

# Systematic Botany. Lecture 7

Alexey Shipunov

Minot State University

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# Outline

Questions and answers

Caryophyllaceae—pink family

Polygonaceae—smartweed family

Rosaceae—rose family

Leguminosae, or Fabaceae—legume family

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## Previous final question: the answer

Which families (studied so far) have three carpels in pistil?

- ▶ Polemoniaceae
- ▶ Campanulaceae (bellflower family)



## Morphology of Caryophyllaceae

- ▶ Mostly herbs
- ▶ Stems are usually swollen at nodes, leaves narrow, opposite, with hyphodromous venation, usually without stipules
- ▶ Flower bisexual, pentamerous, in cymes; with free petals and sepals (sometimes sepals fuse), stamens 5 or 5+5,
- ▶ Pistil has 3 or 5 carpels, ovules in one camera, attached to the central placenta
- ▶ Fruit dehiscent, dry capsule
- ▶ Embryo curved around perisperm





## Garden cultivar of *Dianthus*





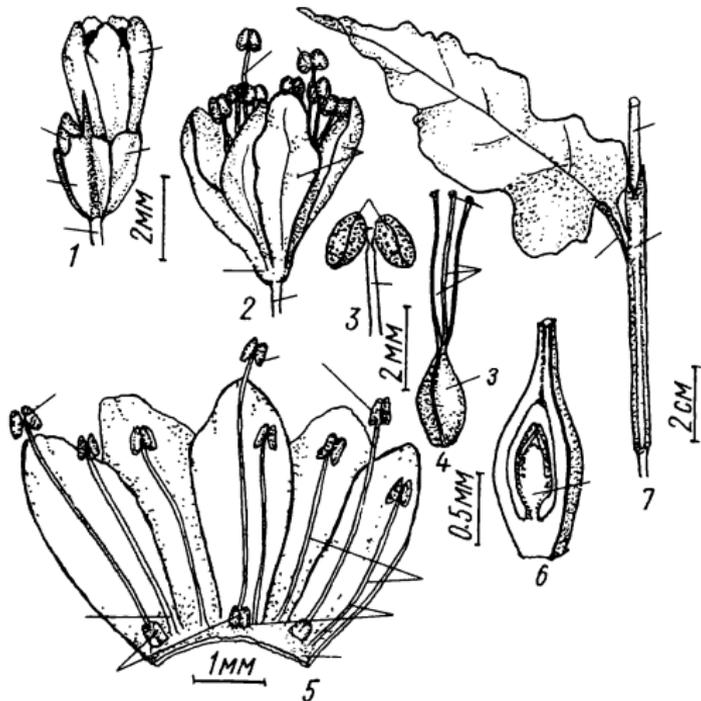


## Polygonaceae—smartweed family

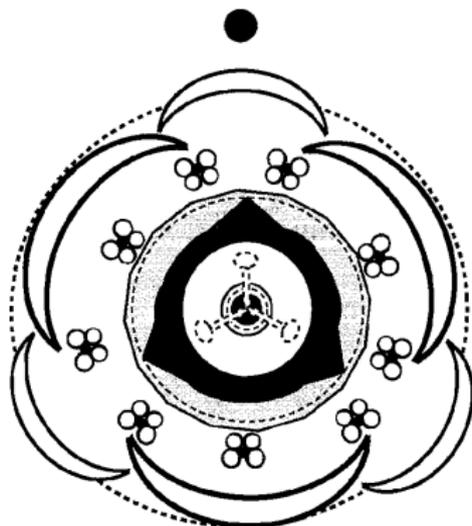
- ▶  $\approx$  1, 100 species
- ▶ Distributed mostly in Northern hemisphere, prefer wetlands
- ▶ Life forms: herbs, sometimes shrubs and even trees (sea-grape, *Coccoloba*)
- ▶ Leaves alternate, simple, with ocrea—sheathing membranous stipule
- ▶ Flowers actinomorphic, often 3-merous, without sepals/petals, perianth calyx-like or corolla-like, androecium of 6–9 stamens
- ▶ Pistil with three carpels, one camera and one terminal ovule
- ▶ Fruit is a nut (1-seeded dry fruit), seed with perisperm



## *Persicaria*, smartweed



# Polygonaceae flower



$$*P_{\{3+3\}} \vee 5 A_{3-9} \underline{G}_{(3)}$$

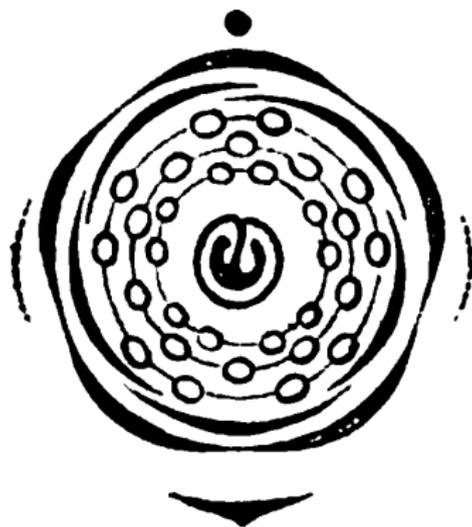
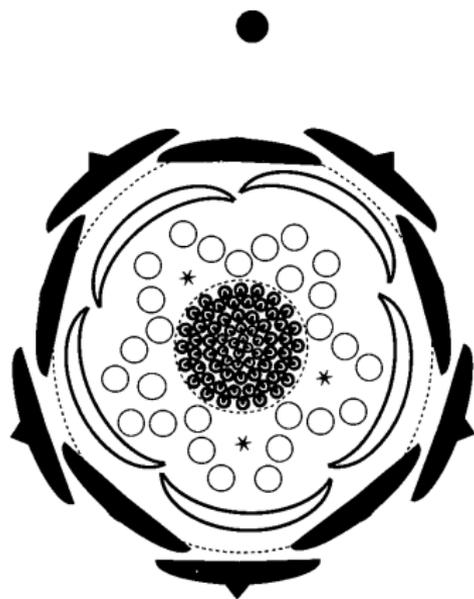




## Morphology of Rosaceae

- ▶ 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









## 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



## Final question (2 points)

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



## For Further Reading



O. A. Stevens.

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

NDSU, 1963.