

Introduction to Botany. Lecture 24

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Outline

1 Correction

2 Flower

- General characters
- Flower transformations
- Inflorescences

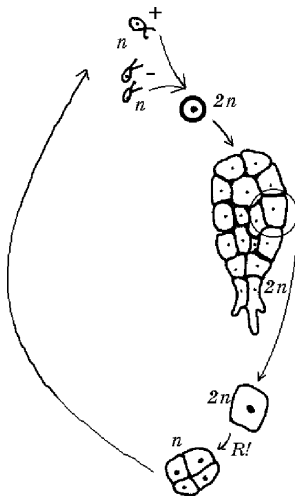
Outline

1 Correction

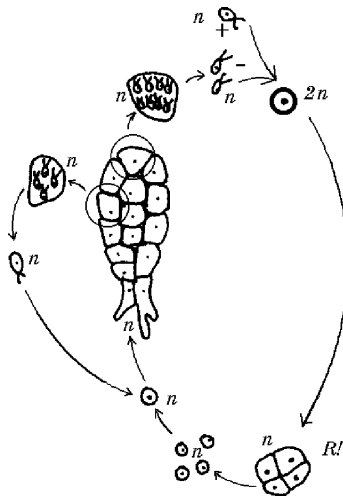
2 Flower

- General characters
- Flower transformations
- Inflorescences

Gametic life cycle: animals



Zygotic life cycle: protists



General characters of flower

- Complete and incomplete flowers
- Sex: staminate, pistillate (imperfect) and bisexual (perfect); monoecious and dioecious plants
- Merosity
- Whorls, connation and adnation
- Symmetry: radial (regular), bilateral (irregular), asymmetry
- Position of gynoecium and ovary: epyginous and hypogynous flowers, or inferior and superior ovary; hypanthium

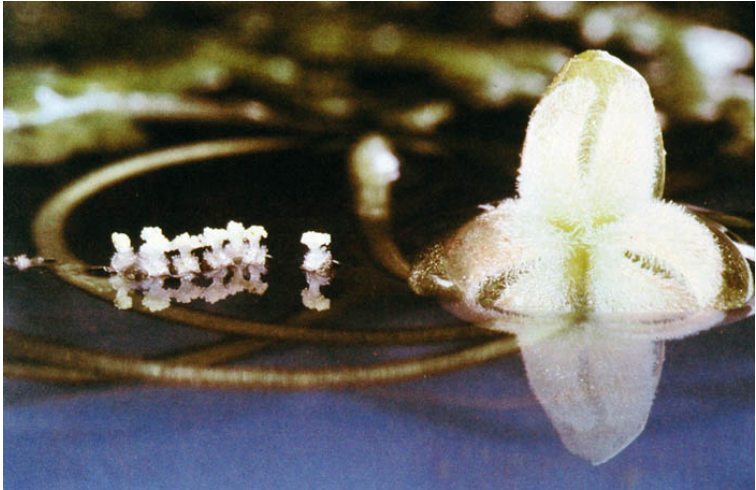
Apomixis

- Reproduction without fertilization
- Apogamy (i.e., parthenogenesis): embryo develops from unfertilized gamete; sexual reproduction becomes vegetative
- Apospory: embryo develops from maternal diploid tissue, without meiosis; here asexual reproduction becomes vegetative

Pollination

- Self-pollination
- Cross-pollination: abiotic (gravity, wind, water) and biotic (insects, birds, bats, sometimes even possums)
- Every pollination type has associated **pollination syndrome**





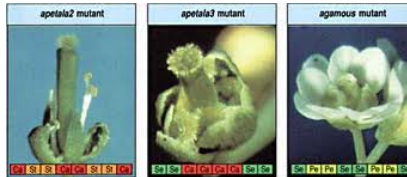
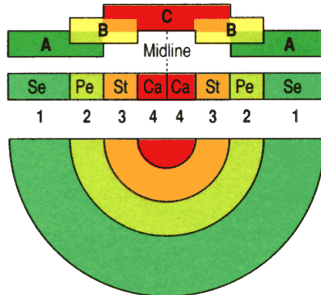




ABC-genes

- There are 3 classes of genes expressed in overlapping, concentric rings.
- The A class (like *apetala2* gene) is expressed in the outermost ring and C (like *agamous*) is expressed in the center; B (e.g., *apetala3*) is expressed at the boundary of A and C.
- If A is expressed in a cell, it goes on to form a sepal.
- If C is turned on, it forms a carpel.
- Petals are formed where both B + A are active.
- Stamens are formed with the combination B + C.

ABC system



Flower evolution: elementary transformations

- Fixation: from indefinite to definite (reverse is diffusion)
- Connation (reverse is splitting)
- Reduction (reverse is multiplication)
- Differentiation (reverse is homeosis)

Inflorescence in general

- Isolated generative shoot bearing flowers
- Open and closed
- Bracteolate and non-bracteolate
- Transformations are similar to flower, plus *aggregation* and *formation of bracts*
- Sometimes flowers and inflorescences are hard to distinguish, these structures are **non-flowers**

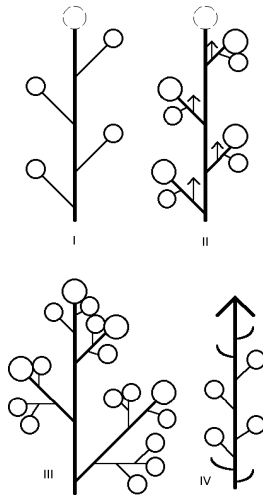


Trithuria non-flowers: one stamen (reduced staminate flower?)
surrounded by multiple pistils (reduced pistillate flowers?)

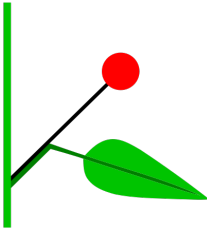
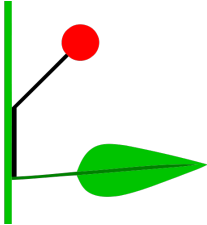
Types of inflorescences

- Model I. Raceme and its derivatives
 - Simple: raceme (11), spike/catkin (10), umbel (01), head (00)
 - Compound: compound raceme (11/11), compound umbel (01/01) etc.
- Model II. Thyrsus and its derivatives
 - Reduced (cymes): dichasium, cincinnus (scorpioid inflorescence) etc.
 - Thyrses in a strict sense
- Model III. Closed panicle (also umbel-like panicles)
- Model IV. Intercalary inflorescences

Models of inflorescences



Metatopy: concaulescence and recaulescence



Summary

- **Apomixis** is a reproduction without fertilization
- Every pollination type has associated **pollination syndrome**
- **ABC-genes** determine the fate of cells forming flower
- **Inflorescence** is an isolated generative shoot bearing flowers

For Further Reading



Th. L. Rost, M. G. Barbour, C. R. Stocking, T. M. Murphy.
Plant Biology. 2nd edition.
Thomson Brooks/Cole, 2006.
Chapters 12 and 13.