

1. Most important plant families

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Outline

- 1 Important details of plant construction
- 2 Most important plant families
- 3 How to identify some important families

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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

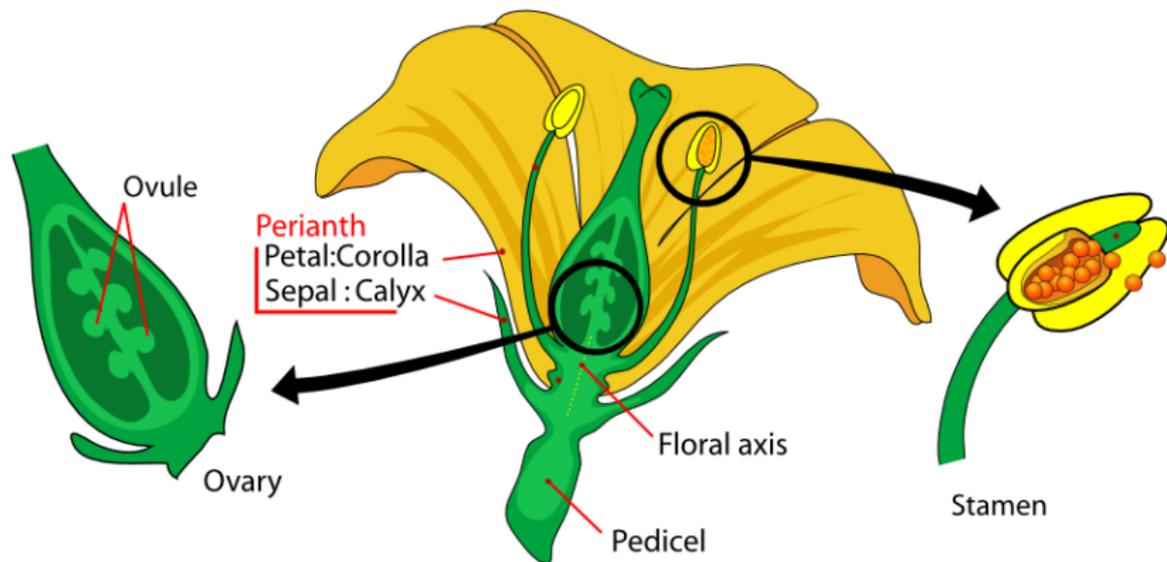
History of plant families

- Famous **Carolus Linnaeus** made the classification of all organic world but he did not use “natural groups”, his classification of plants was artificial
- French scientist **Michael Adanson** first in the world apply “bioinformatic” methods to the plant diversity and identify plant families
- **Antoine de Jussieu** adapted this approach to the natural gardening and make these families “alive” as garden beds in Paris.
- In 90% of cases, molecular methods confirmed Adanson’s findings

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

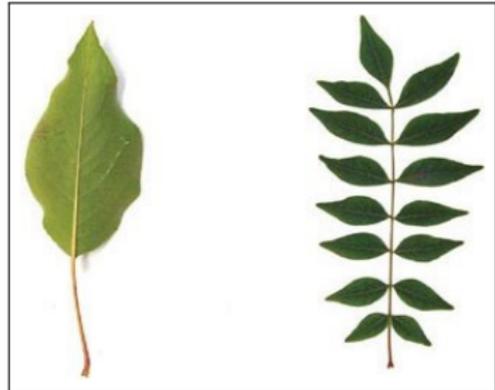
Plant construction: flowers



Plant construction: leaves

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

Plant construction: leaves



Compositae (Asteraceae), aster family

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

Compositae, aster family



Gramineae (Poaceae), 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 families

- 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

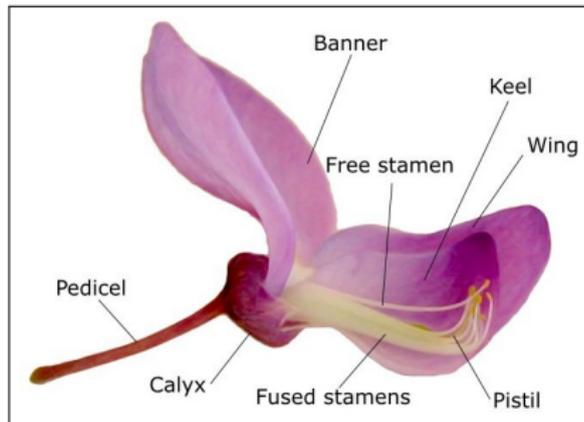
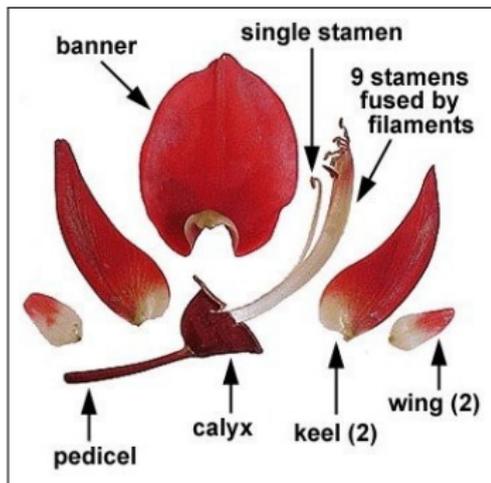
Liliaceae, lily families



Leguminosae (Fabaceae), 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 (Lamiaceae), 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

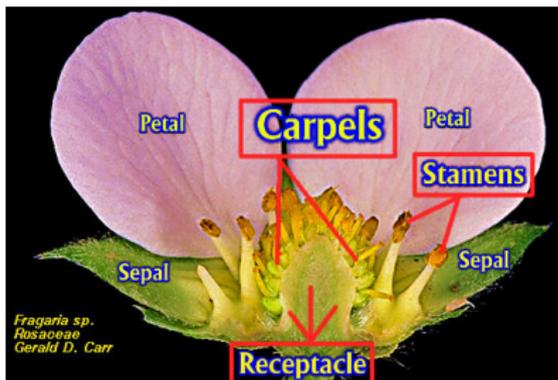
Malvaceae, cotton family



Rosaceae, rose family

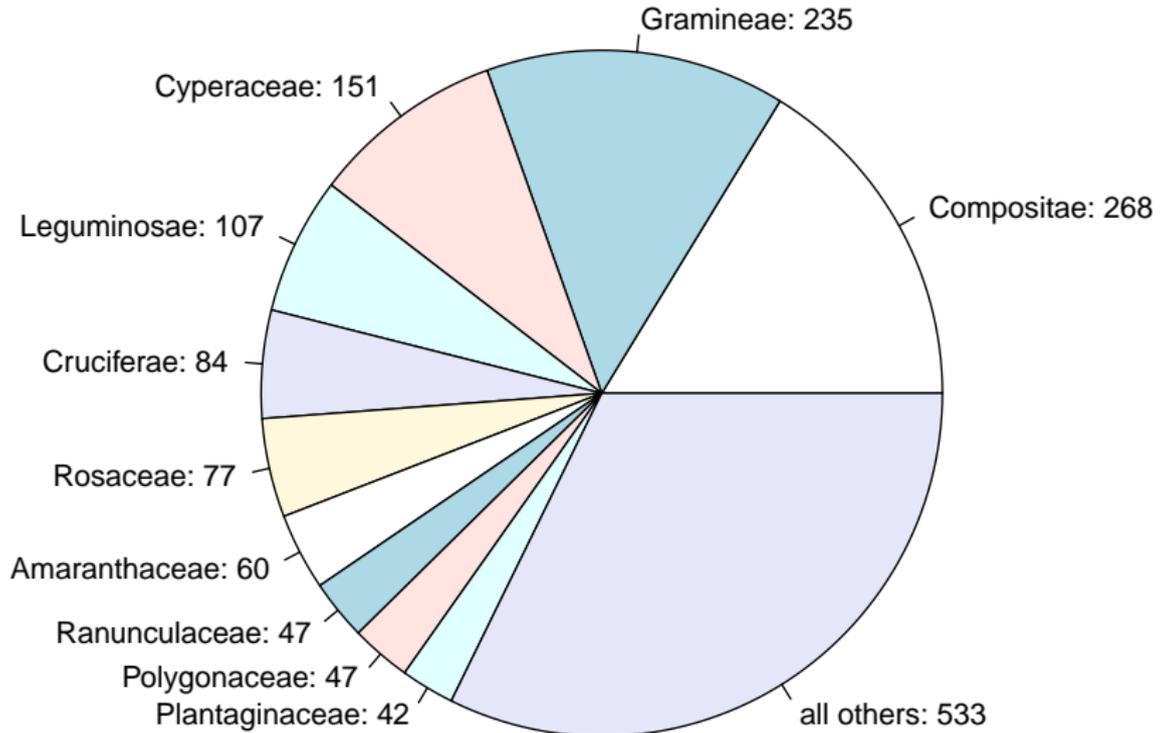
- Trees (like apple), shrubs (rose), herbs (strawberry)
- Polysymmetric flowers with 5 fused sepals, 5 petals, multiple stamens
- Multiple or one pistil sitting inside a “cup” or on the receptacle
- Simple or compound but always alternate leaves

Rosaceae, rose family



Fragaria sp.
Rosaceae
Gerald D. Carr

Which families also to consider?



Most frequent North Dakota plant families

Other economically important plant families

- **Cabbage family**, Cruciferae (Brassicaceae): cabbages, radishes, horseradishes, cress etc.
- **Umbel family**, Umbelliferae: carrot, dill, celery etc.
- **Pumpkin family**, Cucurbitaceae: pumpkins, melon, cucumber, watermelon
- **Palm family**, Palmae: coconut, oil palm etc.
- **Orchid family**, Orchidaceae: tropical epiphytes, famous ornamental plants

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, we should check:

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

For Further Reading



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