Section C2: Bryophytes (continued)

3. Bryophyte sporophytes disperse enormous numbers of spores
4. Bryophytes provide many ecological and economic benefits
3. Bryophyte sporophytes disperse enormous numbers of spores

- While the bryophyte sporophyte does have photosynthetic plastids, they cannot live apart from the maternal gametophyte.

- A bryophyte sporophyte remains attached to its parental gametophyte throughout the sporophyte’s lifetime.
  - It depends on the gametophyte for sugars, amino acids, minerals and water.

- Bryophytes have the smallest and simplest sporophytes of all modern plant groups.
• Liverworts have the simplest sporophytes among the bryophytes.
  
  • They consist of a short stalk bearing a round sporangia which contains the developing spores, and a nutritive foot embedded in gametophyte tissues.
• Hornwort and moss sporophytes are larger and more complex.
  • Hornwort sporophytes resemble grass blades and have a cuticle.
  • The sporophytes of hornworts and mosses have epidermal stomata, like vascular plants.
  • The sporophytes of mosses start out green and photosynthetic, but turn tan or brownish red when ready to release their spores.
• Moss sporophytes consist of a **foot**, an elongated stalk (the **seta**), and a sporangium (the **capsule**).

• The foot gathers nutrients and water from the parent gametophyte via transfer cells.

• The stalk conducts these materials to the capsule.

• In most mosses, the seta becomes elongated, elevating the capsule and enhancing spore dispersal.

Fig. 29.16x

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• The moss capsule (sporangium) is the site of meiosis and spore production.
  • One capsule can generate over 50 million spores.

• When immature, it is covered by a protective cap of gametophyte tissue, the **calyptra**.
  • This is lost when the capsule is ready to release spores.

• The upper part of the capsule, the **peristome**, is often specialized for gradual spore release.
4. Bryophytes provide many ecological and economic benefits

• Wind dispersal of lightweight spores has distributed bryophytes around the world.

• They are common and diverse in moist forests and wetlands.

• Some even inhabit extreme environments like mountaintops, tundra, and deserts.
  • Mosses can lose most of their body water and then rehydrate and reactivate their cells when moisture again becomes available.
• *Sphagnum*, a wetland moss, is especially abundant and widespread.
  
  • It forms extensive deposits of undecayed organic material, called **peat**.
  
  • Wet regions dominated by *Sphagnum* or peat moss are known as peat bogs.
  
  • Its organic materials does not decay readily because of resistant phenolic compounds and acidic secretions that inhibit bacterial activity.
• Peatlands, extensive high-latitude boreal wetland occupied by *Sphagnum*, play an important role as carbon reservoirs, stabilizing atmospheric carbon dioxide levels.

• *Sphagnum* has been used in the past as diapers and a natural antiseptic material for wounds.

• Today, it is harvested for use as a soil conditioner and for packing plants roots because of the water storage capacity of its large, dead cells.
• Bryophytes were probably Earth’s only plants for the first 100 million years that terrestrial communities existed.

• Then vegetation began to take on a taller profile with the evolution of vascular plants.