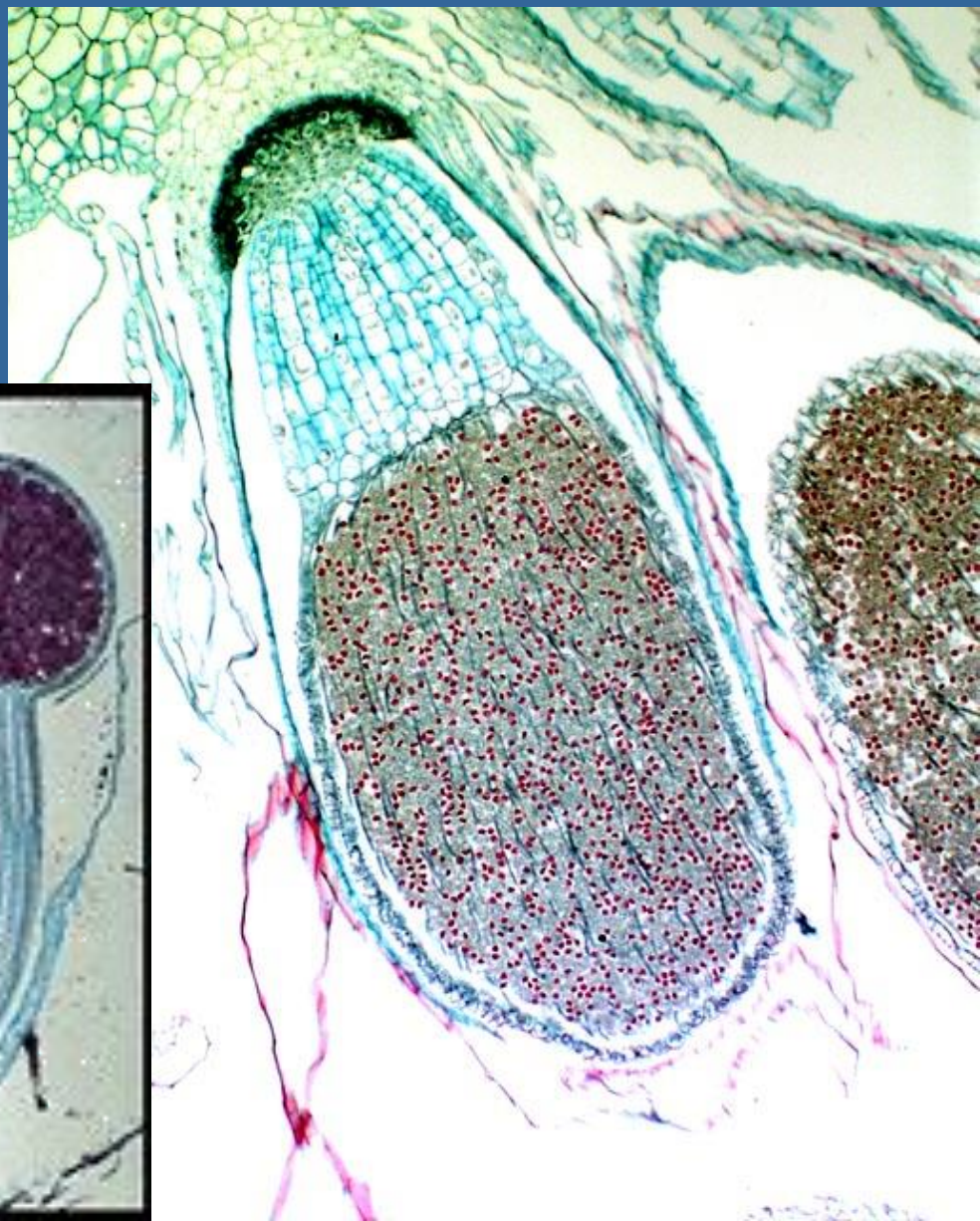
Gametófito

Marchantia sp. (corte)



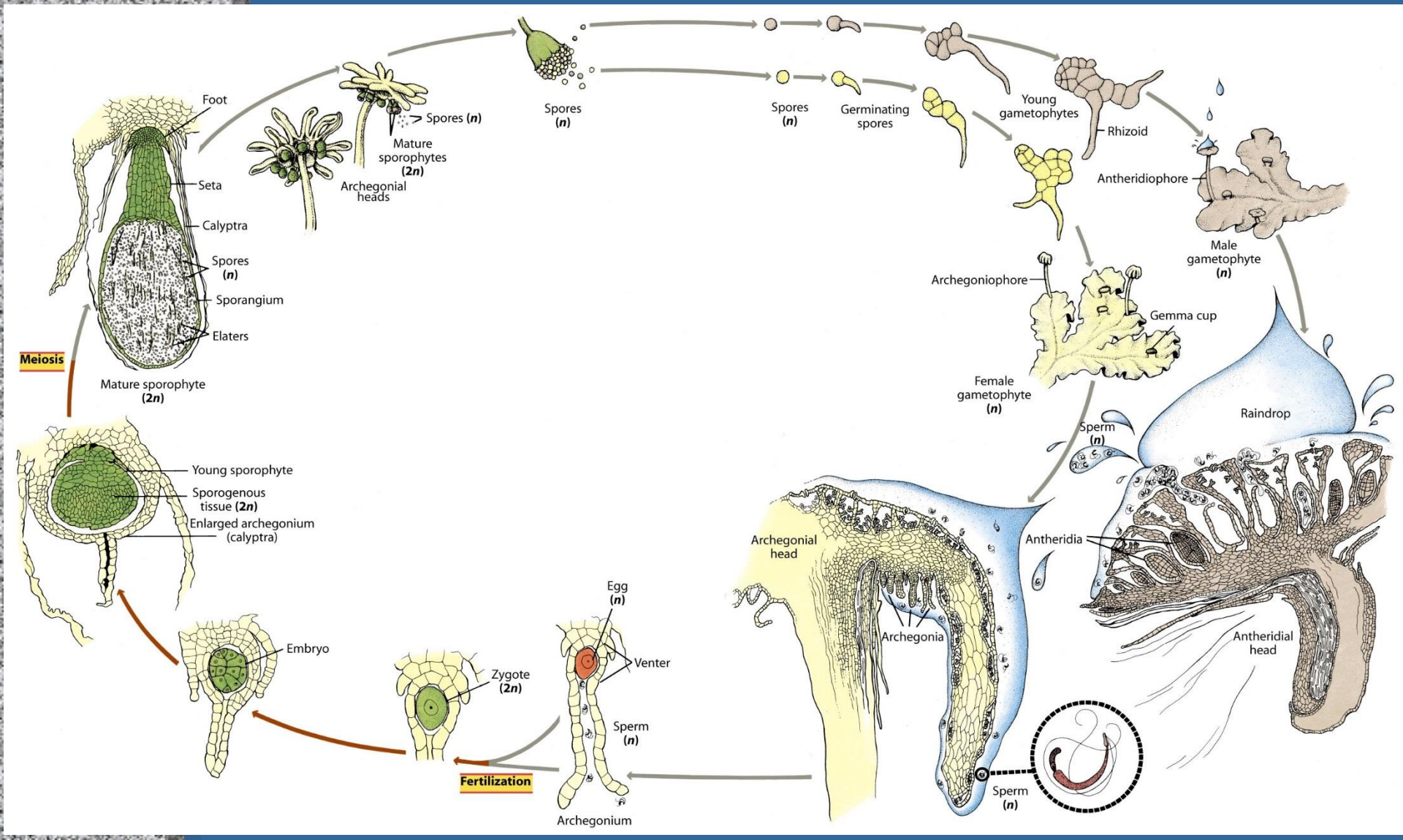
Esporófitos, esporos e elatérios





Marchantia sp.

Marchantia – ciclo de vida




Marchantia sp.
© M. Lüth


© M. Lüth

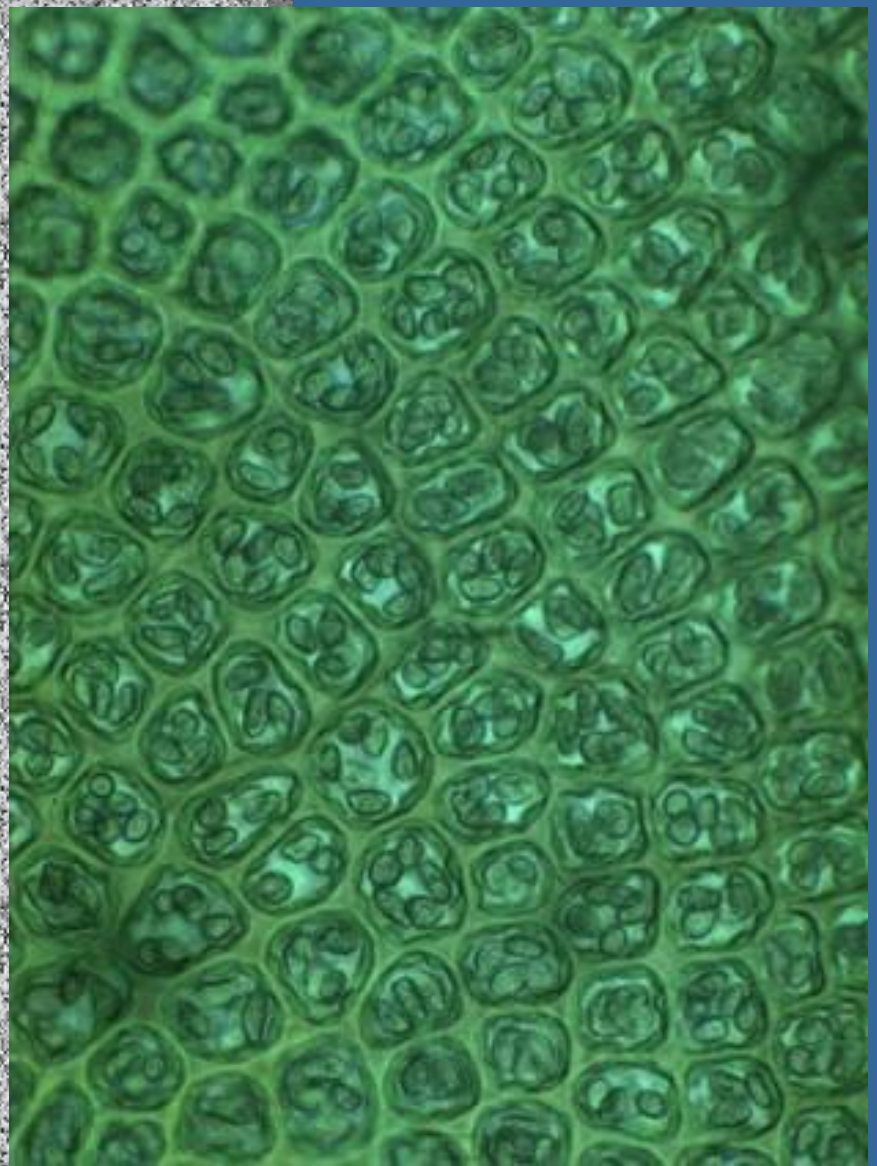
Hepáticas talosas simples

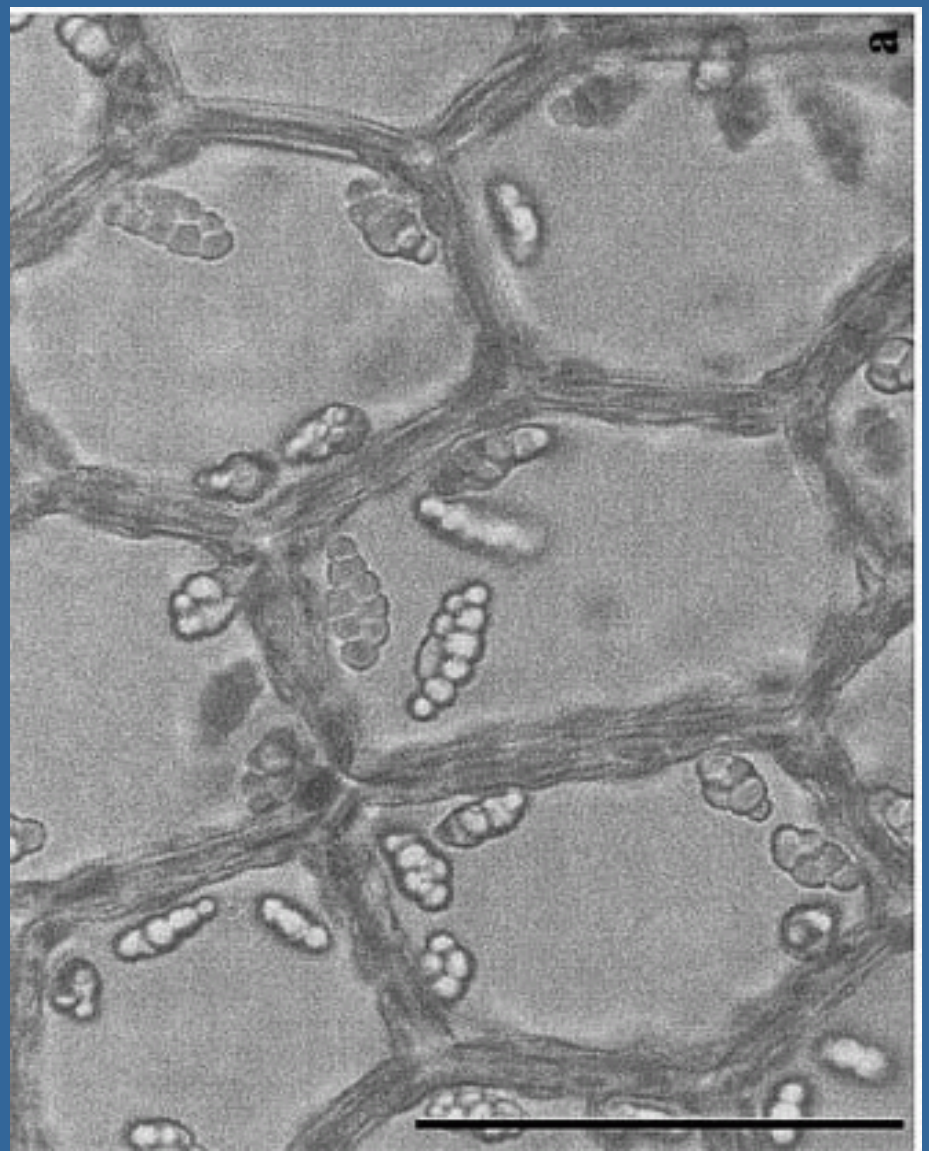
Pellia epiphylla, © M. Lüth

Metzgeriidae I: *Pallaviciniaceae*

Symphyogyna circinata, Chile

Hepáticas talosas simples



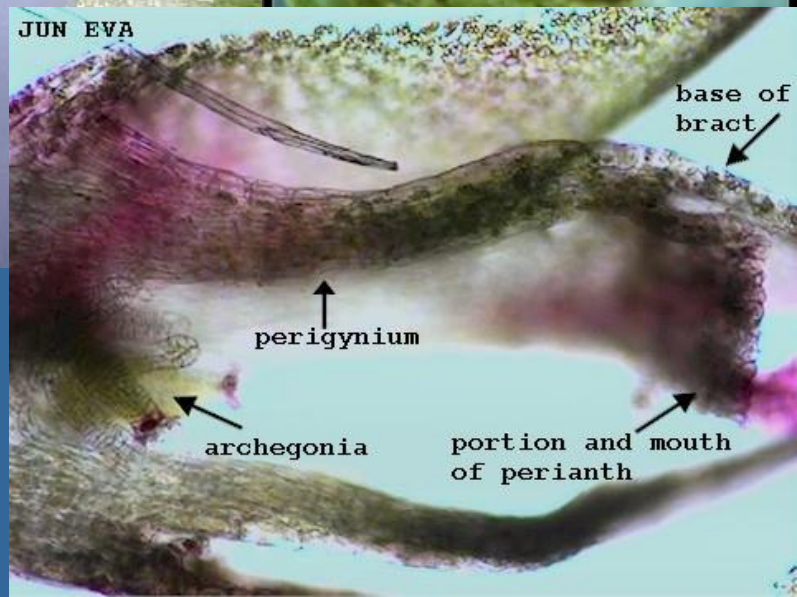


Liverwort capsule (PELLIA) before and after dehiscence.
The brown fluff on the right is a mass of elaters.

Hepáticas folhosas

Ramificadas (aglomerados)

- Filidios: única camada de células indiferenciadas, lobadas
- Nervura ausente
- Anterídios: ramo lateral (androceu)
- Esporófito: perianto
- Anfigastro




Plagiochila porelloides

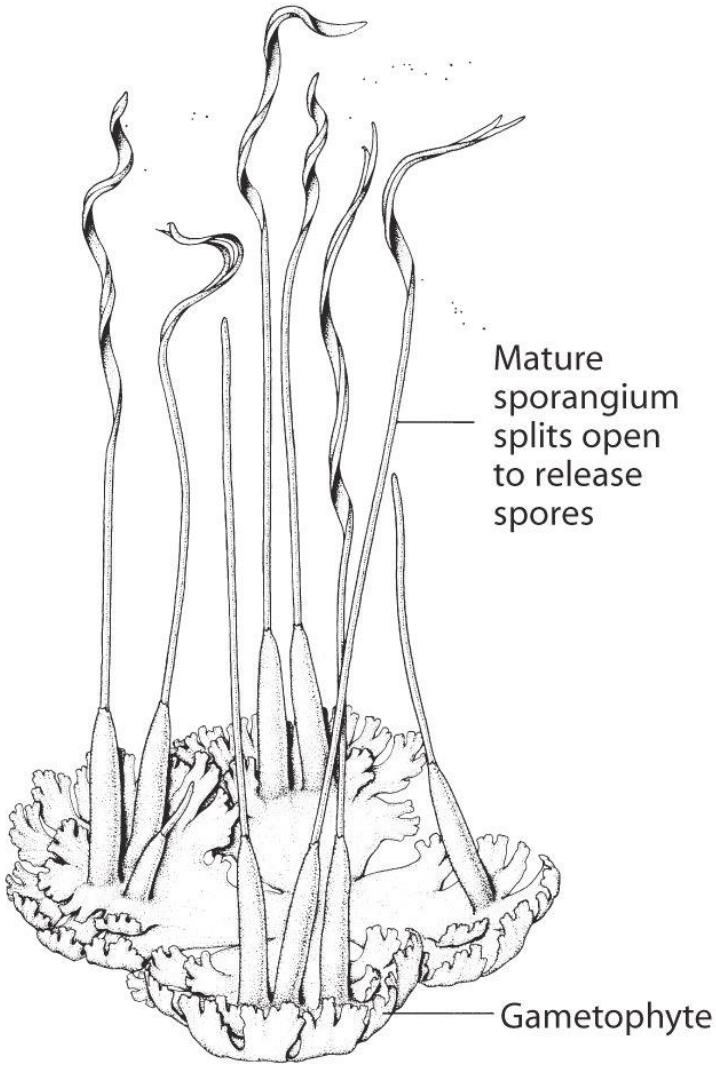
Lejeunea lamacerina ssp. geminata


Anthocerophyta

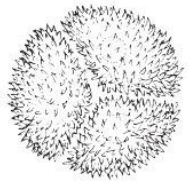
Antóceros: Subfilo *Anthocerophyta*

- 100 spp. (6 gêneros)
- Maior: *Anthoceros*
- Associação com *Nostoc*
- Gametófito:
  - Rosetas
  - Uni ou bissexuados
- Anterídios e arquegônios: no interior do gametófito
- Esporófito: pé + cápsula
  - Meristema
  - Cutícula e estômatos
- Esporos: ápice

Antóceros: morfologia



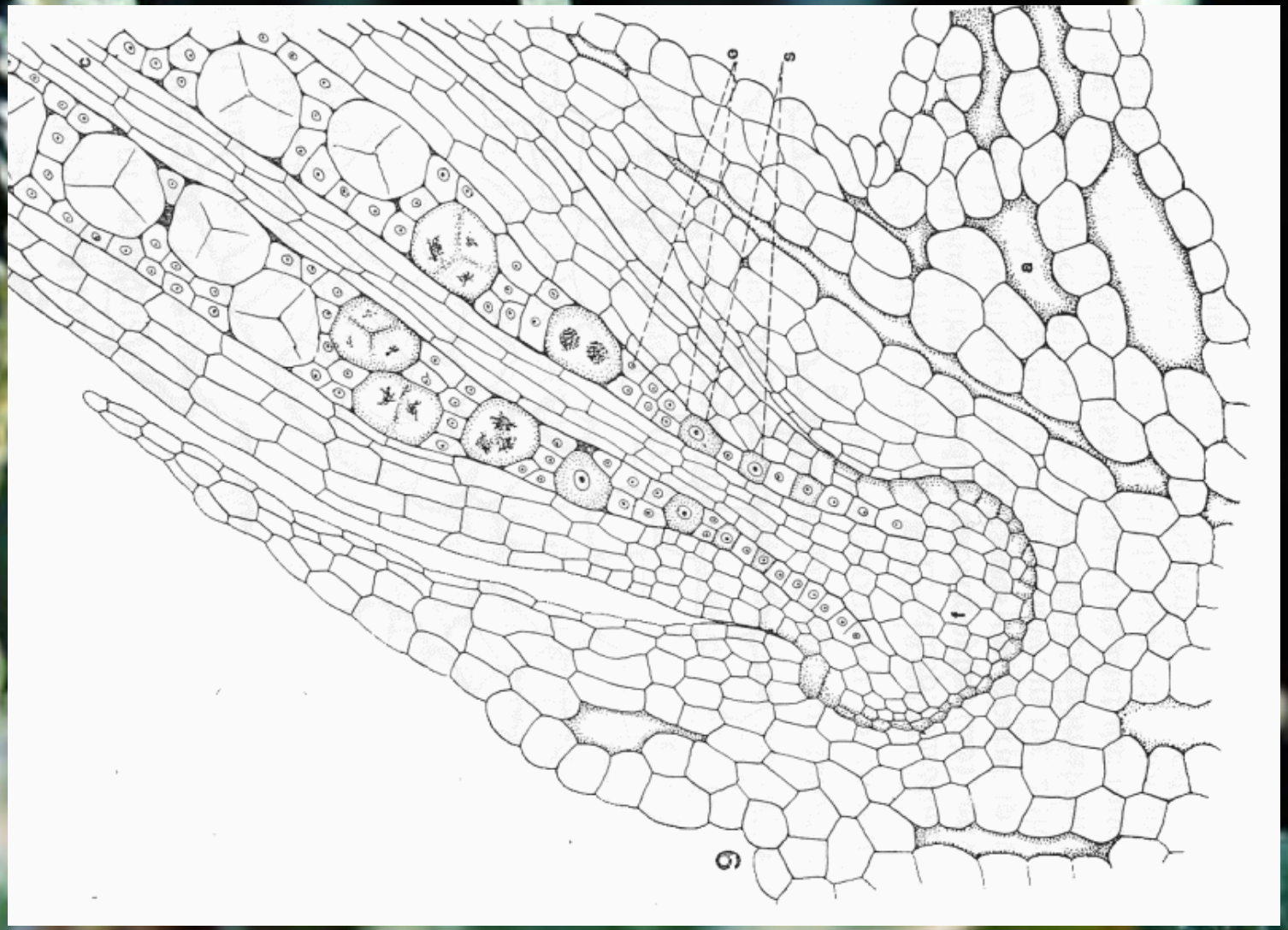
(b)



(e)

Phaeoceros carolinianus, © M. Lüth

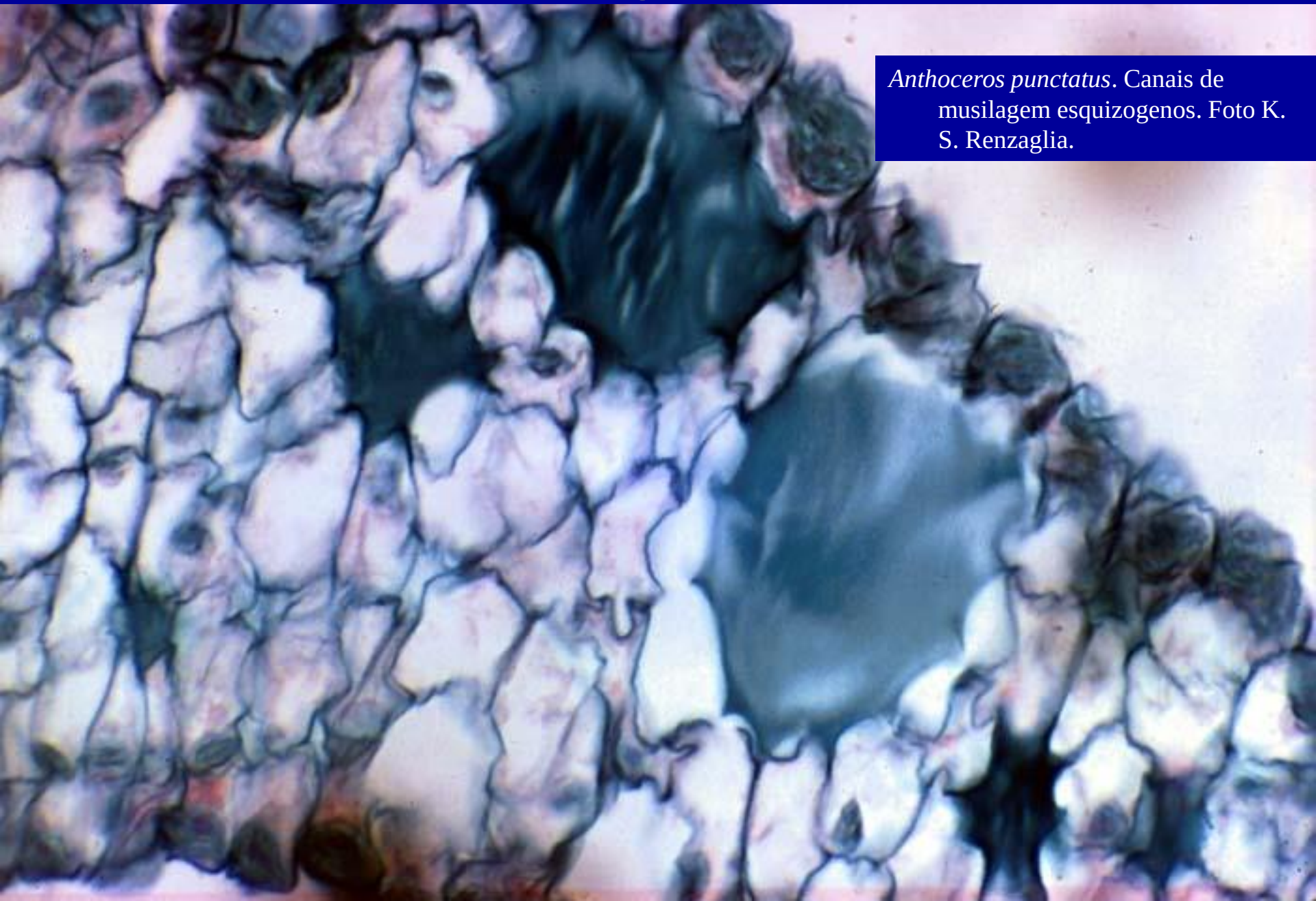
http://www2.una.edu/pdavis/hornwort_page.htm



Anthoceros sp.

Anthoceros sp. (deiscência)

Canais de mucilagem



Anthoceros punctatus. Canais de musilagem esquizogenos. Foto K. S. Renzaglia.

Poros e estômatos

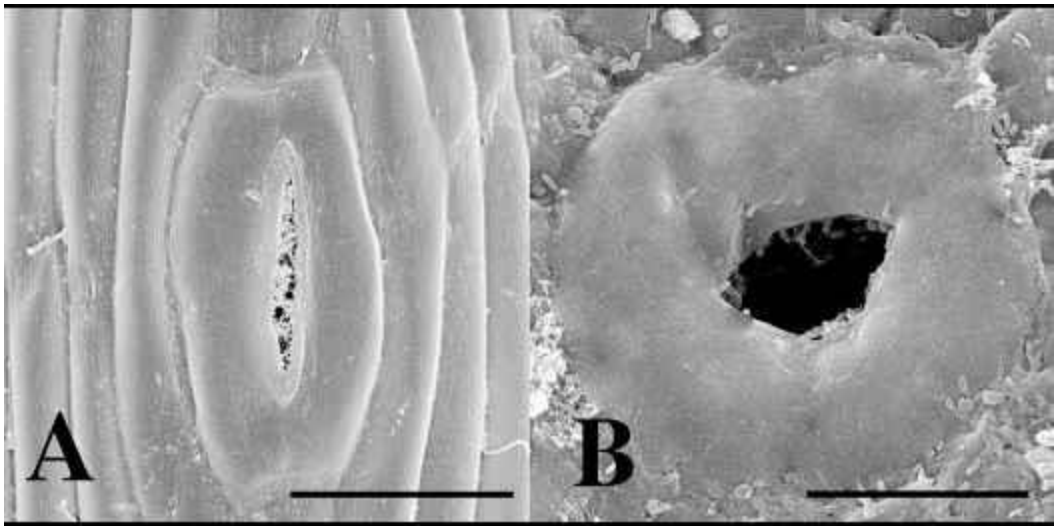
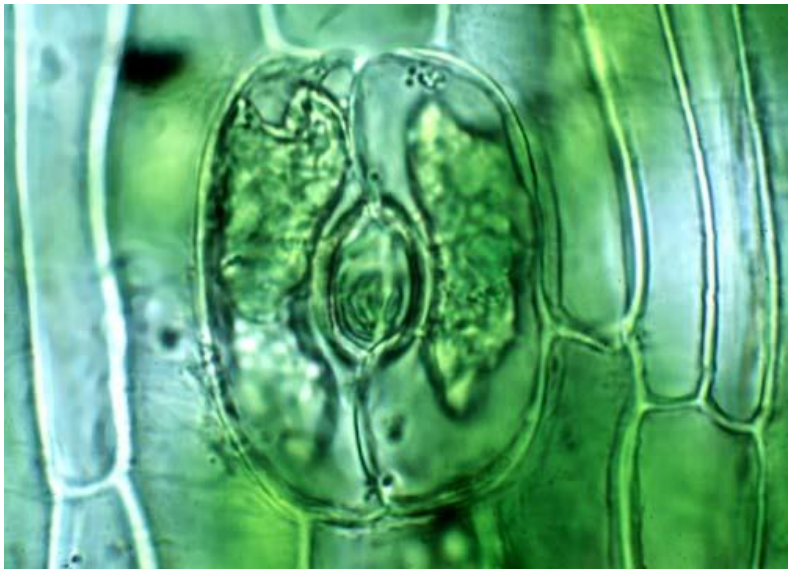
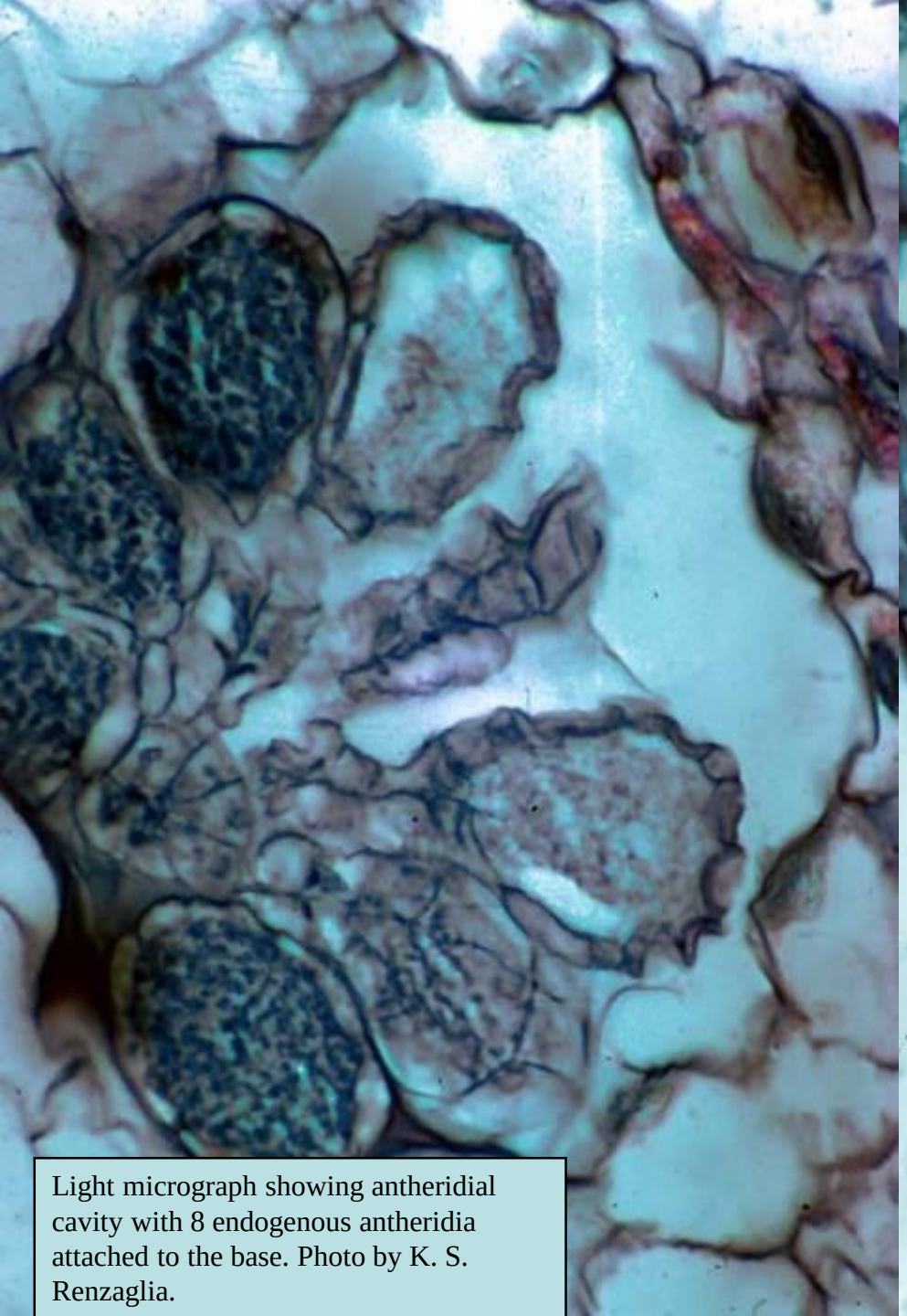


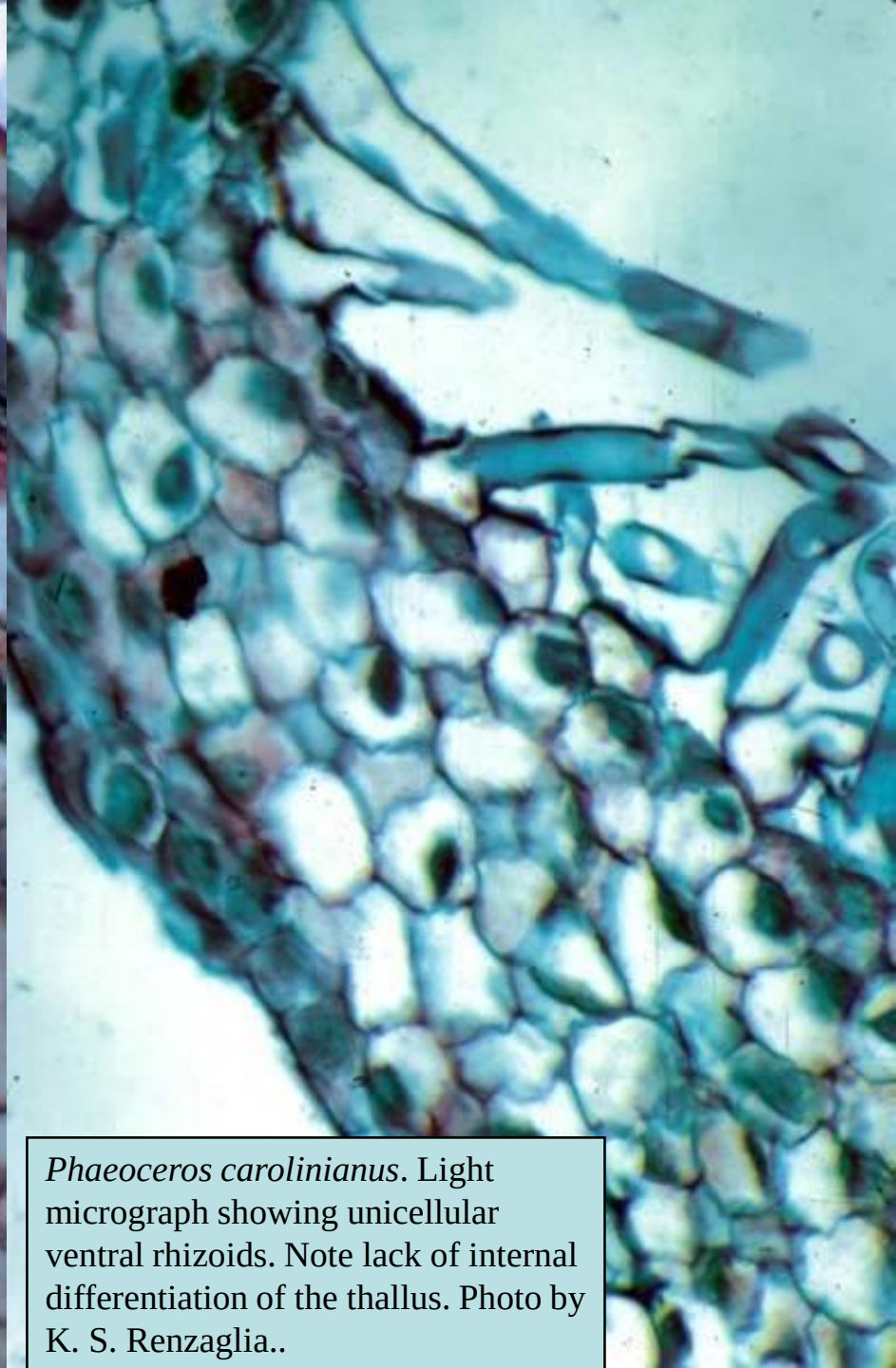
Fig. 6. Scanning electron micrographs of pores in hornworts. **A.** Stoma in the sporophyte epidermis of *Phaeoceros carolinianus* (Michx.) Prosk. **B.** Ventral mucilage cleft in the gametophyte epidermis of *Dendroceros crispatus* (Hook.) Nees. Bars = 20 µm. Shaw & Renzaglia 2004



Dendroceros tubercularis. SEM of ventral side of thallus showing mucilage clefts (pores) along midrib. These are the sites of entry of the endosymbiont *Nostoc* bacteria. Bar = x µm. Specimen from Japan provided by Dr. J. Hasagawa. Photo by K. S. Renzaglia. Shaw & Renzaglia 2004



Light micrograph showing antheridial cavity with 8 endogenous antheridia attached to the base. Photo by K. S. Renzaglia.



Phaeoceros carolinianus. Light micrograph showing unicellular ventral rhizoids. Note lack of internal differentiation of the thallus. Photo by K. S. Renzaglia..

Esporângio

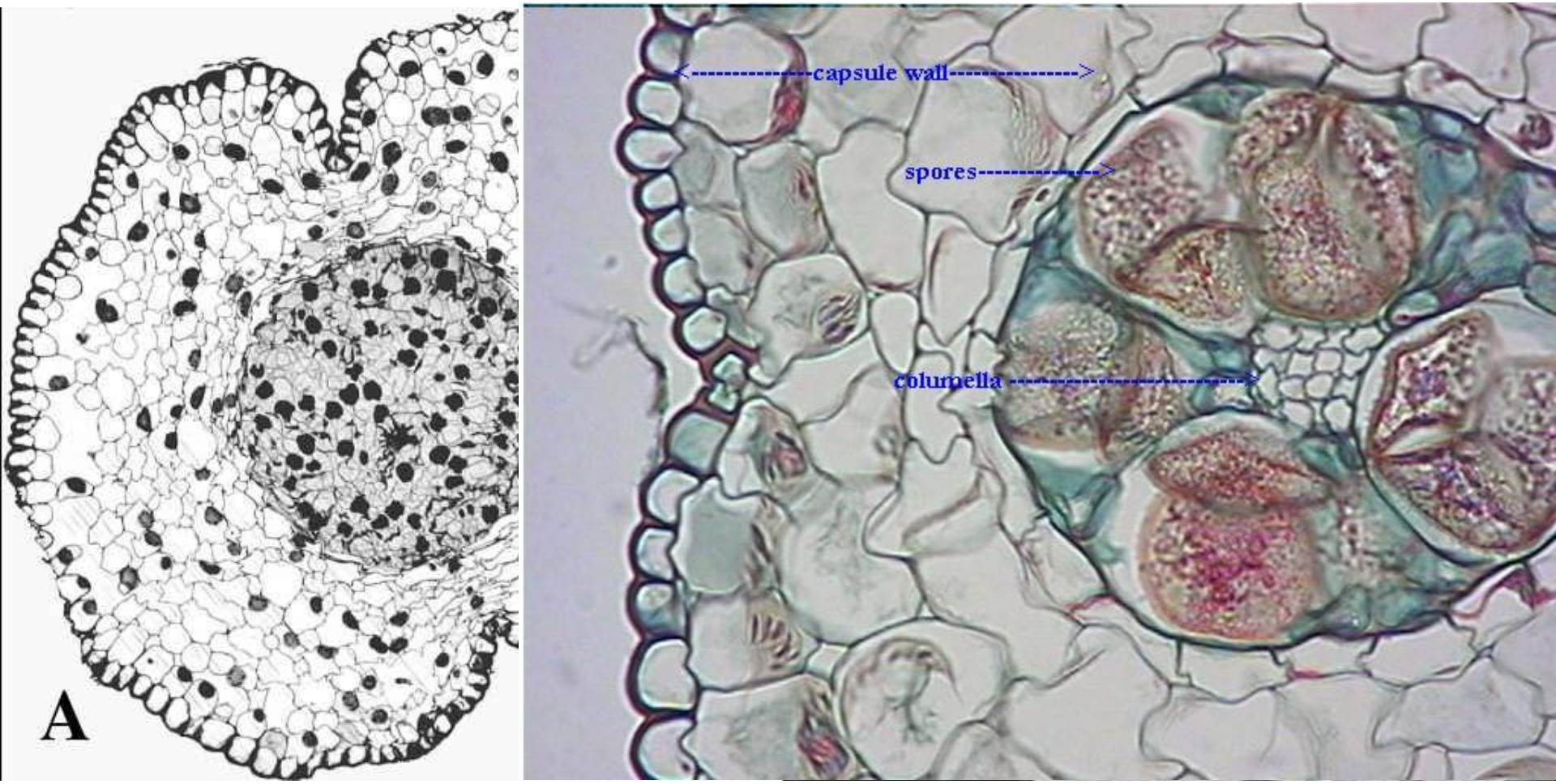


Fig. 4. Cross sections of hornwort sporophytes. **A.** Light micrograph of *Leiosporoceros dussii* (Steph.) Hässel. Tissue is differentiated from outside to inside as follows: single-layered epidermis, 9–10 layers of assimilative cells, abundant sporogenous tissue with several layers of tetrads intermixed with elaters, and an indistinct columella. The suture is clearly defined as a longitudinal groove that extends nearly to the sporogenous tissue. Bar = 100 µm. **B.** Scanning electron micrograph of *Phaeoceros carolinianus* (Michx.) Prosk. In contrast to Fig. 4A, this sporophyte contains an assimilative zone of four cell layers, sporogenous tissue with one layer of large tetrads intermixed with small elaters, and a columella of 16 cells. Bar = 1 mm. Shaw & Renzaglia 2004

Esporos Antocerophyta