

Systematic Botany. Lecture 8

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Outline

Questions and answers

Leguminosae, or Fabaceae—legume family

Cruciferae, or Brassicaceae—cabbage family

Malvaceae s.l.—mallow family

Ranunculaceae—buttercup family

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Previous final question: the answer

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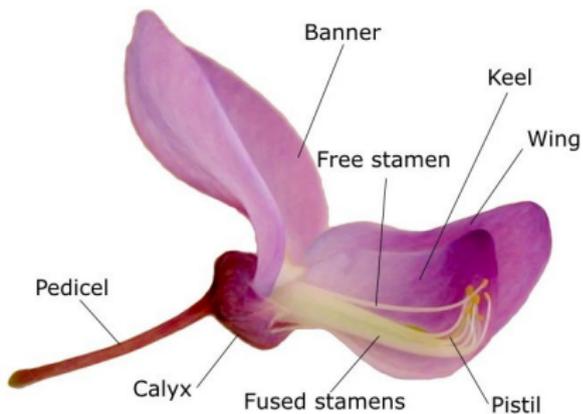
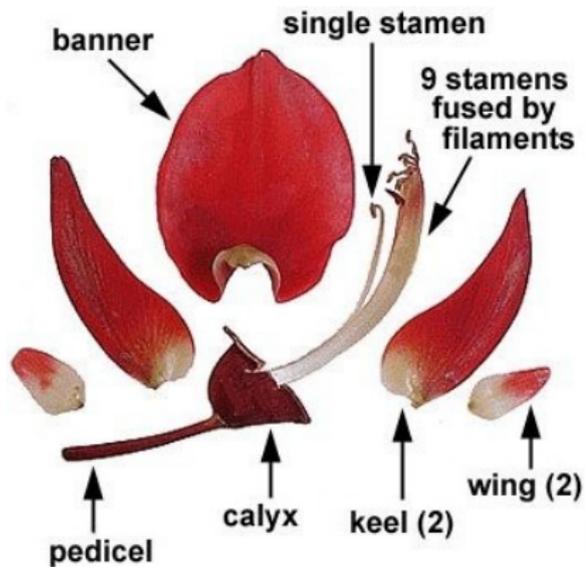
- ▶ Simple leaves
- ▶ Bisexual, actinomorphic flowers
- ▶ One camera in an ovary

etc.

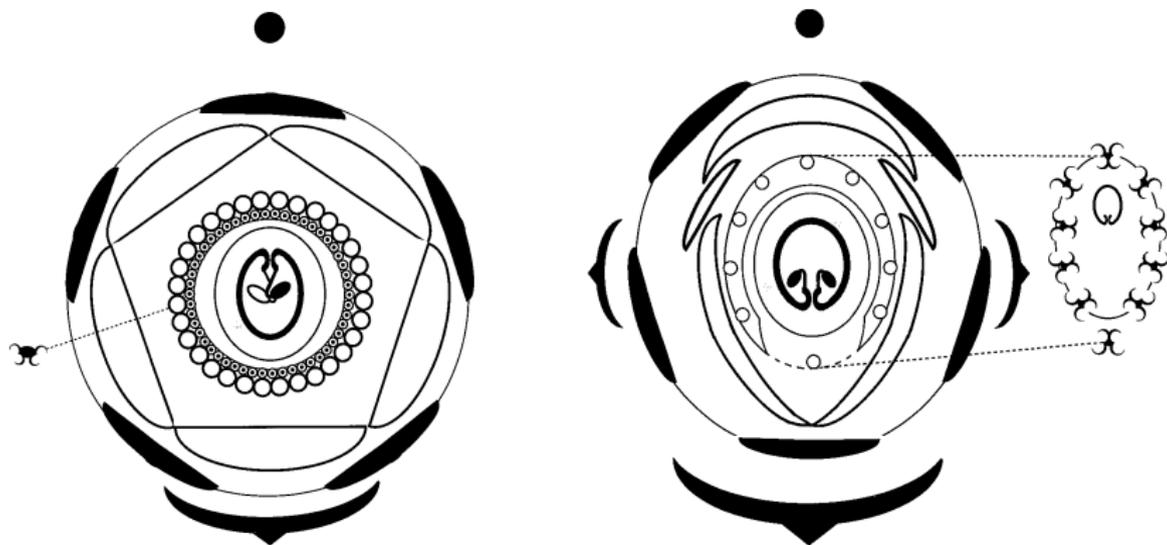
Morphology of Leguminosae

- ▶ Have root nodules with nitrogen-fixing bacteria
- ▶ Leaves alternate, pinnately compound (once or twice), with stipules
- ▶ Sepals 5, united; petals 5, in Papilionoideae they are free, unequal and have special names (banner, keel and wing), in Mimosoideae they fuse and form tube
- ▶ Stamens often 10 with 9 fused and one free stamen; in Mimosoideae, stamens are numerous
- ▶ Single pistil with single carpel
- ▶ Fruit is a legume: dehiscent with one camera
- ▶ Mature seeds without endosperm

Flower of Papilionoideae



Leguminosae flower: Mimosoideae and Papilionoideae



*K(5)C(5)A_{5-∞}G₁ or ↑K(5)C_{1,2,2}A_{1,[4+5]}G₁

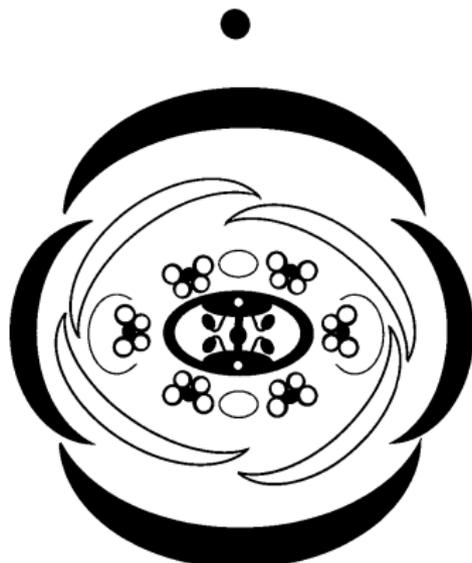
Representatives of Leguminosae

- ▶ Mimosoideae: stamens numerous, petals connected
 - ▶ *Acacia*—dominant tree of African and Australian savannas, often with phyllodes
 - ▶ *Mimosa*—sensitive plant
- ▶ Papilionoideae: stamens 9+1, petals free; this subfamily contains many extremely important food plants with high protein value
 - ▶ *Glycine*—soybean
 - ▶ *Arachis*—peanut with self-buried fruits
 - ▶ *Phaseolus*—bean
 - ▶ *Pisum*—pea

Morphology of Cruciferae

- ▶ Herbs, often hairy, contain mustard oils
- ▶ Leaves simple, often dissected, alternate, without stipules
- ▶ Flowers dimerous, in racemes
- ▶ 4 sepals, 4 petals, ancestrally also 4 stamens but inner stamens split each in two = 6 stamens in total
- ▶ Pistil has two carpels
- ▶ Fruit is a siliqua: dehiscent, with two cameras and replum bearing seeds
- ▶ Mature seeds with small amount of endosperm

Cruciferae flower



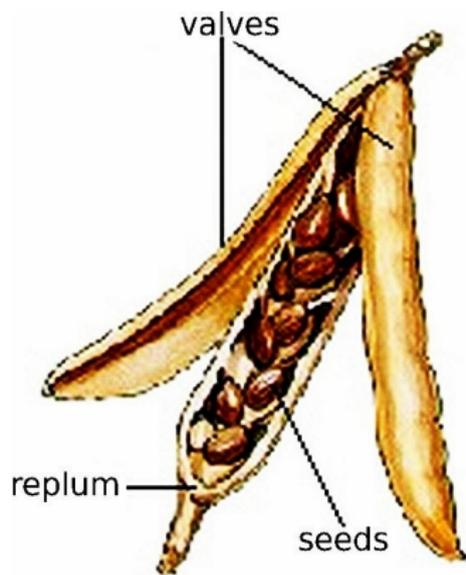
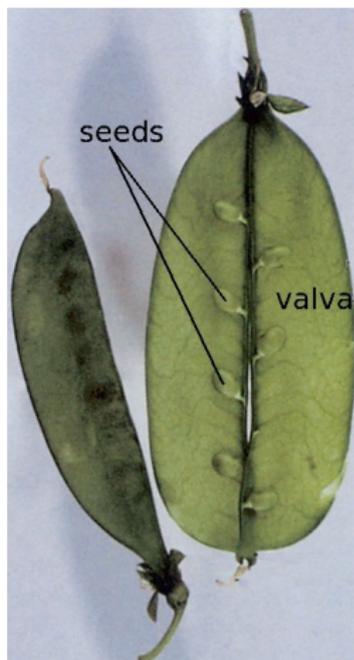
$$*K_4C_4A_{2+2,2}\underline{G(2)}$$

Representatives of Cruciferae

Important vegetables and spices, e.g.

- ▶ *Brassica oleracea*—broccoli, cabbage, cauliflowers
- ▶ *Brassica nigra*—black mustard
- ▶ *Brassica rapa*—turnip
- ▶ *Raphanus*—radish
- ▶ *Armoracia*—horseradish
and
- ▶ *Arabidopsis thaliana*—famous model plant

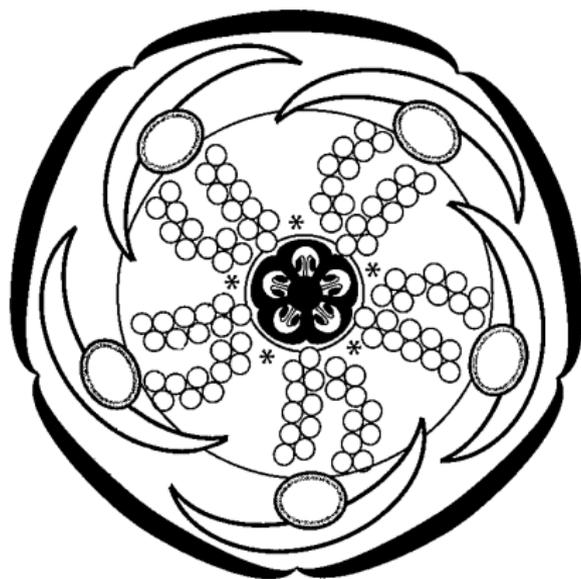
Legume and siliqua



Malvaceae s.l.—mallow family

- ▶ \approx 2,300 species, now united several families (Bombacaceae, Sterculiaceae, Tiliaceae and Malvaceae s.str.)
- ▶ Distributed in tropical and temperate regions, equally in forests and grasslands
- ▶ Life forms: mostly trees and shrubs, core Malvaceae are herbs
- ▶ Leaves simple (or palmately compound), often with actinodromous venation, alternate, with stipules, often with star-like hairs
- ▶ Flowers mostly in inflorescences, bisexual, actinomorphic, usually with double perianth and often also with epicalyx, 5-merous; stamens multiplied and often fused in 1, 5 or more groups
- ▶ Pistil with superior ovary and 5 carpels

Malvaceae flower



$$*K_5 C_0 \vee_5 A_{5-\infty} \underline{G(5)}$$

Representatives of Malvaceae

Importance: textile (cotton), food (cocoa, hibiscus) and ornamental (mallows, basswood)

- ▶ *Malva*, *Abutilon*, *Sphaeralcea*—mallows
- ▶ *Theobroma*—cocoa tree
- ▶ *Gossypium*—cotton
- ▶ *Hibiscus*—hibiscus

Morphology of Ranunculaceae

- ▶ Mostly herbs
- ▶ Vascular bundles sometimes scattered (as in monocots)
- ▶ Leaves are complicatedly dissected or compound, alternate, without stipules
- ▶ Flowers solitary or in different raceme-like inflorescences; bisexual, mostly with infinite (> 12, irregular) number of stamens and pistils
- ▶ Petals originate from stamens, sometimes absent
- ▶ Carpels free, form multiple pistils
- ▶ Fruit is multiple follicle or multiple nut
- ▶ Embryo very small, sometimes has one cotyledon

Representatives of Ranunculaceae

- ▶ Many ornamental plants, e.g., *Ranunculus* (buttercup), *Aquilegia* (columbine), *Anemone*
- ▶ *Ranunculus* and other genera are important component of wet grasslands

Summary

- ▶ All today's families belong to rosids (subclass Rosidae)—flowering plants with normally 5-merous choripetalous flowers

Final question (1 point)

For Further Reading



O. A. Stevens.

Handbook of North Dakota plants. 3rd edition.

NDSU, 1963.