

Introduction to Botany. Lecture 22

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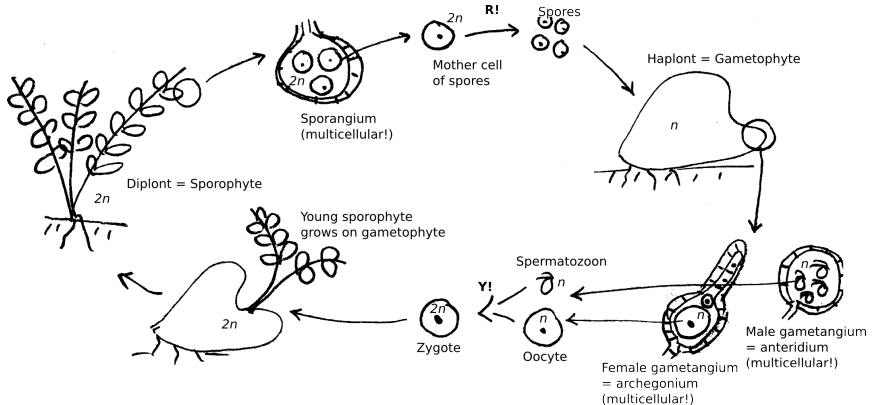
Outline

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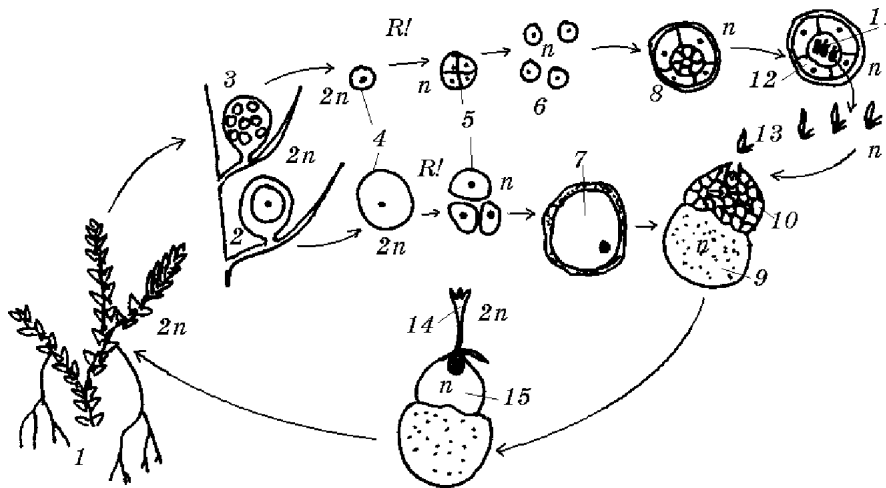
Life cycles

- From general life cycle to heterospory
- Origin of seed
- Angiosperms

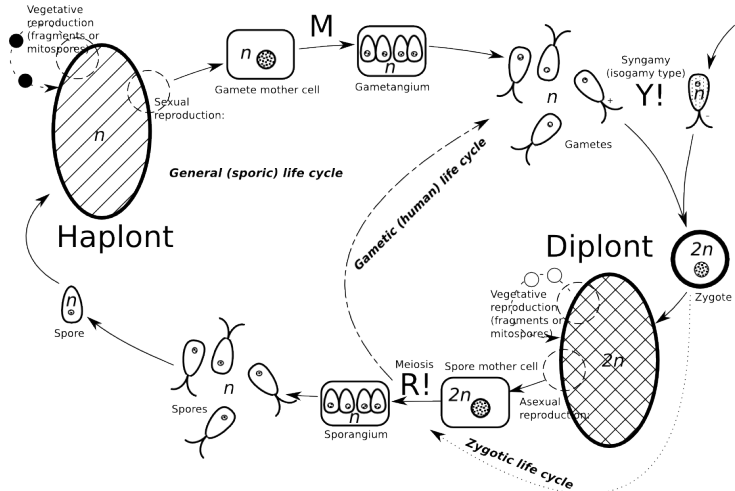
Life cycle of land plants



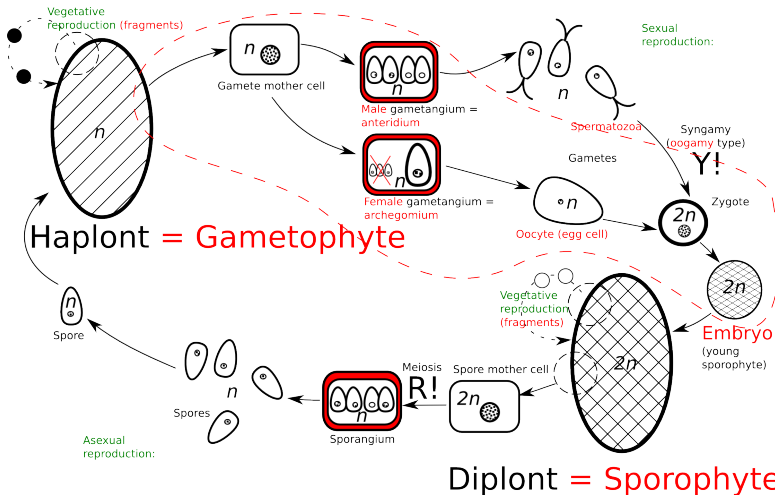
Heterosporic life cycle



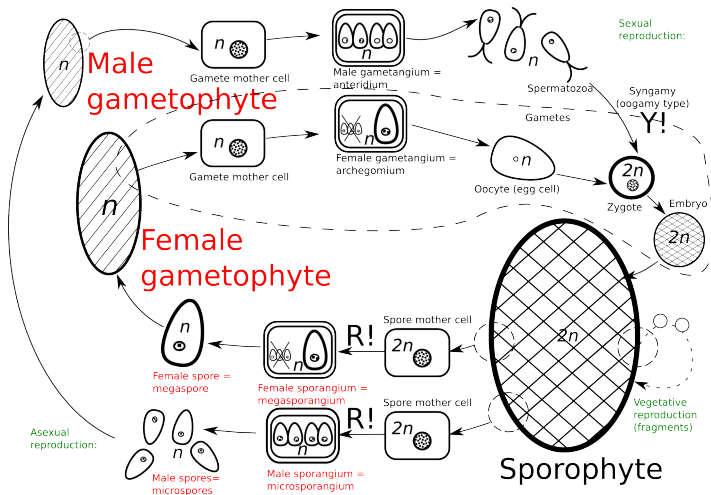
General life cycle



Life cycle of land plants: differences



Heterosporic cycle: differences



Origin of seed

- **Seed is the result of enforced control of sporophyte over gametophyte**
- **Dinosaur problem:** without control on the r-strategic gametophyte, K-strategic tree sporophyte cannot guarantee its reproduction
- Growing of gametophytes, syngamy (fertilization) and growing of daughter sporophyte—everything happens **directly on mother sporophyte**

Seed life cycle***

Terms covered:

- Ovule and integument
- Nucellus and pollen sac
- Pollen grains and endosperm
- Seed

Origin of seed (contd.)

- Seed is a **chimeric organ** with three layers: (1) mother sporophyte tissue (integument + nucellus), (2) female gametophyte tissue (endosperm) and (3) daughter sporophyte (embryo)
- Biggest disadvantages of having seed are: (a) low probability of fertilization (pollination needed) and (b) overall slowness of cycle

Life cycle of angiosperms: differences

- Reduction of gametophyte: 3-celled pollen and 7-celled embryo sac
- No archegonia and anteridia
- Spermatia, pollen tube
- Double fertilization
- New endosperm (second embryo)
- Cupule (pistil) and fruit
- In general, **angiosperms have accelerated life cycle** needed for fast-growing herbs

Life cycle of angiosperms***

Terms covered:

- Embryo sac, antipodes, synergids, central cell
- Spermatia, pollen tube
- Double fertilization
- Pistil and fruit

Summary

- Heterosporic plants have two kinds of spores: female (megaspores) and male (microspores)
- Seed plants have compact life cycle where almost all stages happen on mother sporophyte
- Angiosperms have accelerated life cycle of seed plants

For Further Reading



Th. L. Rost, M. G. Barbour, C. R. Stocking, T. M. Murphy.
Plant Biology. 2nd edition.

Thomson Brooks/Cole, 2006.

Chapter 12.1–12.2 (skip angiosperm life cycle!).