

Systematic Botany. 4. Caryophyllales

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Outline

Pink order: Caryophyllales

Amaranthaceae—amaranth family

Caryophyllaceae—pink family

Polygonaceae—smartweed family



Pink order: Caryophyllales

Amaranthaceae—amaranth family



General features of Amaranthaceae

Amaranthaceae—amaranth family

- ▶ \approx 2,500 species
- ▶ Worldwide distribution
- ▶ Desert, semi-desert and dryland plants
- ▶ Often split in Amaranthaceae s.str. and Chenopodiaceae (beet family)

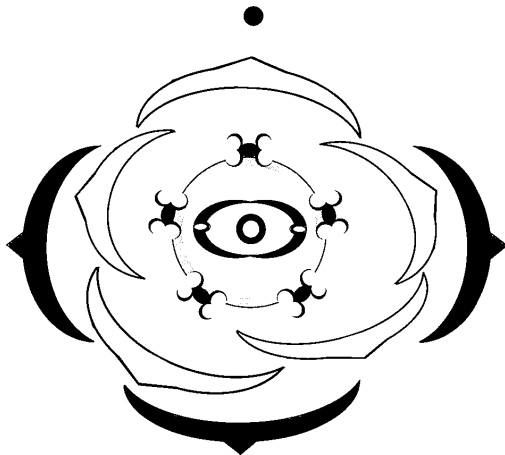


Morphology of Amaranthaceae

- ▶ Herbs and shrubs, contain red pigments **betalains**
- ▶ Stems with unusual tissue structure (“abnormal secondary growth”), leaves often succulent, sometimes with salt glands
- ▶ Flowers reduced, mono- or bisexual, in dense glomerules
- ▶ Pistil has 2 (or 3) carpels and one ovule
- ▶ Fruit is a nutlet
- ▶ Embryo curved around **perisperm**



Amaranthaceae flower



*K₀₋₅C₀A₅G₍₂₋₃₎

Nitrophila occidentalis flower



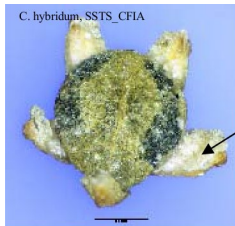
Economically important representatives of Amaranthaceae

Vegetables and so-called “pseudocereals”

- ▶ *Beta*—beet
- ▶ *Chenopodium quinoa*—quinoa
- ▶ *Amaranth*—amaranth, both ornamental and pseudocereal
- ▶ *Spinacia oleracea*—spinach

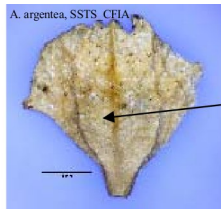


Chenopodium vs. *Atriplex*



Fruiting
bract

- Five fruiting bracts, meeting in the middle of the flat side.
- * Meets on the thin edge in *C. bonus-henricus*, *C. capitatum* and *C. rubrum*.



Fruiting
bract

- Two fruiting bracts, meeting along the thin edge.
- Note that the pericarp (seed covering) follows the alignment of the bracts.

Pink order: Caryophyllales

Caryophyllaceae—pink family



General features of Caryophyllaceae

Caryophyllaceae—pink family

- ▶ \approx 2,000 species
- ▶ Distributed in temperate and warm temperate regions of Northern Hemisphere
- ▶ Forest, meadow and prairie plants

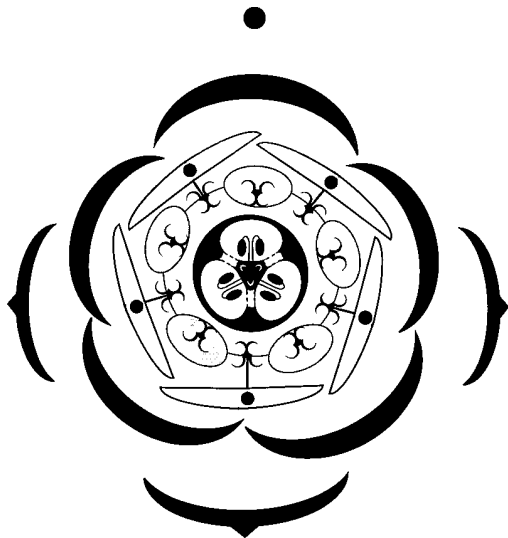


Morphology of Caryophyllaceae

- ▶ Mostly herbs
- ▶ Stems are usually swollen at nodes, leaves narrow, opposite, with hypodromous 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



Caryophyllaceae flower



* $K_5 C_5 A_{5+5} \underline{G_{(3-5)}}$



Representatives of Caryophyllaceae

Mostly ornamental and weed plants

- ▶ *Dianthus*—pink
- ▶ *Stellaria*—chickweed
- ▶ *Cerastium*—mouse-ear chickweed



Garden cultivar of *Dianthus*



Cerastium



Stellaria sp.



Pink order: Caryophyllales

Polygonaceae—smartweed family



Polygonaceae—smartweed family

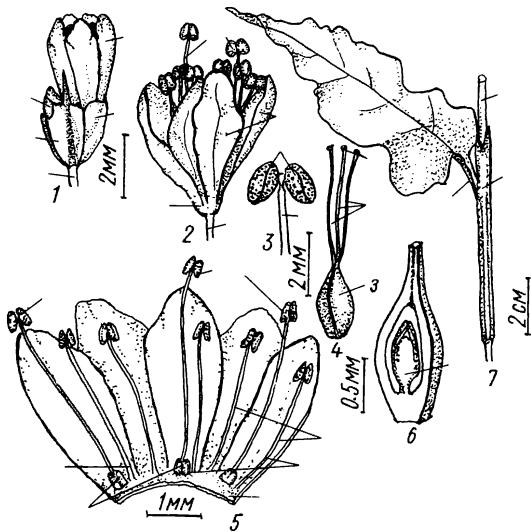
- ▶ \approx 1, 100 species
- ▶ Distributed mostly in Northern hemisphere, prefer wetlands
- ▶ Life forms: herbs, sometimes shrubs and even trees (sea-grape, *Coccoloba*)
- ▶ Leaves alternate, simple, with ocrea—sheathing membranous stipule
- ▶ Flowers actinomorphic, often 3-merous, without sepals/petals, 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



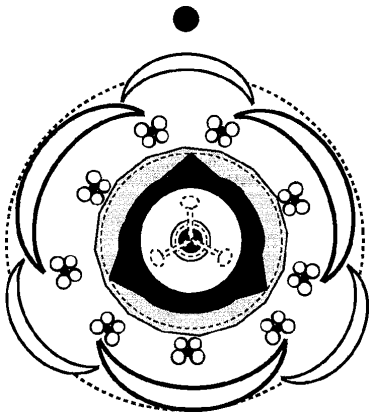
Ocrea



Persicaria, smartweed



Polygonaceae flower



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

Representatives of Polygonaceae

Importance: food and ornamental plants

- ▶ *Polygonum*, *Bistorta*, *Persicaria*, *Fallopia*—smartweeds
Understood differently in “Flora of North America” and USDA PLANTS database
- ▶ *Rumex*—sorrel
Many inconstent keys in the past
- ▶ *Rheum*—rubarb
- ▶ *Fagopyrum*—buckwheat
- ▶ *Coccoloba*—sea-grape
- ▶ *Eriogonum*—wild buckwheat
No ocrea!



Other Caryophyllales

- ▶ Nyctaginaceae (3 genera): small flowers with monomerous pistil and big showy bracts, like *Mirabilis* (four-o'clock)
- ▶ Cactaceae (cacti and leafy *Portulaca*)

- ▶ Aizoaceae (mostly South African 1 genus in ND)
- ▶ Droseraceae (sundew)
- ▶ Molluginaceae (*Mollugo*)
- ▶ Montiaceae (*Phemeranthus*)
- ▶ Nepenthaceae (Asian pitcher plants)
- ▶ Phytolaccaceae (*Sarcobatus* in ND)
- ▶ Tamaricaceae (*Tamarix*)



For Further Reading



A. Shipunov.

Shipunov, A. Plants of North Dakota. Manual.

2017—onwards.

Mode of access: http://ashipunov.info/shipunov/school/biol_448/nd_manual/nd_manual.pdf



A. Shipunov.

Shipunov, A. Flora of North Dakota: Checklist. Version 2. Ed.: Kartesz, J., and Nishino, M.

2017—onwards.

Mode of access: <http://ashipunov.info/shipunov/fnddb2>



Minot State University Herbarium (MSU)



Flora of Great Plains.

1986.

University Press of Kansas, Lawrence, KS.

