

Introduction to Botany. Lecture 35

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Outline

1 Questions and answers

2 Seed plants

- Seed
- Diversity of seed plants



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Previous final question: the answer

What is the difference between bulb and corm?



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What is the difference between bulb and corm?

- Bulb has more leaves, corm has bigger stem



Seed plants

Seed



Origin of seed

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



Seed plant life cycle

Terms covered:

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

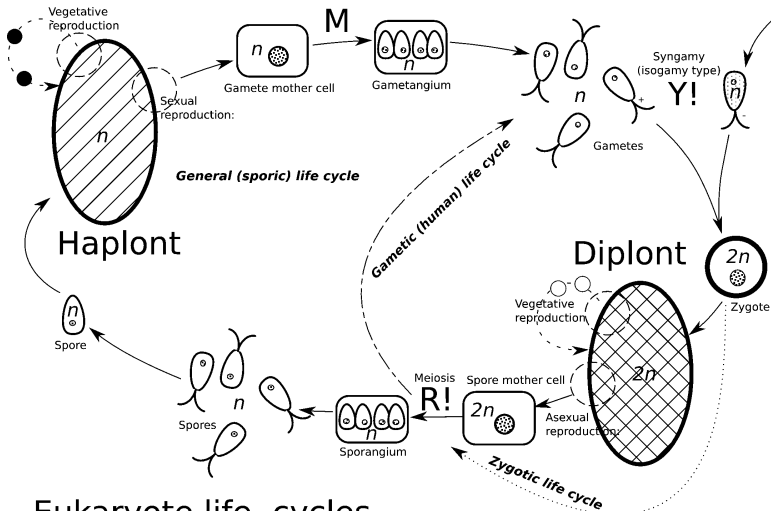


The seed

- 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



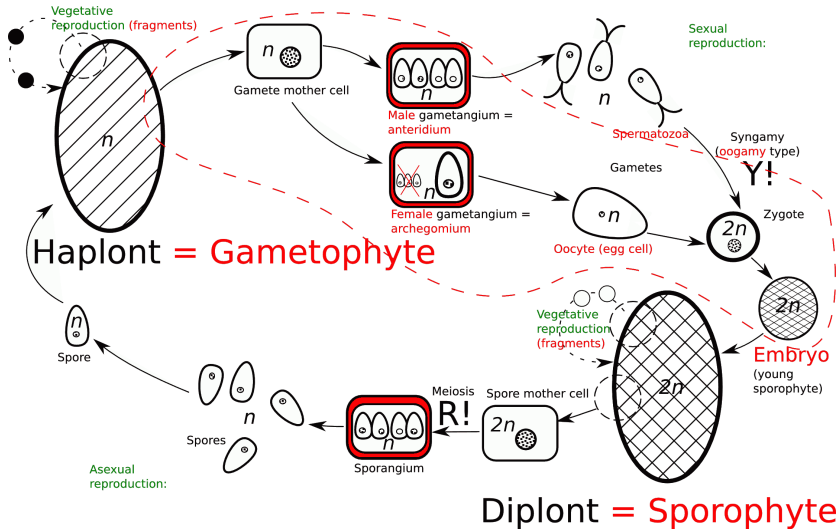
General life cycle



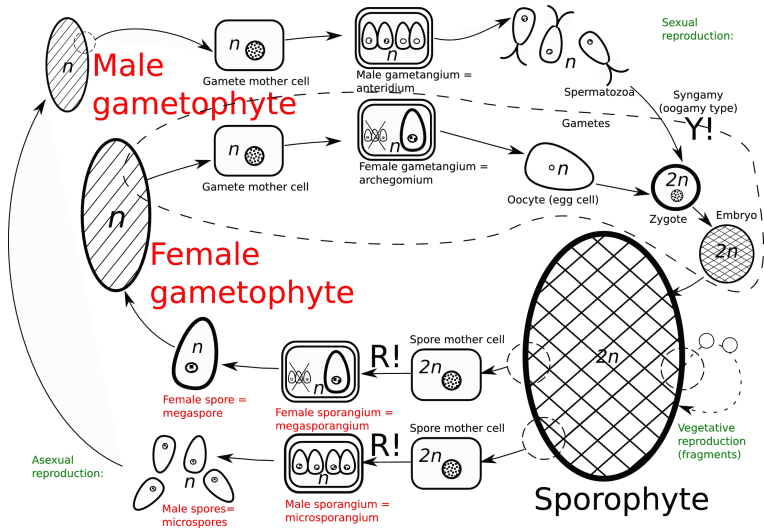
Eukaryote life cycles



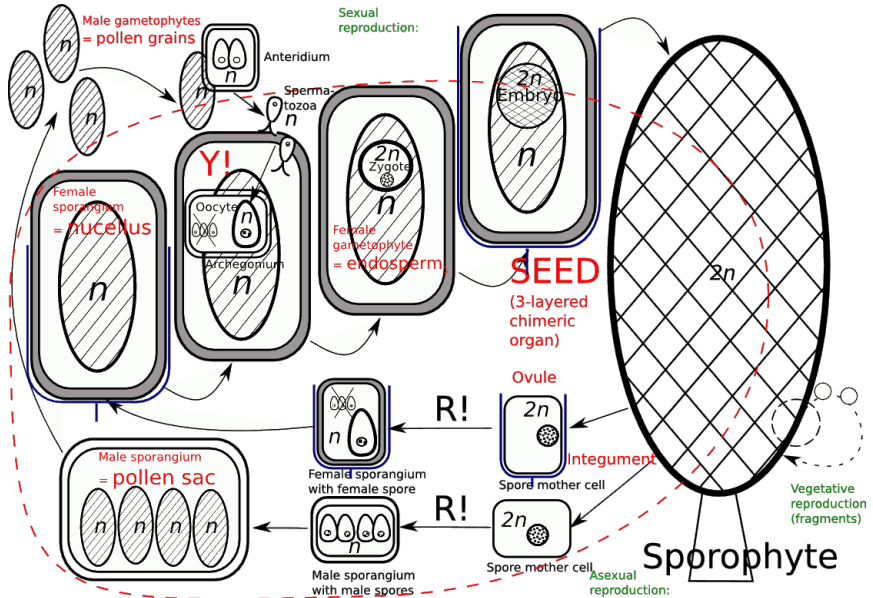
Life cycle of land plants: differences



Heterosporic cycle: differences



Life cycle of seed plants: differences



Seed plants

Diversity of seed plants



Spermatophyta: seed plants

- \approx 600 species of non-angiosperms and \approx 250,000 species of angiosperms
- Sporic life cycle with sporophyte predominance and **seed**
- Gametophyte is reduced to cells inside ovule or inside pollen grain. Minimum number of cells is 3 for male gametophyte (pollen grain) and 4 for female gametophyte (embryo sac of angiosperms). Anteridia are reduced. In angiosperms and Gnetales, archegonia are also reduced.
- Sporophyte always starts development from embryo located inside nutrition tissue, endosperm₁ (female gametophyte) or endosperm₂ (second embryo)
- Have axillary buds
- Homiohydric plants (same as ferns)
- Have secondary thickening



Spermatophyta classes

- **Ginkgoopsida**, ginkgo class
- **Cycadopsida**, cycads
- **Pinopsida**, conifers
- **Gnetopsida**, gnetophytes or chlamydosperms
- **Angiospermae**, or Magnoliopsida, flowering plants



Final question (2 points)



Final question (2 points)

What is a seed?



Summary

- Seed plants have compact life cycle where almost all stages happen on mother sporophyte



For Further Reading



A. Shipunov.

Introduction to Botany [Electronic resource].

2010—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_154



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

Plant Biology. 2nd edition.

Thomson Brooks/Cole, 2006.

Chapter 24.

