

Introduction to Botany. Lecture 30

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Outline

1 Questions and answers

2 Life cycles and diversity

- Systematics
- Kingdom Vegetabilia, land plants
- Phylum Bryophyta: mosses



1 Questions and answers

2 Life cycles and diversity

- Systematics
- Kingdom Vegetabilia, land plants
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Previous final question: the answer

What is typification?



Previous final question: the answer

What is typification?

- Tethering of name to the sub-taxon or type specimen (designated herbarium sample)



Life cycles and diversity

Systematics



Carl Linnaeus, the type specimen of *Homo sapiens*



Type specimen of *Plantago shastensis* Morris (Herbarium of New York Botanical Garden, Brooklyn)



Life cycles and diversity

Kingdom Vegetabilia, land plants



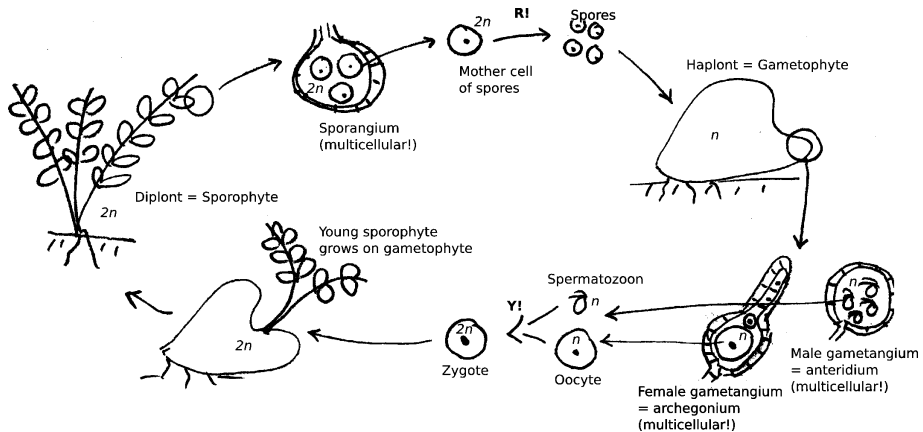
Life cycle of land plants

Terms covered:

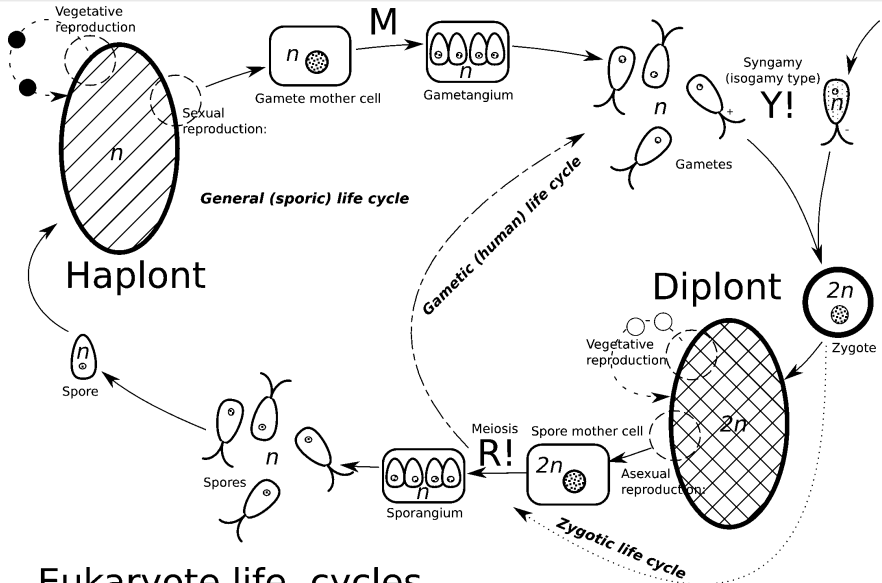
- Sporophyte and gametophyte
- Archegonium and antheridium
- Spermatozoa and oocyte (egg cell)
- Embryo and parasitic sporophyte
- Predominance of sporophyte and/or gametophyte



Life cycle of land plants



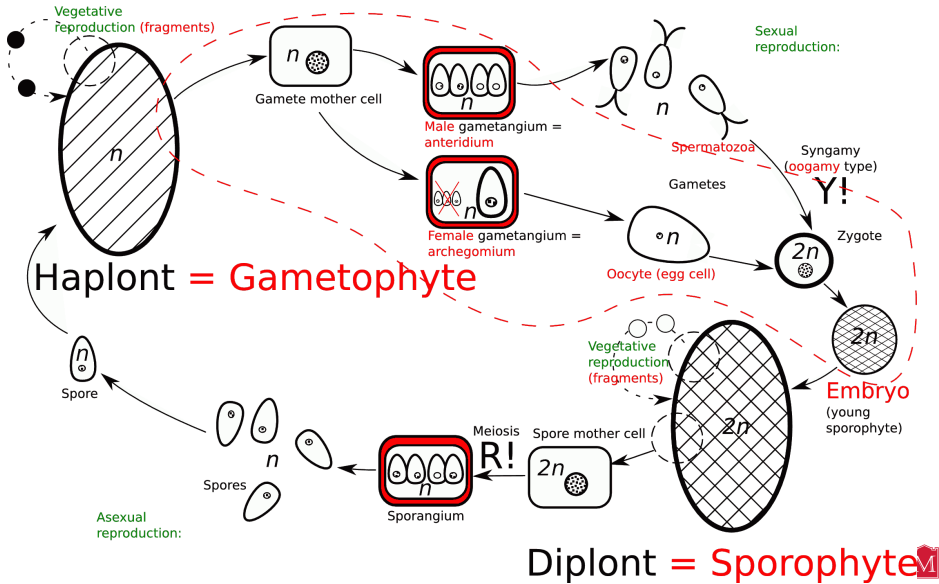
General life cycle



Eukaryote life cycles



Life cycle of land plants: differences



Three main phyla

- **Bryophyta**: gametophyte predominance
- **Pteridophyta**: sporophyte predominance, no seed
- **Spermatophyta**: sporophyte predominance, seed



Life cycles and diversity

Phylum Bryophyta: mosses



Bryophyta

- $\approx 20,000$ species
- Sporic life cycle with gametophyte predominance*
- Sporophyte reduced to sporogon (sporangium with seta), usually achlorophyllous, parasitic
- No roots, only rhizoid cells (long hairy dead cells capable for apoplastic transport)
- Poikilohydric plants
- Gametophyte starts development from protonema



Protonema



Life cycle of mosses



Three main groups (subphyla)

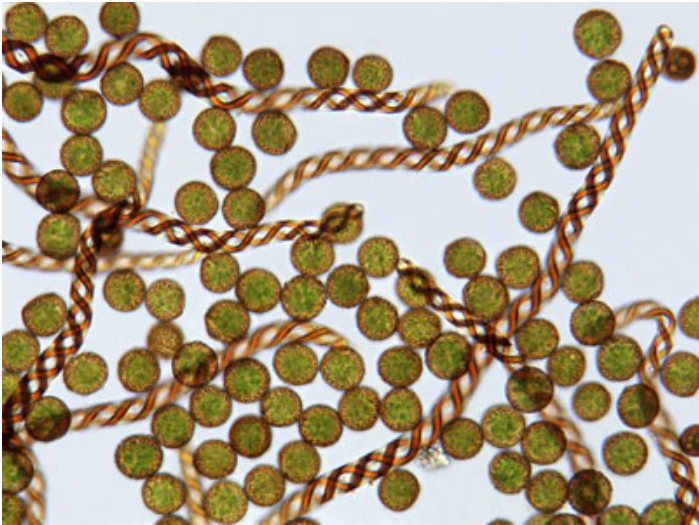
- **Hepaticae**—liverworts. Three classes, most primitive are Haplomitriopsida. Body has dorsal and ventral parts, sporogon bag-like, without columella, spores with elaters.
- **Bryophytina**—true mosses. Six classes, most important are Sphagnopsida (peat mosses), Polytrichopsida (haircap mosses) and Bryopsida. Body radial, sporogon long, with columella, spores without elaters.
- **Anthocerotophytina**—hornworts. One class. Body flattened, sporogon long, green, with columella and stomata, spores with elaters.



Haplomitrium gibbsiae, primitive liverwort



Elaters of liverworts (*Lepidozia* sp.)



Sphagnum sp. (Bryophyta, Sphagnopsida) with sporogons



Dawsonia superba (Bryophyta, Polytrichopsida)—the largest moss with vascular system



Bryum capillare (Bryophyta, Bryopsida)



Leiosporoceros dussii (Bryophyta, Anthocerotopsida)—primitive hornwort



Final question (3 points)



Final question (3 points)

Name two or more specific features of Vegetabilia life cycle



Summary

- Land plants have a sporic life cycle with multicellular gametangia and sporangia, oogamy and embryo.
- **Bryophyta**, **Pteridophyta** and **Spermatophyta** are three main phyla of plants.
- **Bryophyta** are only plants with gametophyte predominance.
- Among **Bryophyta**, Hepaticae is a most primitive group closest to green algae.



For Further Reading



J. E. Bidlack, Sh. H. Jansky.

Stern's introductory plant biology. 12th edition.

McGraw-Hill, 2011.

Chapters 16 and 20.



Th. L. Rost, M. G. Barbour, C. R. Stocking, T. M. Murphy.

Plant Biology. 2nd edition.

Thomson Brooks/Cole, 2006.

Chapters 18 and 22.

