

## Biology 331 - Systematic Botany

**Diagnostic characters of plant families for which sight recognition is expected**  
(except Cyperaceae, Poaceae and Juncaceae)

Disclaimer: This information was compiled as a lab study guide to aid in sight recognition of vascular plant families. Despite my best efforts, this guide may contain mistakes or omissions. Please, use this guide as a study aid only! -Amy Breen

### **Apiaceae** (Umbelliferae) - The Carrot or Parsley Family

1. Leaves compound
2. Petioles sheathing
3. Internodes hollow
4. Inflorescence an umbel or compound umbel
5. Ovary inferior and 2-carpellate
6. Perianth often only a single whorl
7. Fruit a schizocarp

### **Asteraceae** (Compositae) - The Sunflower Family

1. Florets (flowers) arranged in heads
2. Heads are subtended by a series of involucral bracts
3. Calyx is never green, it is either modified into a pappus or absent
4. Pappus of bristles, hairs or scales
5. Stamens are epipetalous and anthers are connate while filaments are distinct
6. Ovary inferior and 2-carpellate
7. Fruit an achene

### **Betulaceae** - The Birch Family

1. Woody trees and shrubs
2. Leaves alternate and serrate
3. Plants monoecious (separate male and female inflorescences)
4. Inflorescence a catkin
5. Flowers apetalous
6. Fruit a samara (if ovary superior) or nut (if ovary inferior)

**Boraginaceae** - The Borage Family

1. Leaves simple, usually entire and arranged alternate on the stem
2. Inflorescence usually a scorpioid cyme
3. Flowers 5-merous
4. Calyx and corolla connate and usually actinomorphic
5. Carpels usually 2 and ovary 4-lobed
6. Style gynobasic
7. Fruit 4 nutlets

**Brassicaceae** (Cruciferae) - The Mustard Family

1. Leaves often deeply lobed
2. Calyx and corolla 4-merous
3. Corolla petals are distinct and arranged in the form of a cross
4. Stamens tetradynamous, 4 long & 2 short
5. Fruit a 2-carpellate capsule (silique or silicle)

**Caryophyllaceae** - The Carnation or Pink Family

1. Leaves opposite and basally connected
2. Nodes swollen
3. Petals notched, clawed or bifid
4. Calyx swollen
5. Calyx and corolla 5-merous
6. Petals distinct and comprised of a blade and claw
7. 2-5 separate styles = # carpels
8. Fruit a capsule or an achene

**Chenopodiaceae** - The Goosefoot Family

1. Herbs and shrubs that often occur in saline habitats
2. Foliage often succulent, appearing mealy due to water-filled vesicles/trichomes; when dry the surface appears dusty
3. Inflorescence often of cymosely clustered flowers
4. Flowers small, green and apetalous
5. Fruit an achene or utricle

**Crassulaceae** - The Stonecrop Family

1. Fleshy, succulent leaves
2. Gynoecium apocarpous (comprised of 2 or more distinct carpels)
3. If corolla fused, stamens epipetalous
4. Carpel # = sepal #
5. Basal nectar gland often present

**Cucurbitaceae** - The Squash or Cucumber Family

1. Herbaceous vines
2. Tendrils present
3. Plants usually monoecious
4. Flowers 5-merous
5. Ovary inferior
6. Fruit usually a pepo

**Cupressaceae** - The Cypress Family

1. Non-flowering plant, conifer
2. Woody trees and shrubs
3. Leaves linear to scale-like
4. Plants monoecious or dioecious
5. Ovulate cones mostly woody at maturity (or fleshy and berry-like)

**Equisetaceae** - The Horsetail Family

1. Non-flowering herbs
2. Stems hollow, jointed and longitudinally ridged
3. Leaves whorled
4. Sporangia borne in cone-like strobili that are terminal on the stem

**Ericaceae** - The Heath Family

1. Plants usually woody shrubs or small trees
2. Leaves coriaceous (with a thick or leathery texture)
3. Flowers urceolate, campanulate or zygomorphic
4. Nectary disc present
5. Anthers dehisce by terminal pores (look a lot like a salt shaker!)
6. Stamen # = 2x corolla number
7. Fruit a capsule or berry

**Fabaceae** (Leguminosae) - The Legume Family

1. Leaves usually pinnately or palmately compound
2. Stipules present and usually showy
3. Tendrils often present
4. Flowers zygomorphic
5. Calyx comprised of 5 fused sepals that form a calyx tube
6. Corolla comprised of a banner, keel and 2 wing petals
7. Stamens 10, often 9 have fused filaments and 1 is distinct
8. Fruit a legume or loment

**Iridaceae** - The Iris Family

1. Leaves equitant (vertically folded and inserted edge-on to stem)
2. Flowers subtended by spathaceous bracts
3. Stamens 3
4. Ovary inferior and stigmas 3-parted
5. Fruit a capsule

**Lamiaceae** (Labiatae) - The Mint Family

1. Stems square in x-section
2. Leaves opposite
3. Aromatic oils often present
4. Inflorescence verticillate
5. Corolla bilabiate
6. Stamens epipetalous
7. Ovary 4-lobed
8. Style gynobasic (arises from the base of ovary lobes)
9. Fruit 4 nutlets

**Liliaceae** - The Lily Family

1. Monocot
2. Calyx and corolla 3-parted = 6 tepals
3. Perianth showy
4. Perianth actinomorphic or weakly zygomorphic
5. Stamens 6
6. Fruit a capsule or berry

**Lycopodiaceae** - The Club-Moss Family

1. Non-flowering herbs
2. Stems densely leafy
3. Leaves simple, 1-veined, line or scale-like
4. Branching usually dichotomous
5. Sporangia borne in axils of fertile leaves
6. Sporangia sometimes aggregated into cone-like strobili

**Magnoliaceae** - The Magnolia Family

1. Woody trees and shrubs
2. Floral parts numerous
3. Floral parts spiraled or whorled
4. Carpels separate, with a whorl of stamens below
5. Fruit a follicle or aggregate of samaras

**Onagraceae** - The Evening Primrose Family

1. Extended hypanthium often present
2. Flowers usually 4-merous
3. Calyx and corolla distinct
4. Stamens 8
5. Ovary inferior
6. Fruit a capsule or berry

**Orchidaceae** - The Orchid Family

1. Monocot
2. Flowers zygomorphic with labellum petal
3. Stamens and style united into a column
4. Pollen grains within pollinia
5. Ovary inferior and twisted 180°, clearly visible in fruit
6. Fruit a capsule

**Papaveraceae** - The Poppy Family

1. Milky, colored or clear sap
2. Leaves often dissected
3. Petals "crumpled" in bud
4. Petal # = 2 x sepal #

5. Sepals caducous (fall as the flower opens)
6. Stamens many and spiraled
7. Fruit a capsule or 1-seeded nut

**Pinaceae** -The Pine Family

1. Non-flowering plant, conifer
2. Woody trees and shrubs
3. Leaves linear to needle-like
4. Leaves alternate and fascicled
5. Plants monoecious
6. Ovulate cones woody at maturity
7. Seeds usually winged

**Polemoniaceae** - The Phlox Family

1. Ovary 3-carpellate
2. Calyx and corolla 5-merous and connate (fused)
3. Stamens epipetalous and unequal in length
4. Flowers twisted in bud
5. Fruit a capsule

**Polygonaceae** - The Buckwheat or Knotweed Family

1. Foliage often reddish due to the presence of anthocyanins
2. Stipules connate and sheathing forming an ocrea
3. Inflorescence of clustered involucrate flowers
4. Flowers apetalous
5. Fruit a lenticular or triangular achene or small nut

**Portulacaceae** - The Purslane Family

1. Leaves succulent
2. Calyx of 2 green sepals
3. Corolla 5-merous
4. Fruit is a pyxis (circumscissile capsule)

**Primulaceae** - The Primrose Family

1. Herbs
2. Inflorescence often an umbel
3. Flowers 5-merous

4. Corolla usually connate, at least at the base
5. Stamens epipetalous
6. Fruit a capsule

**Pteridophyta** - The Fern Division

1. Non-flowering herbs with erect or creeping rhizomes
2. Fronds (leaves) simple to variously compound
3. Fronds either fertile (bearing sori) or sterile (without sori)
4. Sporangia contained within sori

**Pyrolaceae** - The Wintergreen Family

1. Perennial herbs or shrubs
2. Leaves are evergreen or "winter" green
3. Leaves simple and entire
4. Flowers are 5-merous and actinomorphic
5. Sepals are fused at the base and petals are distinct
6. Style is single and showy, often curved and extended from the flower
7. Fruit is a dry capsule

**Ranunculaceae** - The Buttercup or Crowfoot Family

1. Leaves often compound and estipulate
2. Venation palmate
3. Sepals often petaloid
4. Petals may be modified (hoods, sprurs)
5. Stamens numerous and spiralled
6. Pistils numerous and separate
7. Fruit a cluster of achenes or follicles, rarely a berry or capsule

**Rosaceae** - The Rose Family

1. Leaves alternate and usually stipulate
2. Hypanthium present
3. Calyx and corolla usually 5-merous
4. Petals distinct
5. Stamens 10 or numerous
6. If ovary superior - carpels distinct
7. If ovary inferior - carpels fused
8. Fruit a drupe, achene, pome or aggregate of drupelets

**Salicaceae** - The Willow Family

1. Woody trees and shrubs
2. Leaves alternate and simple
3. Plants dioecious (separate male and female plants)
4. Inflorescence a catkin
5. Flowers apetalous
6. Fruit a capsule with comose (bear a tuft of long white hairs) seeds

**Saxifragaceae** - The Saxifrage Family

1. Perennial herbs
2. Leaves often palmately veined and lobed
3. Hypanthium present, often well developed
4. Perianth 5-merous
5. Stamens 5-10
6. Carpels usually 2, often distinct or basally fused
7. Fruit a capsule or cluster of follicles

**Scrophulariaceae** - The Figwort Family

1. Corolla zygomorphic and bilabiate
2. Stamens epipetalous and didynamous (2 long & 2 short) with 1 staminode
3. Ovary superior and 2-carpellate with a terminal style
4. Fruit a many seeded capsule