



## Outline

## Questions and answers

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Leguminosae, or Fabaceae—legume family

Cruciferae, or Brassicaceae—cabbage family

Malvaceae s.l.—mallow family

Ranunculaceae—buttercup family

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What is common between Caryophyllaceae (pink family) and Polygonaceae (smartweed family)?

## Previous final question: the answer

What is common between Caryophyllaceae (pink family) and Polygonaceae (smartweed family)?

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

etc.



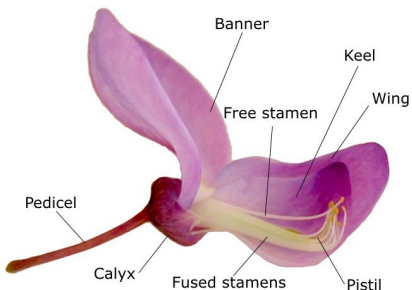
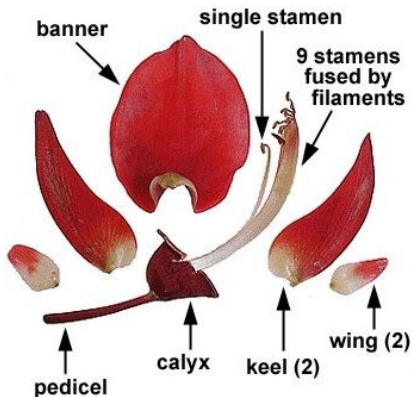
Leguminosae, or Fabaceae—legume family

- ▶ Up to 17,000 species, third largest angiosperm family after Compositae (aster family) and Orchidaceae
- ▶ Widely distributed throughout the world but preferably in tropics
- ▶ Three subfamilies (Caesalpinioideae, Mimosoideae, Papilionoideae) often treated as separate families

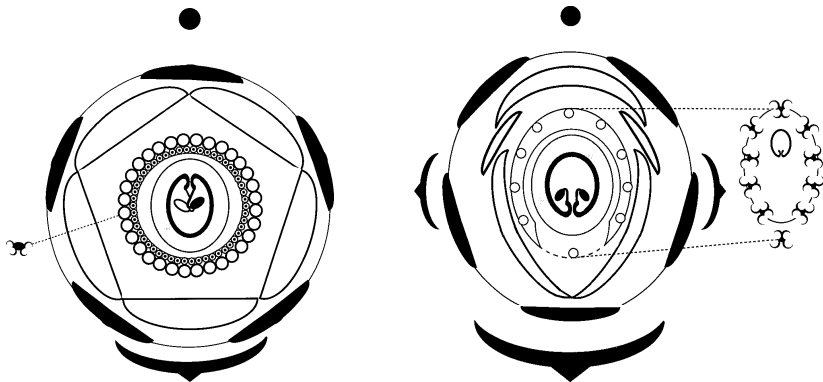
## Morphology of Leguminosae

- ▶ 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



$*K_{(5)}C_{(5)}A_{5-\infty}G_1$  or  $\uparrow K_{(5)}C_{1,2,2}A_{1,[4+5]}G_1$

## 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

## Phyllodes of Australian *Acacia glaucoptera*



## *Mimosa pudica* before touch



## *Mimosa pudica* after touch





## *Glycine max*, soybean



## *Arachis hypogaea*, peanut

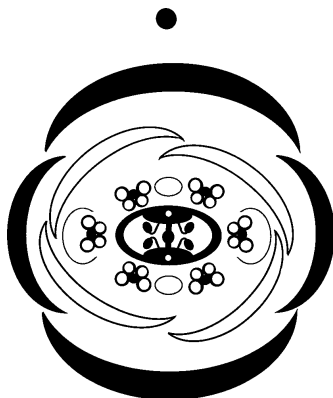


## Cruciferae, or Brassicaceae—cabbage family

- ▶  $\approx 3,000$  species
- ▶ Found mostly in temperate regions, especially in dry climates
- ▶ Morphologically and ecologically uniform family

- ▶ 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 silique: dehiscent, with two cameras and replum bearing seeds
- ▶ Mature seeds with small amount of endosperm

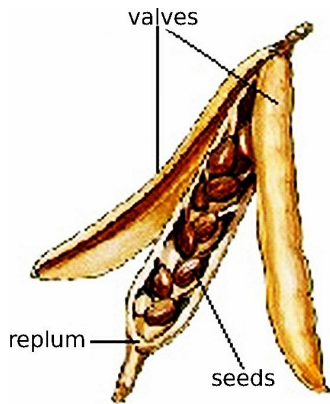
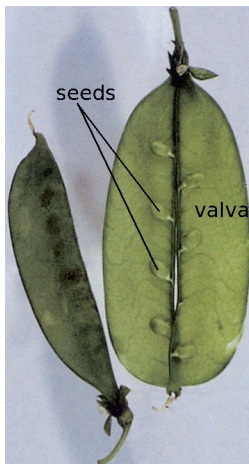
# Cruciferae flower



$$*K_4C_4A_{2+2}G_{\underline{(2)}}$$

- ▶ *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



## *Arabidopsis thaliana*

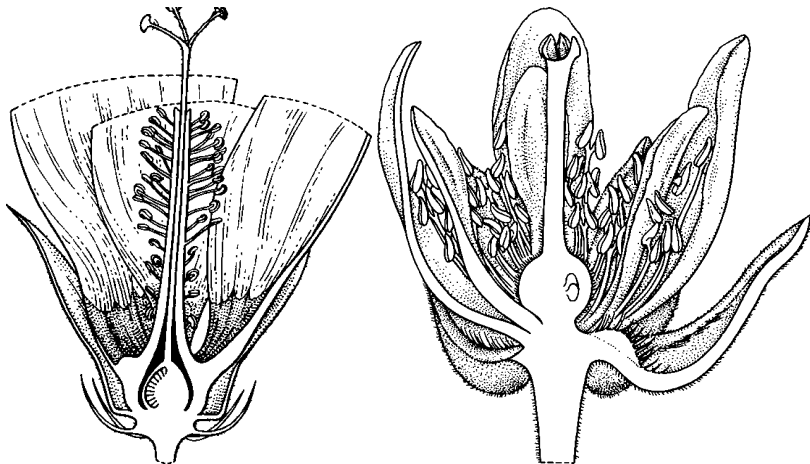




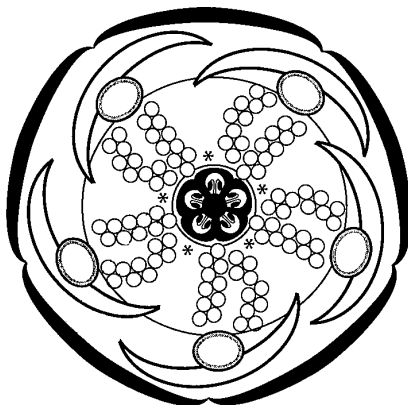
## Malvaceae s.l.—mallow family

- ▶  $\approx 2,300$  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

## *Hibiscus* and *Tilia* flowers



## Malvaceae flower



$$*K_5C_{0v5}A_{5-\infty}\underline{G_{(5)}}$$

## Representatives of Malvaceae

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

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

## Hibiscus tea plant

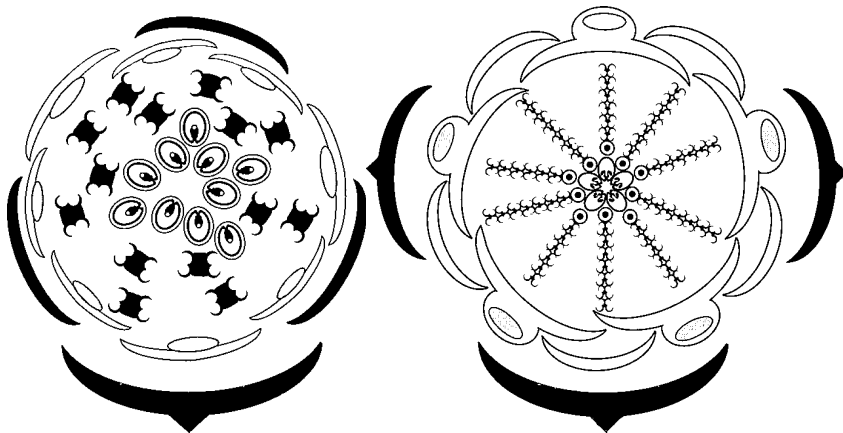


- ▶  $\approx 2,000$  species
- ▶ Distributed mostly in temperate regions of both Northern and Southern Hemispheres
- ▶ Generally, forest or meadow plants

## 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

## Ranunculaceae: *Ranunculus* and *Aquilegia*



\*K<sub>3-5</sub>C<sub>0-5-8</sub>A<sub>∞</sub>G<sub>1-∞</sub>



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

## *Ranunculus ficaria*



## Blue anemones, *Anemone*



## Columbine, *Aquilegia vulgaris*



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

### Final question (1 point)

└ Ranunculaceae—buttercup family

└ Ranunculaceae—buttercup family

## For Further Reading



O. A.Stevens.

*Handbook of North Dakota plants.* 3rd edition.

NDSU, 1963.