Introduction to Botany

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Lecture 14

Outline

1. Questions and answers
   - Quiz
2. Mitosis and meiosis
   - Syngamy (Y!)
   - Meiosis (R!)

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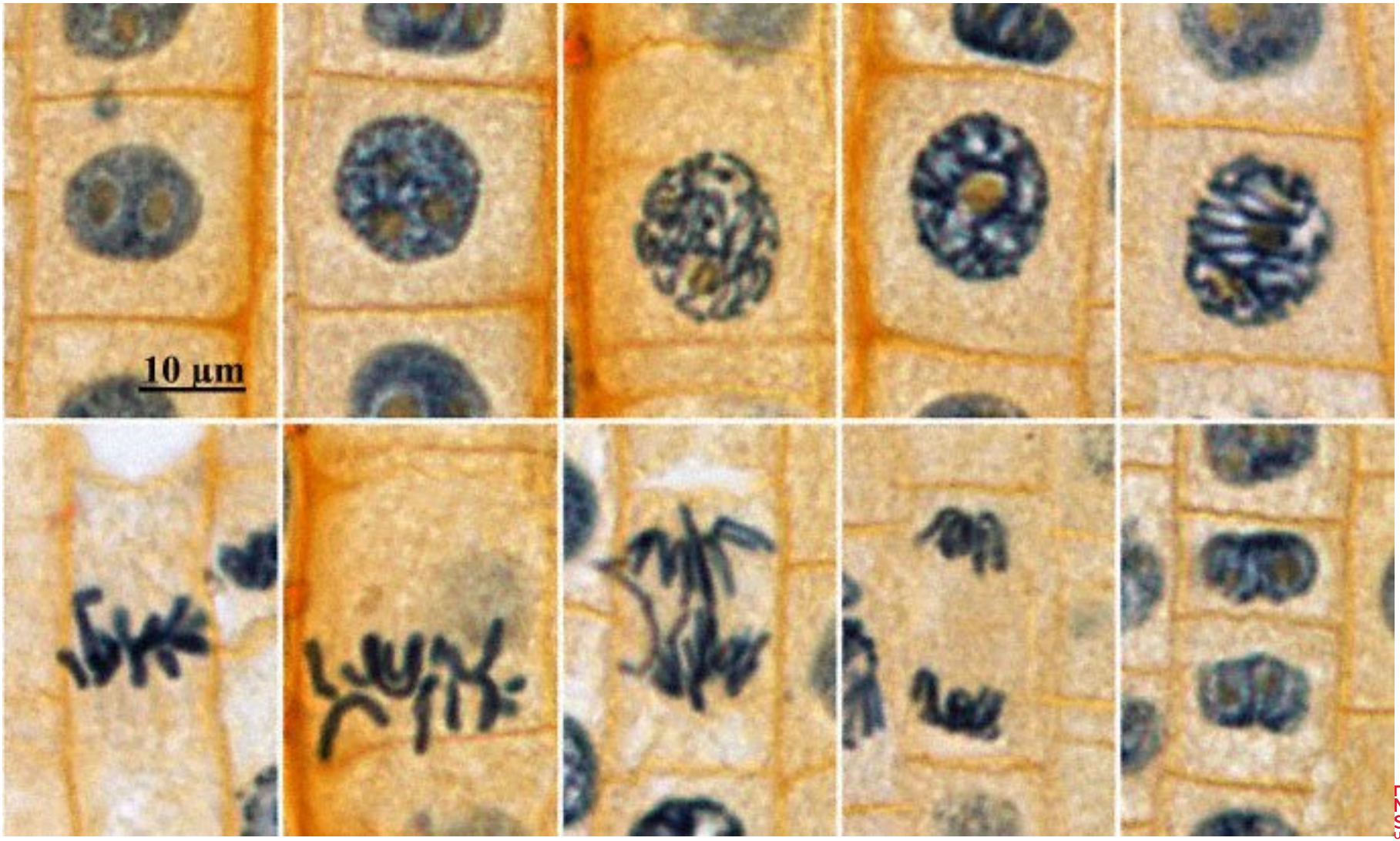
Questions and answers

Quiz

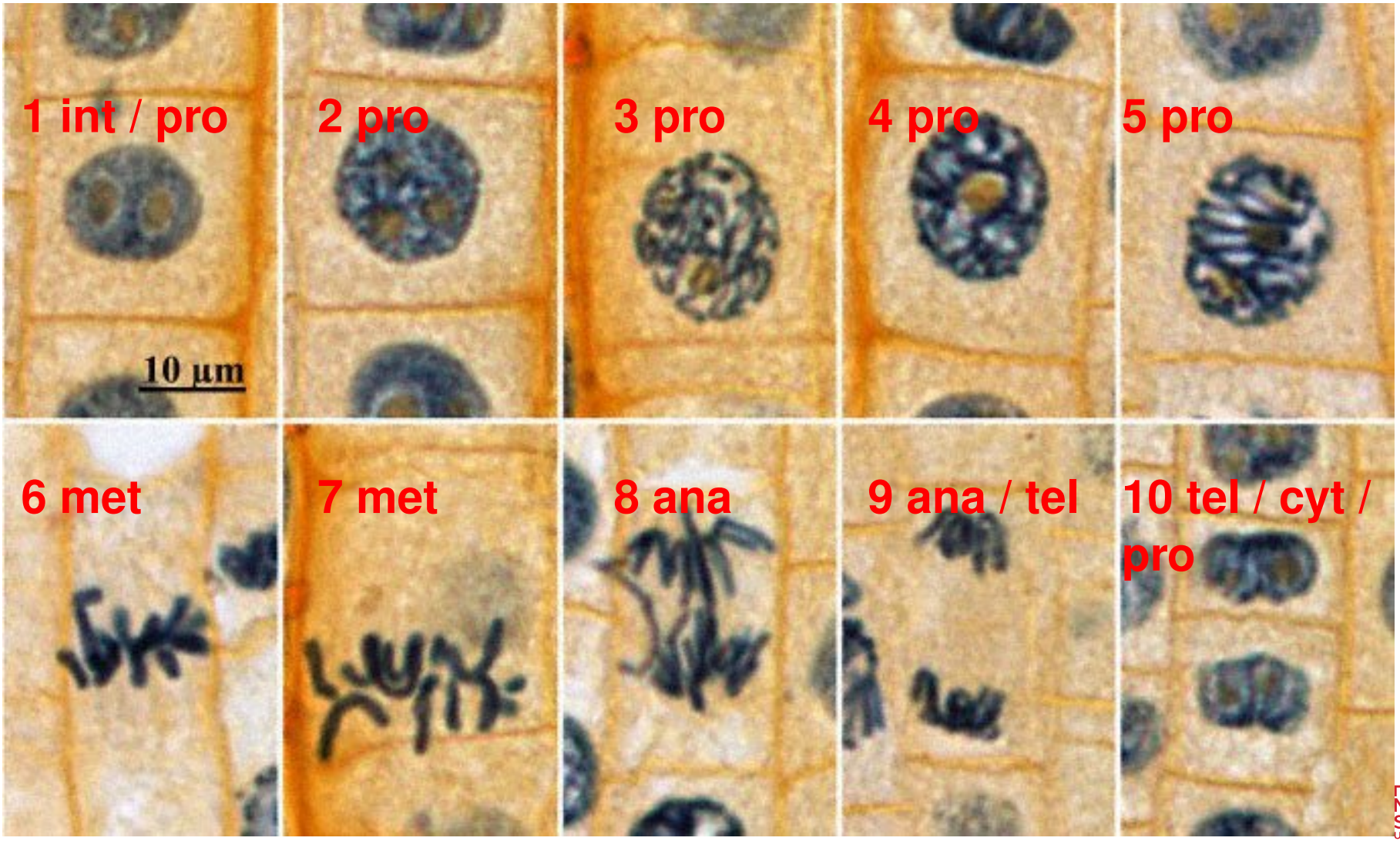
Final question (2 points)

Which stage?



Final question (2 points)

Which stage?



Mitosis and meiosis

Syngamy (Y!)

Why do living things support diversity

- Individual level: diverse genes increase adaptation
- Population level: diverse individuals make population survive

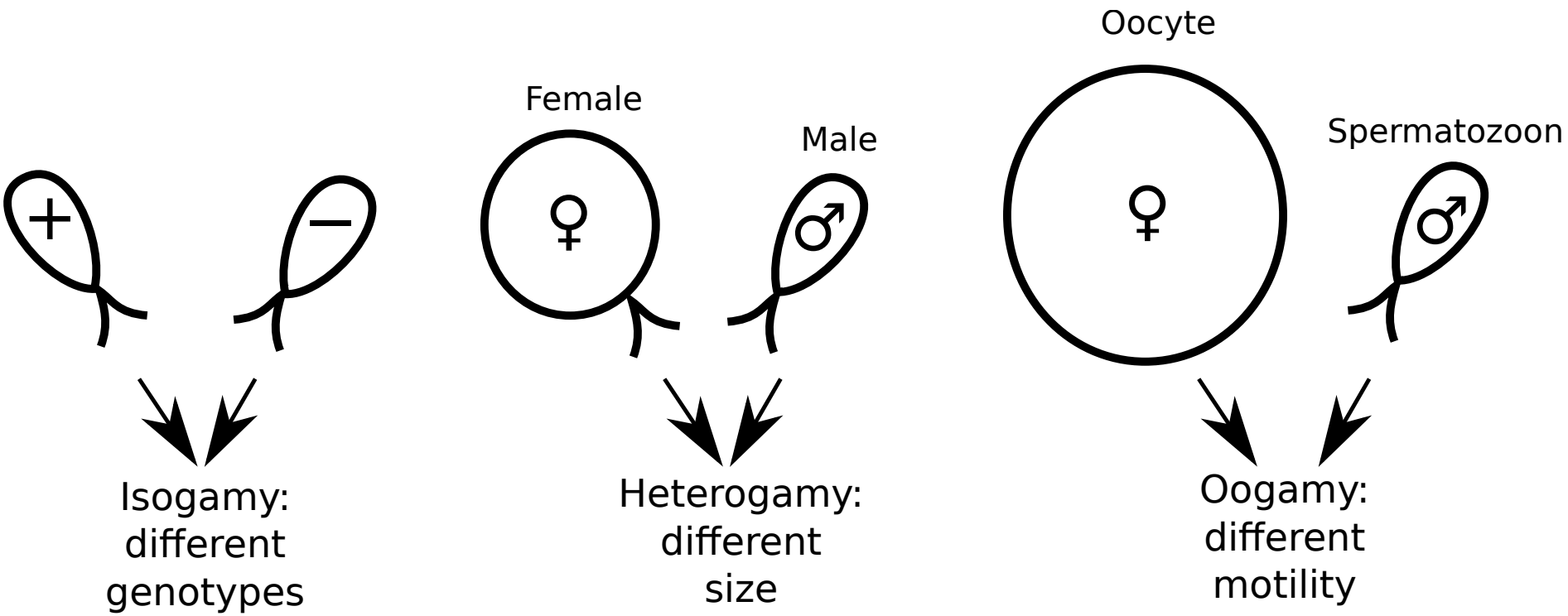
Exchange and renovation of DNA

- To sustain with the ever-changed environment, organisms must evolve (“Red Queen Law”)
- To evolve, they need a genetic diversity: different genotypes in different organisms
- To be genetically diverse, they need a process of genetic exchange
- One of ways of exchange is a sexual process in a form of **syngamy**
- However, constant syngamy will result in constant increase of DNA amount
- Meiosis is a counterbalance to syngamy

Definition of syngamy

- *Fusion of two cells, where resulted cell will have two times more chromosomes*
- Initial cells are **gametes**, resulted cell is a **zygote**
- Chromosome formula: X + X $\longrightarrow$ XX
- **The goal of syngamy** is the renovation of genetic material
- Syngamy changes genotype of cells

Types of syngamy



Mitosis and meiosis

Meiosis (R!)

Some useful terms: checklist

- Gene
- Protein
- Enzyme
- Genotype
- Phenotype
- Genome
- Population
- Mutation
- Syngamy

Quiz question (... points)

Quiz question (... points)

Summary

- **Mitosis** is a equal division of DNA, ploidy does not change, genotype does not change
- **Syngamy** is a sexual process of cell fusion, ploidy doubles, genotype changes
- **Meiosis** is a process of reduction of DNA amount, ploidy halves, genotype changes

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For Further Reading

A. Shipunov.
Introduction to Botany [Electronic resource].
Mode of access:
http://ashipunov.info/shipunov/school/biol_154