Botany

Department of Environment

The first stage

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Plant Taxonomy

The classification, naming, description, and identification of plants.

- From Greek:

taxis (arrangement)

+

nomos (laws, rules)

Family, genus, and species are the ranks most relevant to gardeners

Kingdom

Phylum (-*phyta*)

Class (-*opsida*)

Order (-*ales*)

Family (-*aceae*)

Genus (capitalized, italicized)

Species (lower case, italicized)

Botanical Classification - below the species level

- **Subspecies** or **variety**—naturally occurring (designated with subsp. or var. & italicized)

Helianthus debilis subsp. *cucumerifolius*

- **Cultivar**—bred or selected by man (designated with single quotes or cv. and not italicized)

Camellia japonica 'Debutante'

Plant Classification (informal)

Plants are classified by:

- Life cycle (annual, biennial, perennial)
- Life stages (embryonic, juvenile, transitional, reproduction, dormancy and senescence)
- Latitude (arctic, temperate, subtropical, tropical)
- Usage (fruit, vegetable, ornamental, fiber, dye, medicinal, forage)
- Growing or flowering season (warm season vs. cool season, wet season vs. dry season)

Plant Classification (informal)

Plants are classified by:

- Tissue type (herbaceous, softwood, semi-hardwood and hardwood)
- Water needs (xerophyte, halophyte)
- Foliage retention (evergreen, semi-evergreen and deciduous)
- Monocot vs. dicot (cotyledons, vascular stem arrangement, leaf venation and floral part numbers)

Binomial Nomenclature

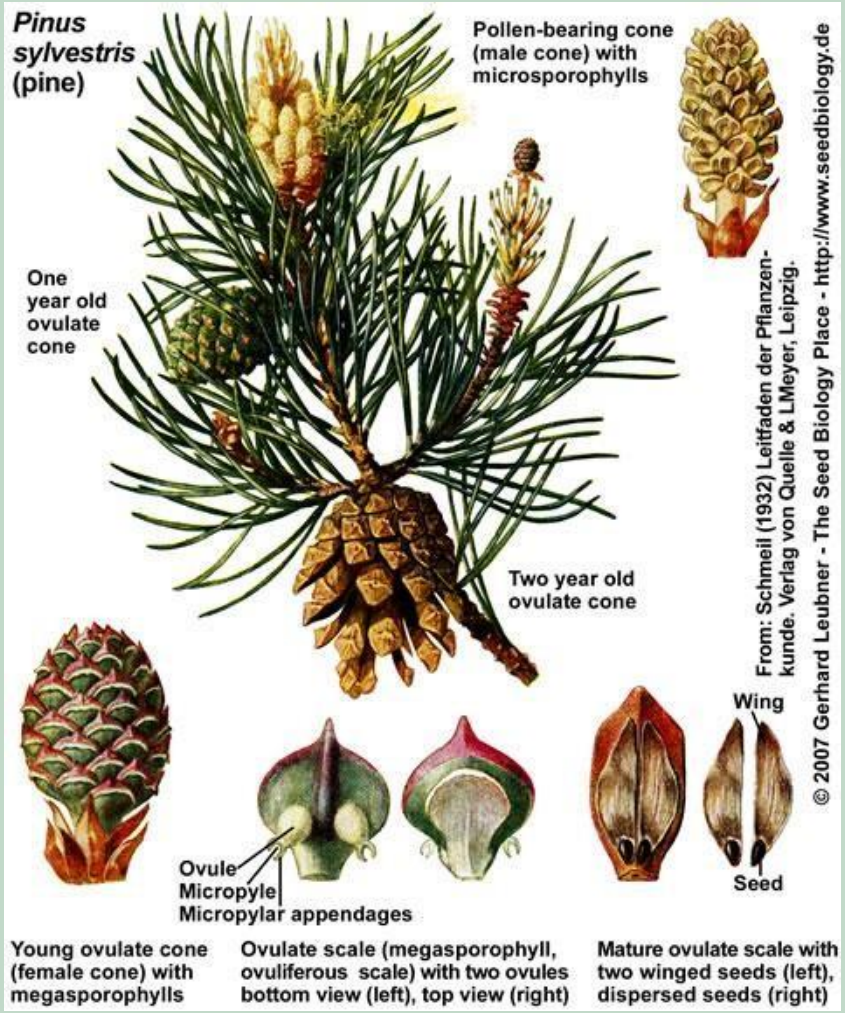
- Allows for the unambiguous identification of an organism with just 2 words:

  Genus + epithet (species)

- First used consistently by Linnaeus in *Species Plantarum* (1753).

Gymnosperms: Cycads, Conifers, and Ginkgo

- Gymnosperm means "naked seed."
  - Seeds not enclosed within an ovary.
  - Does not produce flowers or fruit.
- Pollen and ovules produced in separate male and female **cones.**
- Reproduce and disperse by means of **seeds**, which lack an endosperm.



Gymnosperms

- Gymnosperms are generally woody plants.
- May have needle-like leaves, scale-like leaves, or broad leaves.
- Pollen cones and seed cones may be produced on the same plant or on separate plants.
- In some species, the seed cone may be fleshy and berry-like.

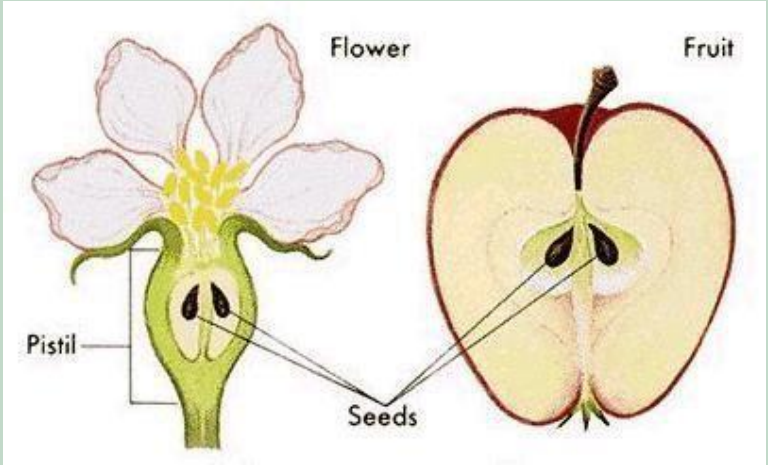
Pine

Coontie

Podocarpus

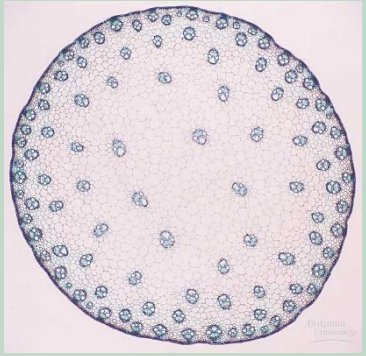
Angiosperms: Flowering plants

- Angiosperm means “container seed.”
  - Seeds enclosed within an ovary (fruit)
- Pollen and ovules produced by specialized structures called **flowers.**
- Dispersed by means of **seeds** which have an endosperm.
- Traditionally divided into **monocots** and **dicots.**



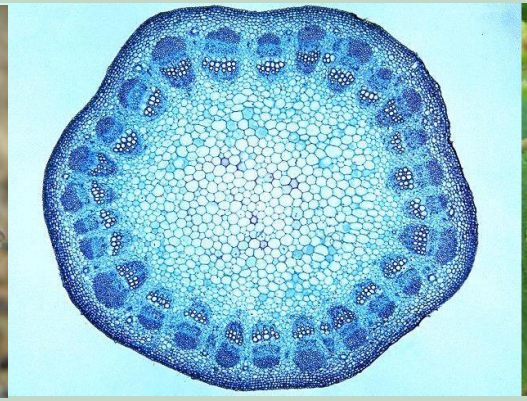
Monocots

- Embryo with one cotyledon (seed leaf)
- Stems with scattered vascular bundles
- Leaf veins usually parallel
- Floral parts in threes
- No secondary growth (no true wood or bark)

Dicots

- Embryo with two cotyledons (seed leaves)
- Stems with vascular bundles in rings
- Leaf veins usually reticulate (branching)
- Floral parts in fours or fives
- Capable of secondary growth (true wood/bark)

In the real world…

- **Basal Angiosperms** and **Magnoliids** account for **2%** of all angiosperms.
  - Examples: water lilies, star anise, magnolias, nutmeg, peperomias
- **Monocots** account for **23%** of all angiosperms.
  - Examples: grasses, orchids, bromeliads, palms
- **Eudicots** (true dicots) account for **75%** of all angiosperms.
  - Examples: oaks, roses, cacti, mints, asters