

Introduction to Botany

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Lecture 17

Outline

1 Questions and answers

- Quiz

2 Life cycle

- Basics
- Evolution of life cycles
- Diversity of life cycles

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Questions and answers

Quiz

Quiz question (2 points)

Why is multicellularity better?

Quiz question (2 points)

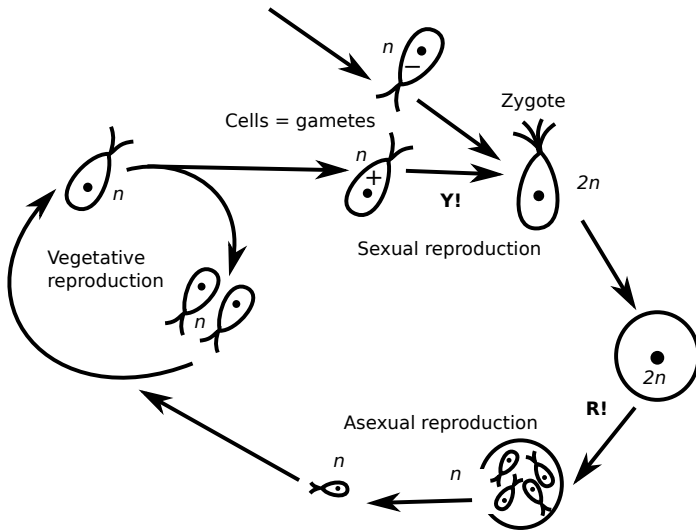
Why is multicellularity better?

- Organism is bigger
- Many cells allow for division of labor

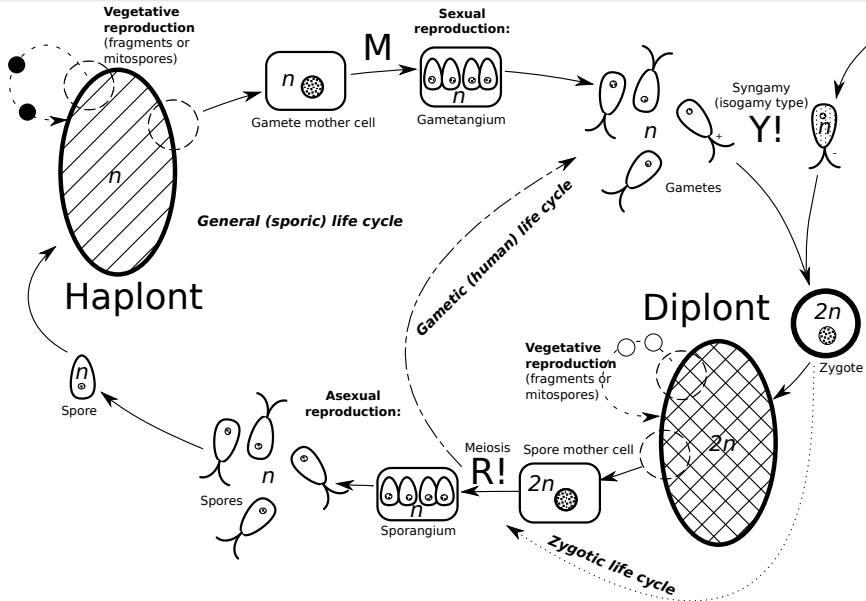
Life cycle

Basics

General life cycle: unicellular organism



General life cycle: multicellular organism



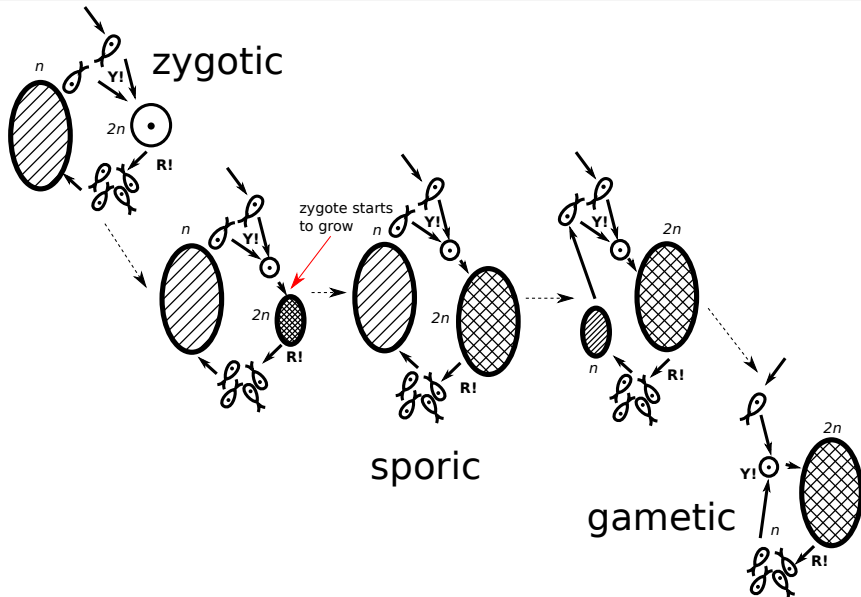
Life cycle

Evolution of life cycles

3 cycles

- **Zygotic:** $Y! \rightarrow R!$, no diplont, many protists
- **Gametic:** $R! \rightarrow Y!$, ho haplont, animals and few protists
- **Sporic:** both haplont and diplont, many protists and all plants₂

Diplonts grow, haplonts reduce



Why diplonts are better?

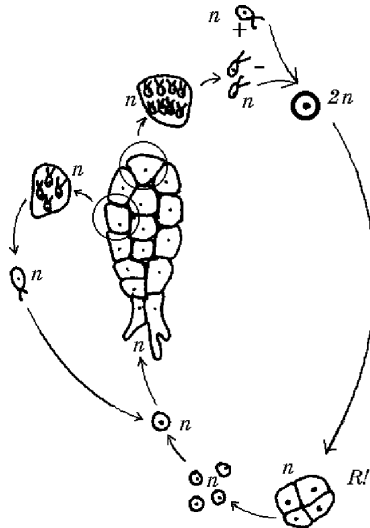
They have two variants of each gene!

- A Dominance:** if one gene is deadly mutated, there is the second working variant
- B Protein production:** two genes will give more protein
- C Diversity:** if one gene is producing protein adapted to $+5...+30^{\circ}\text{C}$ and other—to $+10...+35^{\circ}\text{C}$, the organism may live under $+5...+35^{\circ}\text{C}$

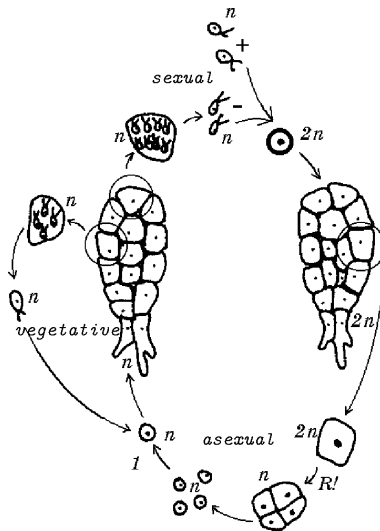
Life cycle

Diversity of life cycles

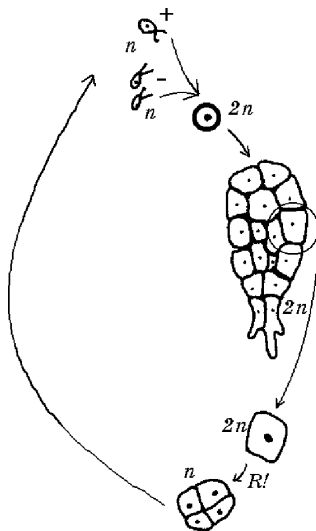
Zygotic life cycle: protists



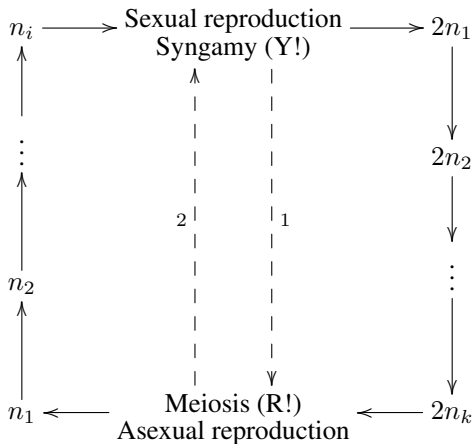
Sporic life cycle: plants



Gametic life cycle: animals

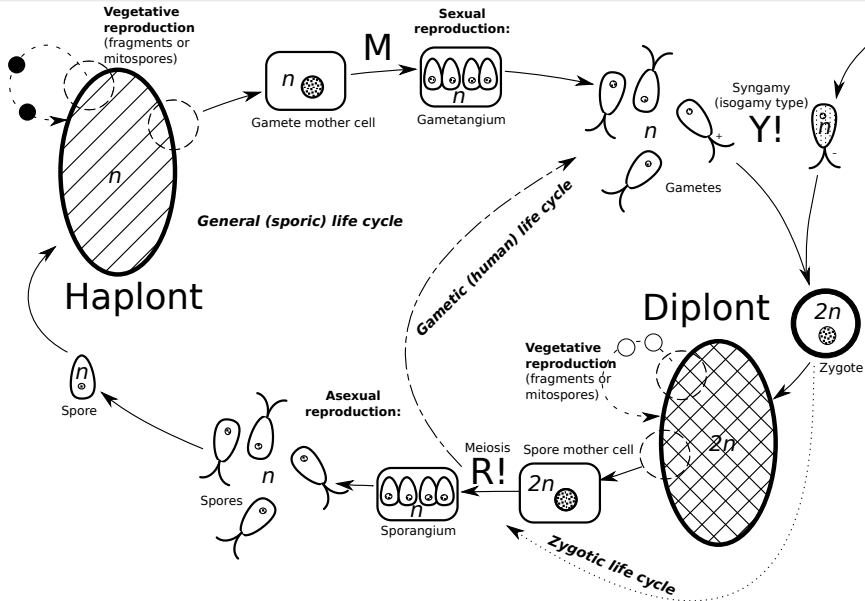


Life cycle math

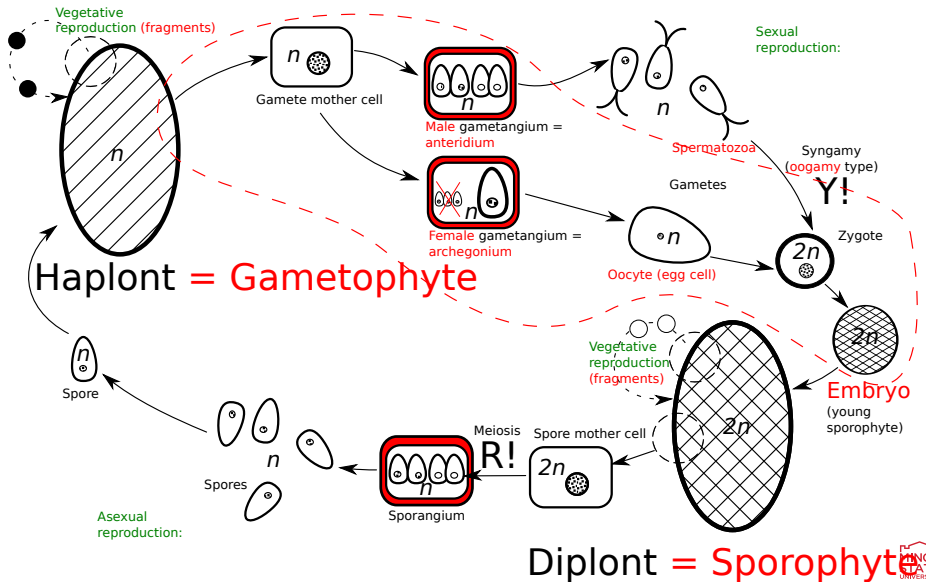


1 — zygotic cycle ($Y! \rightarrow R!$);
 2 — gametic cycle ($R! \rightarrow Y!$).

Life cycle (again)



Life cycle of plants₂



Quiz question (2 points)

Quiz question (2 points)

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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 better”

For Further Reading



A. Shipunov.

Introduction to Botany [Electronic resource].

Mode of access:

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