

# Systematic Botany. Lecture 24–27

Alexey Shipunov

Minot State University

October 30 – November 6, 2013



# Outline

Rosaceae—rose family

Cruciferae, or Brassicaceae—cabbage family



# Outline

Rosaceae—rose family

Cruciferae, or Brassicaceae—cabbage family



# General features of Rosaceae

## Rosaceae—rose family

- ▶  $\approx$  3,000 species
- ▶ Nearly cosmopolitan, but more common to temperate and subtropical regions of Northern Hemisphere
- ▶ Forest and meadow plants, do not prefer dry places

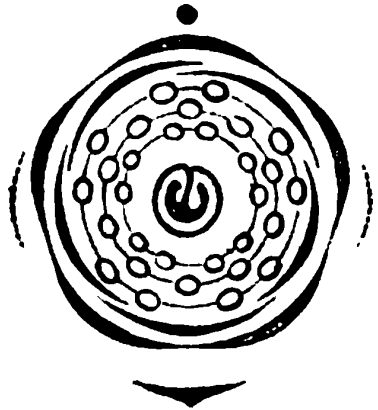
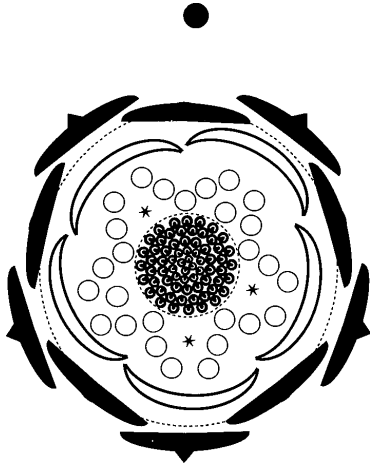


# Morphology of Rosaceae

- ▶ Trees, shrubs and herbs
- ▶ Often accumulate cyanogenic compounds (contains  $\text{—C} \equiv \text{N}$  group); some Rosaceae have nitrogen-fixing bacteria as symbionts
- ▶ Alternate, simple or dissected leaves with stipules
- ▶ Flowers with hypanthium; in Maloideae hypanthium fuses with pistils and produces inferior ovary
- ▶ Calyx with connected sepals, corolla with distinct petals
- ▶ Stamens numerous, typically in sets of 5 (or 10)
- ▶ Fruits diverse: multiple nuts/drupes in Rosoideae, multiple follicles or single drupes in Spiraeoideae, pomes in Maloideae
- ▶ Mature seeds without endosperm



# Rosaceae flower: Rosoideae and Spiraeoideae



\*K<sub>5</sub>C<sub>5</sub>A<sub>5-10-∞</sub>G<sub>1-5-∞</sub> ∨ G<sub>(3-5)</sub> (Maloideae)



# Representatives of Rosaceae

Several subfamilies, each with economically important members:

- ▶ **Rosoideae** (multiple one-seeded fruits)
  - ▶ *Rosa*—rose
  - ▶ *Fragaria*—strawberry and close genus *Potentilla*—cinquefoil
  - ▶ *Rubus*—blackberry, raspberry
- ▶ **Spiraeoideae** (fruits—follicles of solitary drupes)
  - ▶ *Prunus*—cherry, peach, apricot, plum
  - ▶ *Spiraea*—meadowsweet, important component of prairies
- ▶ **Maloideae** (now often included in Spiraeoideae; have inferior ovary, fruits are pomes)
  - ▶ *Pyrus*—apple, pear
  - ▶ *Crataegus* (hawthorn), *Sorbus* (mountain ash), *Amelanchier* (serviceberry), *Aronia* (chokeberry) and others



## *Spiraea tomentosa*, prairie plant





## *Aronia* × *mitchurinii*



Spontaneous hybrid between American chokeberry and European  
*Sorbus aria*



## *Potentilla fruticosa*, shrubby cinquefoil



# General features of Cruciferae

## Cruciferae, or Brassicaceae—cabbage family

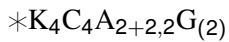
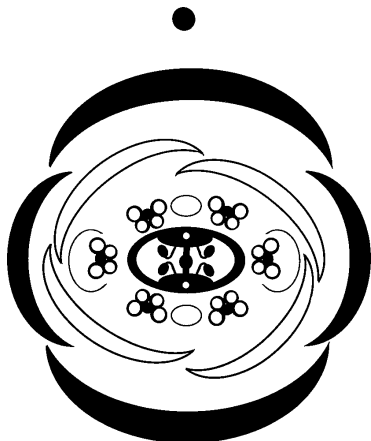
- ▶  $\approx 3,000$  species
- ▶ Found mostly in temperate regions, especially in dry climates
- ▶ Morphologically and ecologically uniform family

# 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

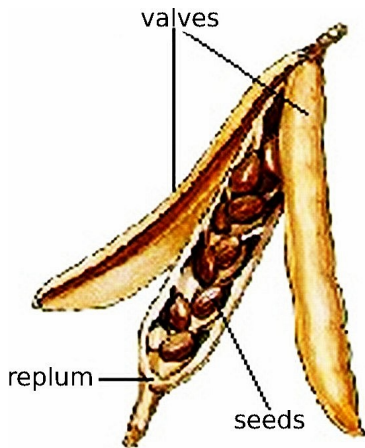
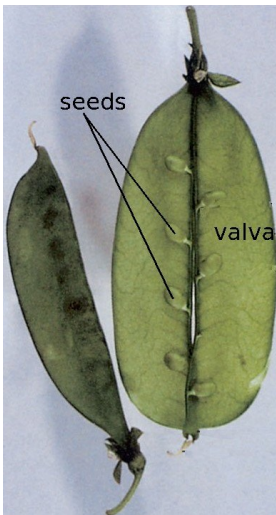


# Representatives of Cruciferae

Important vegetables and spices, e.g.

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

## Legume and siliqua



# *Arabidopsis thaliana*





## For Further Reading



A. Shipunov.

*Systematic Botany* [Electronic resource].

2011—onwards.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_448](http://ashipunov.info/shipunov/school/biol_448)



Van Bruggen, Th.

*The vascular plants of South Dakota.*

1996. 3rd ed.

University of South Dakota, Vermillion, SD.

