

Introduction to Botany. Lecture 17

Alexey Shipunov

Minot State University

October 6, 2017



Outline

1 Questions and answers

- Quiz

2 Life cycle

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



1 Questions and answers

- Quiz

2 Life cycle

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



Questions and answers

Quiz



Final question (2 points)

Why is zygotic life cycle most primitive?



Final question (2 points)

Why is zygotic life cycle most primitive?

- Because it directly relates with typical life cycle of unicellular organism.

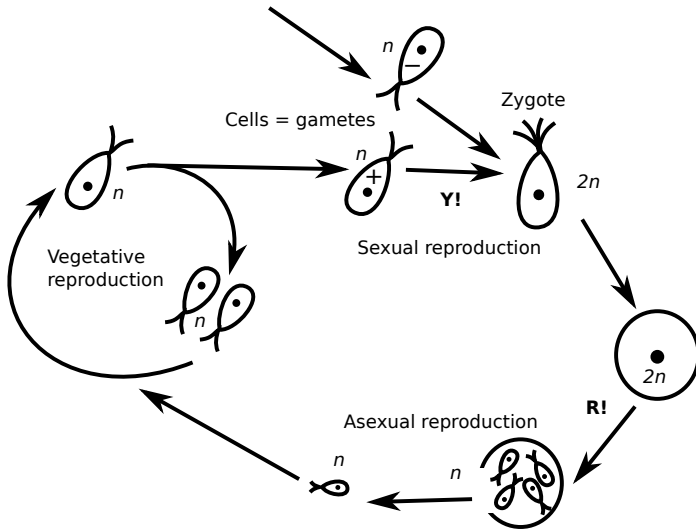


Life cycle

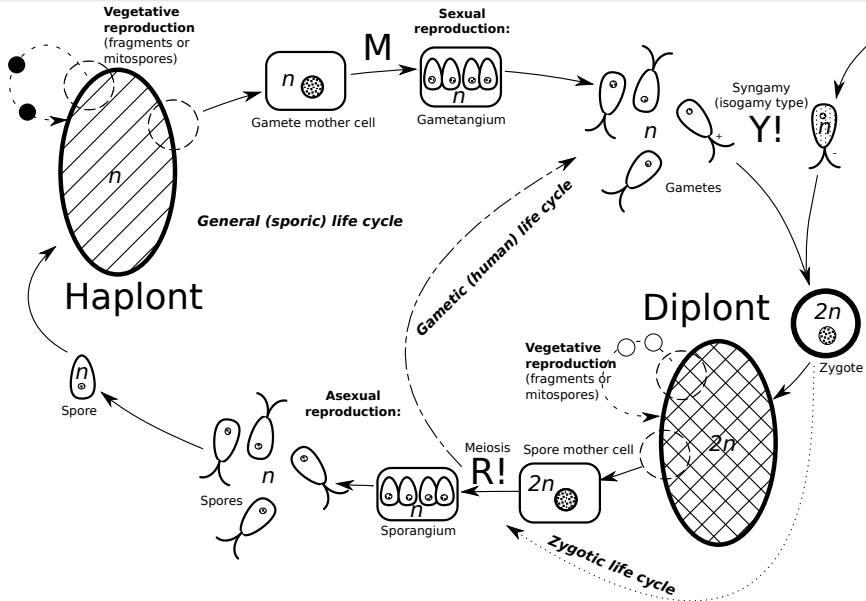
Basics



General life cycle: unicellular organism



General life cycle: multicellular organism



Life cycle

Evolution of life cycles

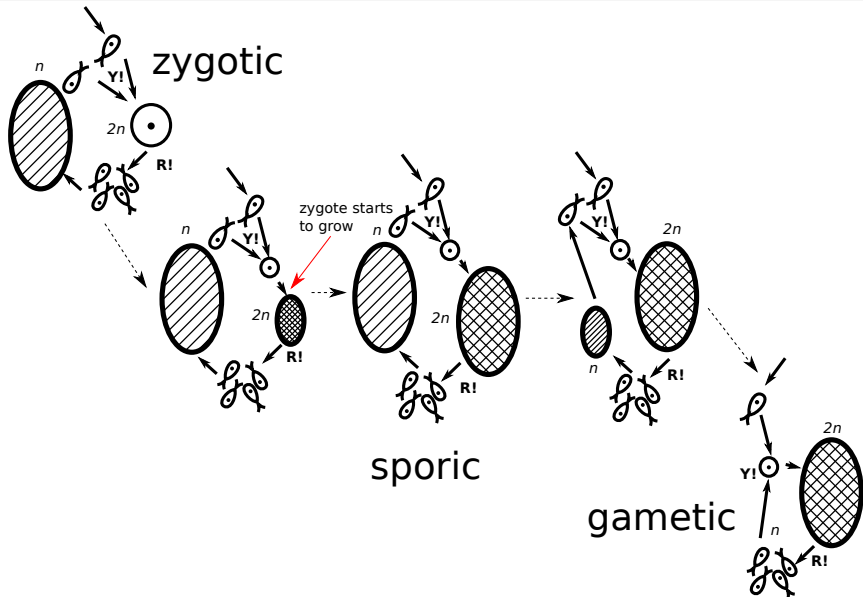


3 cycles

- **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 $+5...+35^{\circ}\text{C}$

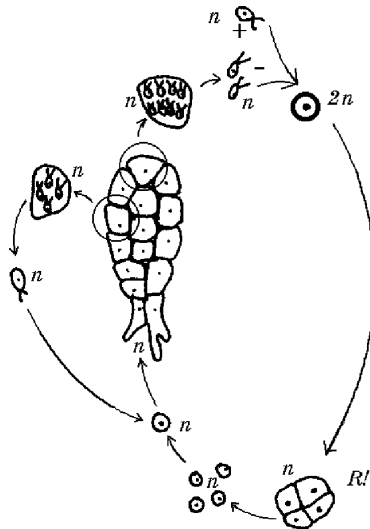


Life cycle

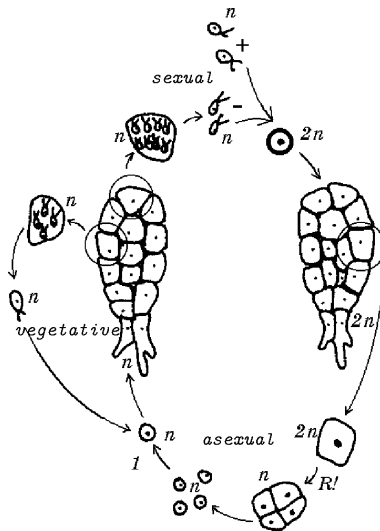
Diversity of life cycles



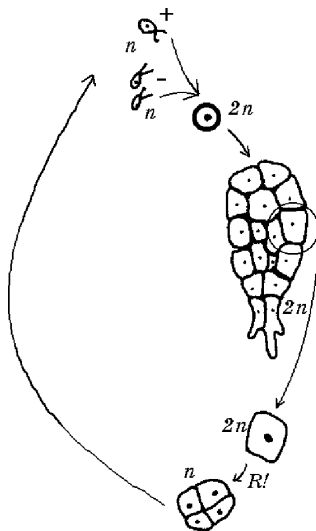
Zygotic life cycle: protists



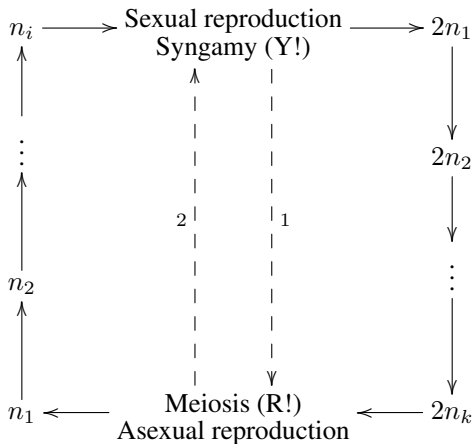
Sporic life cycle: plants



Gametic life cycle: animals



Life cycle math

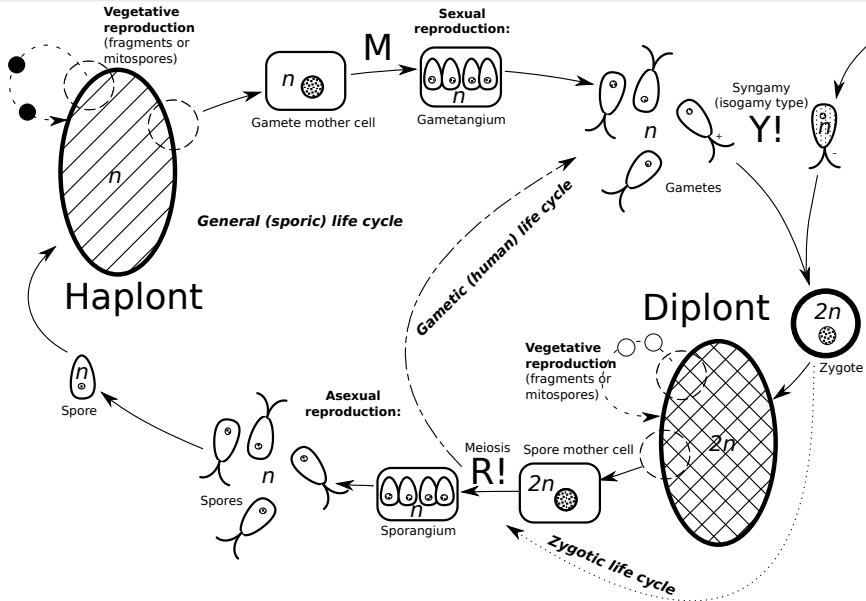


1 — zygotic cycle (Y!→R!);

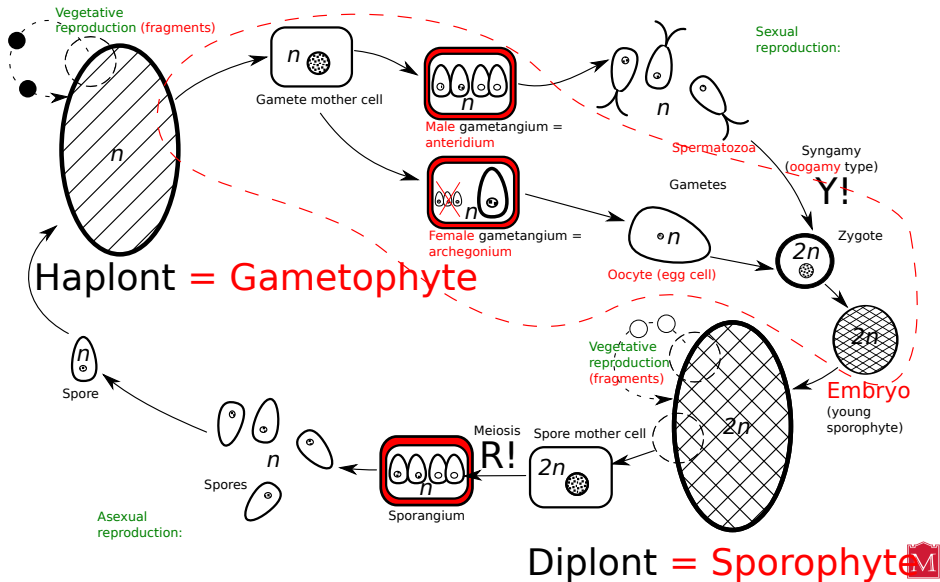
2 — gametic cycle (R!→Y!).



Life cycle (again)



Life cycle of plants₂



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”



Final question (2 points)

Answers will be provided on your paper fragments, please check it
ASAP!



Final question (2 points)

Ask me a question about the current part of Botany course.

Answers will be provided on your paper fragments, please check it
ASAP!



For Further Reading



A. Shipunov.

Introduction to Botany [Electronic resource].

Mode of access:

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

