

Introduction to Botany. Lecture 16

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Outline

1 Questions and answers

2 Life cycles

- Origin of plants₂: life cycle



1 Questions and answers

2 Life cycles

- Origin of plants₂: life cycle



Previous final question: the answer

What is the difference between zygotic and gametic life cycles?



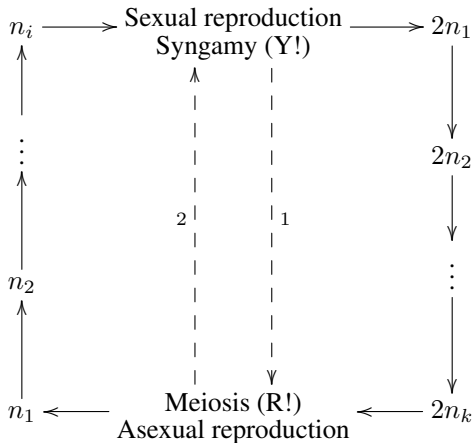
Previous final question: the answer

What is the difference between zygotic and gametic life cycles?

- **Zygotic:** $Y! \rightarrow R!$, no diplont, many protists
- **Gametic:** $R! \rightarrow Y!$, ho haplont, animals and few protists



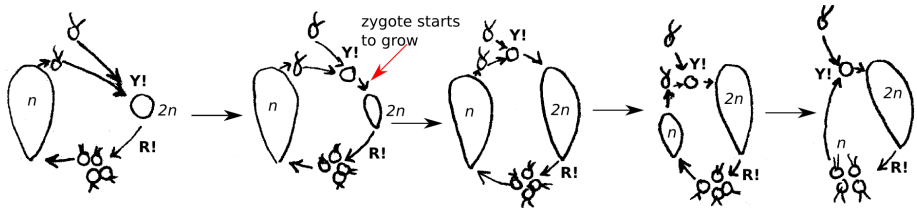
Life cycles



1 — zygotic cycle ($Y! \rightarrow R!$);
 2 — gametic cycle ($R! \rightarrow Y!$).



Evolution of life cycles: diplonts grow, haplonts reduce



Directions of life cycle evolution

- The simplest life cycle of unicellular organism is the alternation of syngamy (cell fusion) and meiosis
- Next stage is a zygotic cycle of many algae and fungi
- When zygote starts to divide without changing genotype, sporic life cycle arises
- Initial sporic cycle was probably with haplont dominance (mosses), then with equal generations
- Advanced sporic cycle is with diplont predominance (ferns and seed plants)
- Finally, gametic cycle of animals and some algae in the final step of life cycle evolution

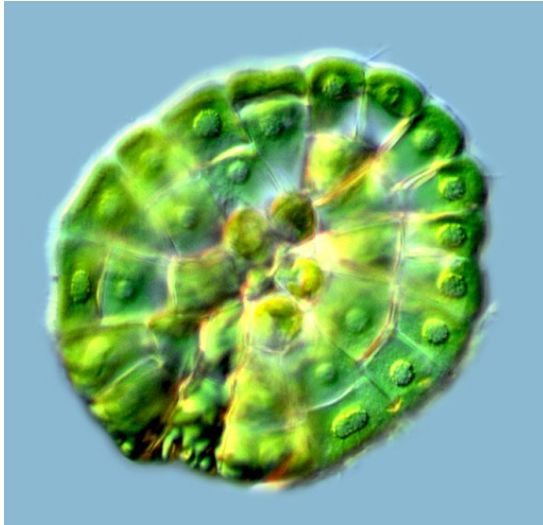


Life cycles

Origin of plants₂: life cycle



Stonewort, *Coleochaete scutata*



Stonewort is an alga with zygotic life cycle but it belongs to the **sister group** of all plants₂

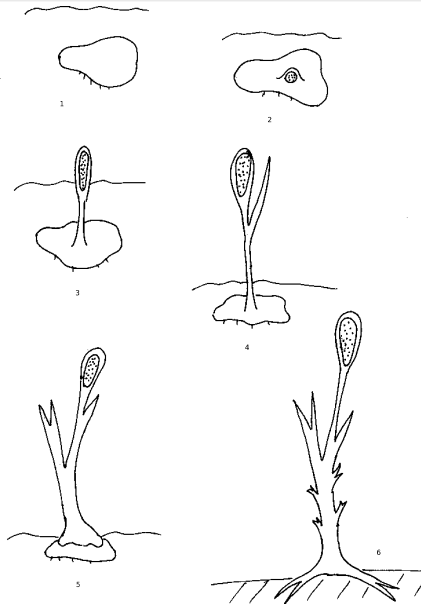


Origin of sporophyte in plants₂

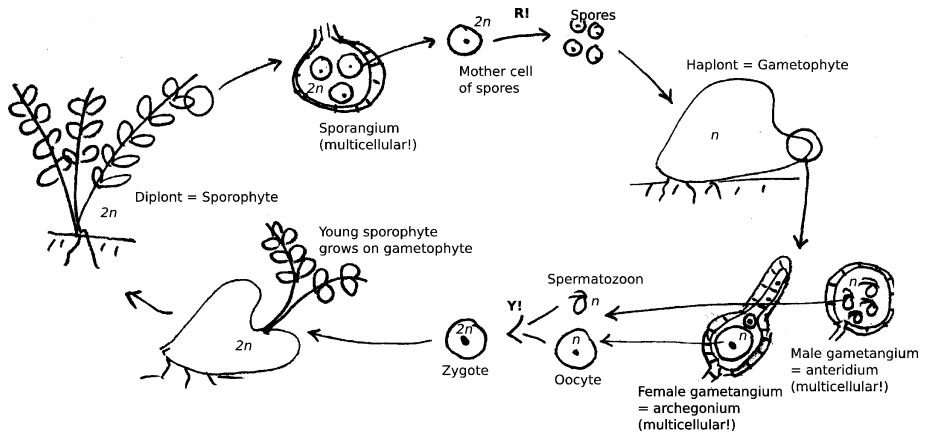
- Land colonization requires the intensive reproduction
- Distribution of spores is more effective with wind
- Diploid sporangium on the stalk is one of most effective ways



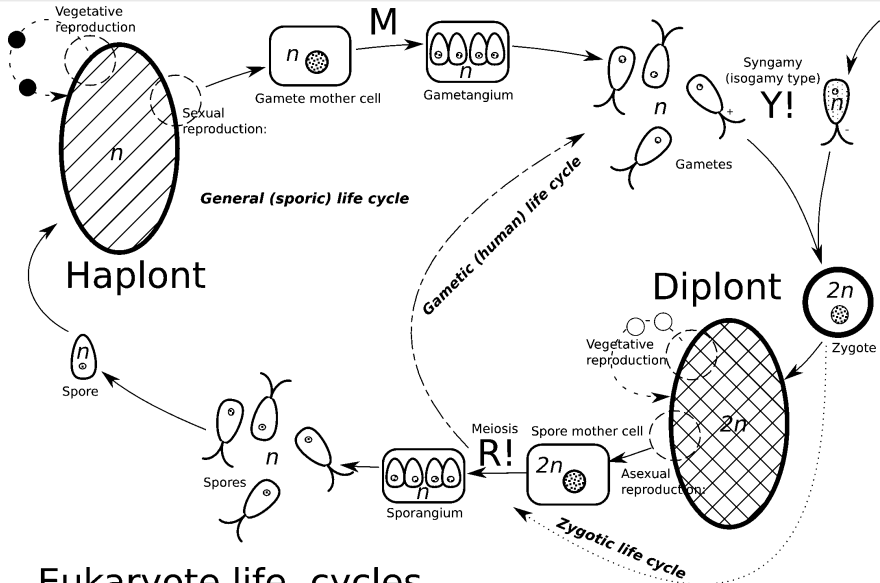
Origin of sporophyte in plants₂



Life cycle of land plants



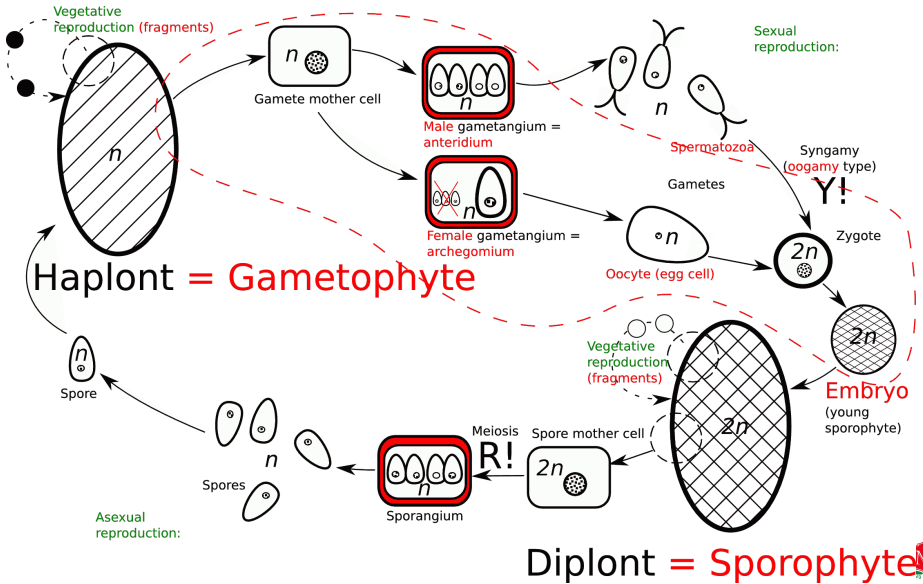
General life cycle



Eukaryote life cycles



Life cycle of land plants: differences



Final question (2 points)



Final question (2 points)

Why is diplont better?



Summary

- **Zygotic** life cycle has no *diplont*, **gametic** life cycle has no *haplont*, **sporic** life cycle has both *haplont* and *diplont*
- The evolution of life cycles goes from zygotic to sporic and then to gametic because diplonts are preferred in the evolution



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 12 (skip the angiosperm life cycle!).

