

Plants and Other Organisms in the Classroom

Plants. Seminar 3

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Outline

- 1 Important details of plant construction
- 2 Most important plant families
- 3 How to identify our families
- 4 Flora of North Dakota: accessible literature

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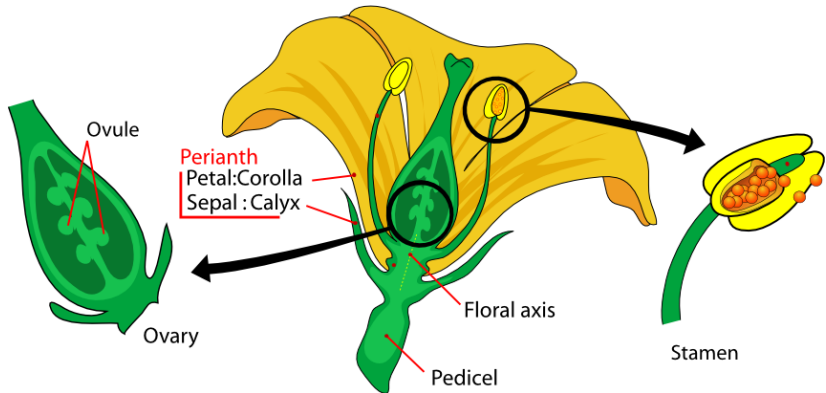
Why we need to know plant families

- If you know the family, you know characters of hundreds and thousand of genera and species, you may even predict them
- There are 250,000 species of flowering plants and only 350 families; knowing family will significantly reduce efforts
- In science, everything is constantly changing, but plant families are exception—they are stable for more than 300 years

Plant construction: flowers

- Solitary or in inflorescences
- Symmetry: star-like and human-like (with left and right sides)
- Number of: sepals, petals, stamens, pistils and carpels
- Position of ovary: above or below the other parts of flower

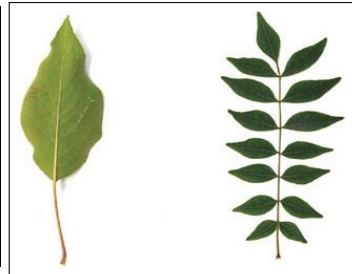
Plant construction: flowers



Plant construction: leaves

- Alternate and opposite leaves
- Simple (whole or dissected) and compound leaves

Plant construction: leaves



Compositae, aster family

- Largest family of flowering plants
- Flowers are always in flower-like inflorescences (heads)
- Inferior ovary, fused stamens

Compositae, aster family



Gramineae, grass family; and Cyperaceae, sedge family

- Grasses and grass-like plants forming turf with their underground rhizomes
- Simplified, reduced flowers gathered in spikes and next to more complex structures
- No showy flower parts, everything is adapted to wind pollination
- Stems hollow, triangular (sedges) or rounded (grasses) in the section

Grasses and sedges



Liliaceae, lily family

- This is a group of several families
- Simple and alternate leaves, well-developed underground parts (bulbs, rhizomes etc.)
- Six tepals (neither sepals nor petals), 6 stamens, pistil of three carpels

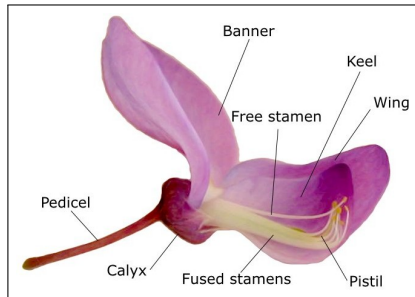
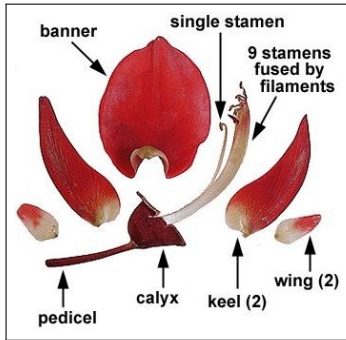
Liliaceae, lily family



Leguminosae, legume family

- Third largest family; tropical trees and temperate herbs
- Butterfly-like or boat-like flowers with “keel”, “banner” and “wings”
- Always one pistil of one carpel
- Alternate compound leaves, root nodules

Leguminosae, legume family



Labiatae, mint family

- Aromatic herbs and shrubs
- Bilateral flowers with upper and lower lips
- Stamens in two pairs; pistil of two divided carpels
- Simple opposite leaves

Labiatae, mint family



Solanaceae, potato family

- Herbs and shrubs, often poisonous
- Polysymmetric flowers with 5 sepals, 5 fused petals and 5 stamens
- Pistil of two carpels
- Simple (but often dissected) alternate leaves

Solanaceae, potato family



Malvaceae, cotton family

- Trees (like basswood or chocolate tree), shrubs (like cotton) or herbs (like mallow)
- Big showy flowers with numerous fused stamens, 5 sepals and 5 petals
- Pistil of 5 carpels
- Simple alternate leaves

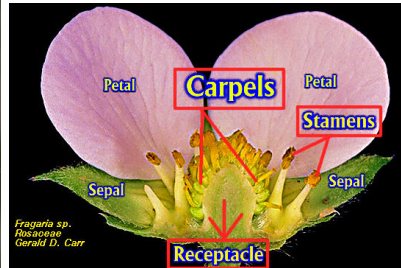
Malvaceae, cotton family



Rosaceae, rose family

- Trees (like apple), shrubs (rose), herbs (strawberry)
- Polysymmetric flowers with 5 fused sepals, 5 petals, multiple stamens
- Multiple or one pistil sitting inside a “cup” or on the receptacle
- Simple or compound but always alternate leaves

Rosaceae, rose family



How to identify our seven families: steps 1–3

- Flowers in dense flower-like inflorescences?

Yes Compositae, aster family

No Go to the next step

- Grass-like plants with green or yellow, small flowers in spikes?

Yes Gramineae, grass family, and Cyperaceae, sedge family

No Go to the next step

- Flowers with upper and lower lips and 4 stamens?

Yes Labiatae, mint family (and some others)

No Go to the next step

Identification: steps 4–6

- Flowers with six tepals?

Yes Liliaceae, lily family (and some others)

No Go to the next step

- Flowers with banner and keel; leaves compound?

Yes Leguminosae, legume family

No Go to the next step

- Flowers with 5 sepals, petals and stamens and pistil of two carpels?

Yes Solanaceae, potato family (and some others)

No Go to the next step

Identification: steps 7–8

- Flowers with multiple stamens?

Yes Rose or cotton family, go to the next step

No Some other family

- Flowers with multiple (or one) pistils sitting inside a “cup” or on the receptacle?

Yes Rosaceae, rose family

No Malvaceae, cotton family (and some others)

Summary

To know plant family, one should check:

- Position and structure of leaves
- Symmetry and number of flower parts

Flora of North Dakota: accessible literature 1

- Flora of North America. Volumes 2-5, 6-8, 19-23, 26-27
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- Hansen, K. 2008. Plants of the Grand River and Cedar River National Grasslands: 2008. USDA-Forest Service, Dakota Prairie Grasslands, internal report. 56 pp.
<http://www.fs.fed.us/r1/dakotaprairie/recreation/plants-grand-river-brochure-khansen-07-08-opt.pdf>
- Identifying Plants on Soaring Eagle Prairie
<http://www.und.nodak.edu/org/soaringeagleprairie/2005/identifyingplants/startidentifyingplants.htm>

Flora of North Dakota: accessible literature 2

- Larson, G.E. 1993. Aquatic and wetland vascular plants of the northern Great Plains. Gen. Tech. Rep. RM-238. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 681 p.
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<http://www.npwrc.usgs.gov/resource/plants/floramw/>
- Sedivec, K.K., Barker W.T. 1998. Selected North Dakota and Minnesota Range Plants. NDSU Department of Animal and Range Sciences : Fargo.
<http://www.ag.ndsu.edu/pubs/ansci/range/eb69-1.htm>
- USDA Plants database <http://plants.usda.gov/>

For Further Reading



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