Fossil spores and sporophyte tissue

Text Fig. 29.12
Fig. 29.1
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<th>DEVELOPMENT MORPHOLOGY</th>
<th>GAS EXCHANGE WATER ATTRACTION</th>
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CHARACTERISTICS OF FUNCTIONAL GROUPS IN THE PLANT KINGDOM

Biol. 2010.
Examples of the three Bryophyte Phyla.

Liverwort

Moss

Hornwort
BRYOPHYTE SPOROPHYTES DEVELOP ON THE GAMETOPHYTE AND ARE DEPENDENT ON THEM FOR SUSTENANCE

sporophytes with sporangia
Asexual reproduction in liverworts: “gemmae” cups disperse propagules (via rain splashing?)

Moss sporophytes growing from gametophyte.
Thallose liverwort

Air pores
BIOL 2010. Thalloid liverwort with air pore

- **Air pore**: permanent opening in epidermis--facilitates CO2 uptake but cannot regulate water loss
- **Internal air space**: for distribution of CO2
- **Upper epidermis with cuticle**
Tip of moss sporangium (capsule) with peristome

Text Fig. 29.18
Moss life history highlights

Gametophytes with antheridia or archegonia

Archegonia

Sporophytes with sporangia

Close-up of sporangium with peristome

Spores

Protonema (filamentous stage of developing gametophyte)

Moss life history highlights
Sphagnum bog (= peat bog) in Norway
Fig. 29.1
Phloem conducting elements

Sieve cells

Sieve tube members

Xylem conducting elements

Tracheids

Vessel elements and vessels

Figure 3-15 Representative tracheids from three major groups of vascular plants. A, Woodwardia, a fern (one-sixth of cell shown). B, Piuus, a conifer (one-third of cell shown). C, Quercus, oak. [Redrawn from An Introduction to Plant Anatomy by A. J. Eames and L. H. MacDaniels, McGraw-Hill, New York. 1947.]

Figure 3-16 Representative angiosperm vessel members. A, Liriodendron (tulip tree); B, Quercus (oak); C, Acer (maple); D, Quercus. [Redrawn from An Introduction to Plant Anatomy by A. J. Eames and L. H. MacDaniels, McGraw-Hill, New York. 1947.]
Fern stem cross section

vascular bundle

xylem

phloem

Text Fig. 29.11
Xylem and phloem in stems of seedless vascular plants

*Psilotum* stem

Lycopod stem
Secondary meristems:
Growth in diameter
Vascular cambium
produces xylem to inside,
phloem to outside
Cork cambium
produces cork to outside