

Botany for the Herbalist

Common Plant Families

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This handout describes common plant families in the US and Canada. Each family segment contains general characteristics of the family as well as some of the more commonly known species within. In some families such as the Liliaceae, the genera of the plants are still in transition and being placed in newly created families. In other families such as the Scrophulariaceae, some of the former genera have been placed into different already existing families. Within this handout they are generally kept in the older family grouping with the new family identified next to the genus.

Field botany is the study of identifying plants and grouping them into categories based on shared anatomical characteristics. Much of this is based on their reproductive parts, especially their flowers. One of the most useful starting points to identify specific plants in the field is by knowing their plant families. Families are a useful category to understand, as plants within them may share obvious traits both botanical (anatomical similarities) and other qualities such as aromatics. As far as medicinal characteristics within a family, there are generally more exceptions to shared traits than similarities in uses. An example showing both sides this is the Apiaceae. This family includes many aromatic, flavorful plants such as Dill, Fennel, and Angelica *but also* Poison hemlock (Conium), a notoriously poisonous plant.

Another example is the Liliaceae with edible foods such as garlic, onion and asparagus but also the toxic Veratrum and Lily-of-the-valley (Convallaria). Both of the proceeding examples should give novice plant gathering herbalists ample warning about taking plant identification seriously.

Plant families are in continual revision, due to DNA evidence and other research. This can be a source of frustration for the beginning botanist, but it is the nature of science to continually reinvestigate and make changes where deemed necessary. This handout leans more towards the lumpers camp by putting broad groupings of plants together to make it less complicated, but still practical.

For understanding terms and places to acquire further information, there is a botanical glossary and reference section at the end.

Once one begins identifying plants by keying them out in a flora (an inclusive plant field guide), some of the shared traits within a family will become more obvious and make future identification easier.

Plant Families: Below are some of the more common families found throughout the US and Canada. The segments include some basic characteristic traits of each family as well as some of the well-known and medicinal plant genera (in **bold**). The plant characteristics noted below are the most common attributes. This is rather simplified and there will be many exceptions for each grouping. The genera and species of each family are approximations and are in flux.

Flowering Plant Families-Number of Species

These are the 7 largest plant families by number of species. Note that the first 3 plant families comprise nearly 25% of all flowering plant species. To put this into perspective there are approximately 250,000 named species and the Asteraceae, Orchidaceae and Fabaceae have about 63,000 species between the three of them showing the great diversity of these families.

The number of species per families is approximate and continually shifts as evidence and opinion changes amongst the various genera and species.

1. Asteraceae-23,000
2. Orchidaceae-21,000
3. Fabaceae-19,000
4. Rubiaceae-13,000
5. Poaceae-10,000
6. Lamiaceae-7,000
7. Euphorbiaceae-6,000

Apiaceae (Umbelliferae)–Parsley or Carrot Family

Genera: 300 Species: 3,000

Stems: Often hollow between nodes **Fruit:** Indehiscent, hard, often aromatic with oil ducts **Inflorescence:** Simple or compound umbel, usually with bracts at base **Flowers:** Often perfect, regular, small **Pistil:** Compound of 2 carpels with 2 styles, often thickened at base **Ovary:** Inferior, 2 celled with a single ovule in each **Corolla:** 5 petals on epigynous disk, polypetalous **Calyx:** Small, scale-like, 5 or none

Anethum-Dill; **Angelica**; **Apium**-Celery; **Bupleurum**-Chai hu; **Cicuta**-Water hemlock; **Conium**-Poison hemlock; **Coriandrum**-Coriander; **Daucus**-Carrot; **Ferula**-Asafoetida; **Foeniculum**-Fennel; **Heracleum**-Cow parsnip; **Centella**-Gotu kola; **Ligusticum**-Osha; **Lomatium**; **Osmorhiza**-Sweet cicely; **Pastinaca**-Parsnip; **Petroselinum**-Parsley; **Pimpinella**-Anise

Araliaceae–Ginseng Family

Genera: 65 Species: 800

Leaves: Alternate, simple or compound **Inflorescence:** Umbels or racemes. **Flower:** greenish or white, regular, small **Ovary:** Inferior **Stamen:** 5 or twice petals. **Corolla:** Usually 5. **Fruit:** Usually a berry, often aromatic

Aralia-Angelica tree, Spikenard, Wild sarsaparilla; **Hedera**-English ivy; **Oplopanax**-Devil's club; **Panax**-Ginseng; **Schefflera**

Asteraceae (Compositae)—Daisy or Sunflower Family

Genera: 800 Species: 23,000

Habit: Mostly herbaceous **Inflorescence:** Head of flowers surrounded by involucre of bracts (phyllaries) **Flower:** 2 types, sometimes together on same receptacle; Disk flower-tubular, regular, 5-merous; Ray flowers (ligule), irregular **Stamen:** 5 united at anthers **Pistil:** 2-lobed stigma, 1 style **Ovary:** Inferior **Calyx:** Absent or represented by pappus, hairs, bristles, awns or scales **Fruit:** Achene

Achillea-Yarrow; **Ambrosia**-Ragweed; **Arctium**-Burdock; **Arnica**; **Artemisia**-Mugwort, Sagebrush, Southernwood, Tarragon, Wormwood; **Aster** (now broken up into a number of genera including; *Symphyotrichum*, *Doellingeria*, *Eurybia*, etc)

Calendula; **Chrysanthemum**-Daisy; **Cichorium**-Chicory; **Echinacea**; **Eclipta**-Bhringaraj, Han lian cao; **Erigeron**-Fleabane; **Eupatorium**-Boneset, Gravel root, Joe Pye; **Grindelia**-Gumweed; **Helianthus**-Sunflower; **Inula**-Elecampane; **Lactuca** -Lettuce; **Matricaria**-Chamomile; **Silybum**- Milk thistle; **Solidago**-Goldenrod; **Spilanthes**; **Taraxacum**-Dandelion; **Tanacetum**- Feverfew, Tansy

Berberidaceae—Barberry Family

Genera: 12 Species: 600

Habit: Herbs and shrubs, perennial **Flower:** Perfect, regular, hypogynous **Perianth:** 3 sepals, 3 petals **Fruit:** Berry or capsule. **Berberis**-Barberry, Oregon graperoot, Algerita; **Caulophyllum**-Blue cohosh; **Epimedium** -Yin yang huo; **Mahonia**- (now often merged with *Berberis*); **Podophyllum**-Mayapple

Brassicaceae (Cruciferae)—Mustard Family

Genera: 350 Species: 3000

Habit: usually herbaceous **Juice:** Often peppery, pungent **Perianth:** 4 sepals, 4 petals, cross-shaped. **Flower:** Perfect, regular. **Fruit:** Dry pod, usually dehiscent **Stamen:** often tetradynamous-6 (4 long & 2 short) **Pistil:** 2 united carpels.

Armoracia-Horseradish; **Arugula** **Barbarea**-Cress; **Brassica**-Broccoli, Brussel sprouts, Cabbage, Cauliflower, Kale, Kohlrabi, Bok choy, Rutabaga, Turnip; **Capsella**-Shepherd's purse; **Cardamine**-Toothwort, Bittercress; **Eruca**-Arugula; **Erysimum**-Wallflower; **Nasturtium**-Watercress; **Raphanus**- Radish; **Sinapis**-Mustard

Caprifoliaceae—Honeysuckle Family, **Note;** this family has been broken up into three families and the genera *Viburnum* and *Sambucus* are now moved to new families which are listed next to the genera below.

Genera: 12 Species: 450

Habit: Small trees, shrubs, vines and seldom herbs. **Leaves:** Usually opposite & simple (compound in *Sambucus*) **Fruit:** Generally a berry. **Corolla:** Perfect, regular or irregular, 5-merous **Calyx:** 4-5-merous. **Ovary:** Inferior to partially inferior.

Lonicera- Honeysuckle; **Sambucus** (**Adoxaceae**)-Elder; **Triosteum**-Horse gentian; **Viburnum** (**Adoxaceae**)-Crampbark, Black haw, Nannyberry; **Symphoricarpos**-Snowberry

Ericaceae—Heath Family

Genera: 70 Species: 2500

Habit: Woody, usually shrubs or small trees, temperate climates in acid soils **Leaves:** Simple entire, often evergreen and leathery **Corolla:** United 4 or 5 lobed, often urn-shaped **Calyx:** United 4-5 lobed, usually persistent **Stamen:** As many or twice as many as petals **Pistil:** Single thin style and stigma.

Arbutus-Madrone; **Arctostaphylos**-Uva-ursi, Manzanita; **Chimaphila**-Pipsissewa; **Epigaea**-Trailing arbutus; **Erica**-Heath; **Gaultheria**-Wintergreen; **Kalmia**-Laurel; **Ledum** -Labrador tea; **Rhododendron**-Azalea; **Vaccinium**- Blueberry, Cranberry, Huckleberry

Fabaceae (Leguminosae)—Pea Family

Genera: 600 Species: 13,000

Leaves: Alternate, often compound, with stipules **Fruit:** Legume **Perianth:** 5 sepals; 5 petals (sometimes joined **Flower:** Often characteristic papilionaceous shape with banner, wings and keel **Corolla:** 2+2+1 **Stamen:** Often with 10 stamens, 9 filaments partly fused and one separate **Ovary:** 1, superior.

Astragalus -Huang chi; **Baptisia**-Wild indigo; **Cassia**-Senna; **Cercis**-Redbud; **Cytisus**-Broom; **Glycine**-Soybean; **Glycyrrhiza**-Licorice; **Medicago**-Alfalfa; **Pisum**-Pea; **Pueraria**-Kudzu; **Trifolium**-Clover

Lamiaceae (Labiatae)—Mint Family

Genera: 200 Species: 3200

Leaves: Generally opposite or whorled, often aromatic **Stems:** Square (4 angled). **Flower:** complete, perfect, hypogynous **Stamen:** 2 or 4 (in 2 unequal sets) **Ovary:** Deeply 4 lobed, forming 4 nutlets at maturity with a basal style **Corolla:** Irregular, generally 2 lipped or with 1 lip lacking **Calyx:** 5 lobed or cleft, regular or 2 lipped.

Collinsonia-Stoneroot; **Hyssopus**-Hyssop; **Lavandula**-Lavender; **Leonurus**-Motherwort; **Lycopus**-Bugleweed; **Marrubium**-Horehound; **Melissa**-Lemon balm; **Mentha**- Mint; **Monarda**-Bee Balm; **Nepeta**-Catnip; **Ocimum**-Basil; **Origanum**-Oregano, Savory; **Prunella**- Heal-all; **Rosmarinus**-Rosemary; **Salvia**-Sage; **Scutellaria**-Skullcap; **Stachys**-Betony; **Thymus**-Thyme

Liliaceae—Lily Family. **Note**-the Liliaceae is in flux with new families genera undecided. Many of the below genera are now in these separated out families. The new family is listed next to the genera below, but as noted, it will likely change.

(Former Genera: 175 Species: 2500)

Leaves: Alternate or basal, simple, veins parallel **Roots:** Often fleshy **Fruit:** 3-valved capsule **Corolla:** Generally 3 separate petals **Flower:** Complete, regular **Calyx:** 3 separate sepals **Pistil:** Compound of 3 closely united carpels **Stamen:** Mostly 6 or 3. **Ovary:** Usually superior or partially inferior.

Aletris (Melanthiaceae)-Colicroot; **Allium** (Alliaceae)-Chives, Garlic, Onion; **Aloe** (Asphodelaceae); **Asparagus** (Asparagaceae); **Chamaelirium** (Melanthiaceae)-Devils-

bit; **Convallaria** (Ruscaceae)-Lily-of-the-Valley; **Lilium** -Lily; **Polygonatum** (Ruscaceae)-Solomon's seal; **Smilax** (Smilacaceae)-Greenbrier, Sarsaparilla; **Trillium** (Melanthiaceae); **Veratrum** (Melanthiaceae)-Corn lily; **Yucca** (Agavaceae)

Malvaceae—Mallow Family

Genera: 80 Species: 1500

Leaves: Simple, lobed, alternate, often with star-shaped pubescence **Perianth:** 5 sepals, 5 petals **Flower:** Often showy, regular **Stamen:** Numerous, united into a long tube surrounding the style **Carpel:** Several, united **Ovary:** Superior, pistils emerging from stamen tube

Abelmoschus-Okra; **Althaea**-Hollyhock, Marshmallow; **Gossypium**-Cotton; **Hibiscus**; **Malva**-Mallow; **Sphaeralcea**-Globe mallow

Pinaceae—Pine Family

Genera: 10 Species: 200

Habit: Trees, occasionally shrubs

Leaves: Simple, needlelike, alternate sometimes in a fascicle, evergreen (except *Larix*)

Fruit: Woody cones **Flower:** Monoecious.

Abies-Fir; **Larix**-Larch; **Picea**-Spruce; **Pinus**-Pine; **Tsuga**-Hemlock

Poaceae (Gramineae)—Grass Family

Genera: 500 Species: 8000

Leaves: Specialized with blade, ligule and sheath, veins strongly parallel **Stem:** Hollow except at nodes, round in cross section **Perianth:** Specialized, subtended by glumes (bracts) **Flower:** Spikelet. **Styles:** 2, feathery **Stamen:** 3

Elytrigia-Quack Grass; **Avena**-Oat; **Bambusa**-Bamboo; **Hierochloe**-Sweet grass; **Hordeum**-Barley; **Oryza**-Rice; **Phragmites**-Reed; **Poa**-Bluegrass; **Saccharum**-Sugar cane; **Triticum**-Wheat; **Zea**-Corn; **Zizania**-Wild rice

Polygonaceae—Buckwheat Family

Genera: 32 Species: 800

Stem: Enlarged at nodes with a papery sheath **Leaves:** Simple, entire **Fruit:** Small, 3-angled nutlet **Perianth:** Tepals, 2 whorls of 3 **Flower:** Small, regular **Stamen:** 3, 6 or 9 **Ovary:** Superior

Eriogonum-Wild buckwheat; **Fagopyrum**-Buckwheat; **Polygonum**-Smartweeds; **Ho-Shou-Wu**; **Rheum**-Rhubarb; **Rumex**-Yellow dock

Ranunculaceae—Buttercup Family

Genera: 35 Species: 2000

Habit: Usually herbaceous and some aquatic.

Characteristics: Vary widely **Flower:** Hypogynous, generally perfect and complete

Calyx: 3-many, separate **Pistil:** simple **Stamen:** Often numerous and free **Ovary:** One-celled

Aconitum -Aconite, Monkshood, Fu-tze; **Actaea**-Black cohosh, Baneberry; **Anemone**-Pasque flower; **Aquilegia**-Columbine; **Cimicifuga** (now *Actaea*); **Clematis**; **Coptis** Goldthread; **Helleborus**-Christmas rose; **Hepatica**-Liverwort; **Hydrastis**-Goldenseal; **Xanthorhiza**-Yellow root

Rosaceae—Rose Family

Genera: 115 Species: 3200

Perianth: 5 sepals, 5 separate petals **Flower**: Regular, usually perfect **Stamen**: Numerous **Carpel**: Superior and free or inferior and united **Receptacle**: Hypanthium cup

Agrimonia-Agrimony; **Alchemilla**-Ladies mantle; **Crataegus**-Hawthorne; **Fragaria**-Strawberry; **Malus**-Apple; **Potentilla**-Cinquefoil; **Prunus**-Almond, Apricot, Cherry, Peach, Plum; **Pygeum**; **Pyrus**-Pear; **Rosa**-Rose; **Rubus**-Blackberry, Raspberry

Scrophulariaceae-Figwort Family-**Note**-the Scrophulariaceae has been broken up into 4 smaller families. The newly separated out families are listed next to the genus. Generally former Scrophulariaceae that are partially parasitic are now in the Orobanchaceae, and most of the rest are in the Plantaginaceae. The genus *Mimulus* has been moved to the Phrymaceae, and some genera are still in the Scrophulariaceae.

Habit: annual, biennial or perennial, sometimes partially parasitic **Leaves**: Simple, opposite or alternate, entire to lobed. **Inflorescence**: various. **Fruit**: capsule often with persistent style and calyx **Ovary** Superior **Flower**: Irregular, perfect, hypogynous, often showy **Ovary** superior **Calyx**: 4-5 sepals **Corolla**: United with 4-5 lobes, irregular **Stamen**: 4 occasionally with one infertile

Bacopa (Plantaginaceae); **Chelone** (Plantaginaceae)-Turtlehead; **Digitalis** (Plantaginaceae)-Foxglove; **Euphrasia** (Orobanchaceae)-Eyebright; **Linaria** (Plantaginaceae)-Bastard toadflax; **Pedicularis** (Orobanchaceae)-Lousewort; **Penstemon** (Plantaginaceae); **Scrophularia**-Figwort; **Verbascum**-Mullein; **Veronica** (Plantaginaceae)-Speedwell; **Veronicastrum** (Plantaginaceae)-Culver's root

Solanaceae—Nightshade Family

Genera: 85 Species: 2300

Leaves: Often glandular and sticky, generally alternate **Fruit**: Berry or capsule. **Corolla**: Plicate regular, 5 lobed, showy **Stamen**: Five **Stigma**: Capitate **Carpel**: Two-united, single style **Ovary**: Superior, 1 style, 1 stigma

Atropa-Belladonna; **Capsicum**-Cayenne; **Datura**-Jimsonweed; **Hyoscyamus**-Henbane; **Lycium**-Wolfberry, Goji berry; **Lycopersicon**-Tomato; **Petunia**; **Solanum**-Bittersweet nightshade, Eggplant, Potato

Glossary: Highlighted words are defined elsewhere in glossary.

- **'A'**—A prefix meaning without.
- **Achene**—A small, dry, 1-seeded **indehiscent** fruit.
- **Alternate**—One leaf per **node** on stem
- **Androecium**—Collective term for all the **stamens**.
- **Anther**—The terminal part of a stamen containing the pollen sacs.
- **Annual**—A plant that completes its life cycle in one growing season.
- **Biennial**—A plant that completes its life cycle in two years.
- **Blade**—The flat, expanded portion of a **leaf**. Also called a lamina.
- **Bract**—A modified leaf-like structure **subtending** a **flower** or **inflorescence**.
- **Calyx**—Collective term for all of the **sepals**.
- **Carpel**—The ovule bearing structure of a flower.
- **Complete**—A flower with stamens, **pistils**, sepals and **petals** all present.
- **Compound Leaf**—A leaf separated into two or more distinct **leaflets**.
- **Corolla**—Collective term for all the petals of a flower.
- **Dehiscent**—Opening by distinct pores or slits
- **Dioecious**—Flowers unisexual with male and female flowers on different plants.
- **Epigynous**—Flowers in which **calyx**, **corolla** and **stamens** are situated near tip of **ovary**. Also known as a inferior ovary
- **Family**—A group of related **genera**.
- **Fascicle**—a bundle, a group of an item (such as pine needle leaves)
- **Filament**—The stalk of a **stamen** supporting the **anther**.
- **Flower**—The reproductive structure of a plant.
- **Fruit**—A ripened **ovary**, its seeds and the structure that encloses it.
- **Genus**—A group of **species**. The plural is **genera**
- **Gynoecium**—Collective term for all the **pistils**.
- **Habit**—The general appearance of a plant, its shape and form.
- **Head**—A tight cluster of flowers on a common receptacle.
- **Herb /Herbaceous**—A non-woody plant in which all portions above the ground die back each growing season.
- **Hypanthium**—An enlargement of the **receptacle** below the **calyx** that surrounds the **gynoecium** and **fruits**.
- **Hypogynous**—Flowers in which **calyx**, **corolla** and **stamens** are inserted below the **ovary**. Also known as a superior ovary
- **Indehiscent**—Not opening by definite pores or slits
- **Inflorescence**—A single flower or a cluster of flowers.
- **Internode**—The portion of a stem between two nodes.
- **Irregular**—Flower that is not **radially symmetrical**. May be bilaterally symmetrical (divisible into equal halves on only a single plane) or less regular in shape.
- **Leaf**—The generally green, photosynthetic organ of a plant. Usually made up of a **blade** (lamina) and **petiole** (leaf stalk).
- **Leaflet**—One of the divisions of a **compound leaf**.
- **Ligule**—The strap-shaped ray flower in the Asteraceae

- **Monoecious**—Flowers unisexual with both male and female flowers on the same plant
- **Node**—The point of attachment of a leaf or branch to the stem.
- **Opposite**—Two leaves situated at the same **node** on a stem
- **Ovary**—The part of the pistil containing the immature seeds (ovules).
- **Pedicel**—The stalk of an individual flower in an **inflorescence**.
- **Peduncle**—The stalk of an individual flower or of an inflorescence.
- **Perennial**—A plant that lives for three or more years.
- **Perfect**—A flower that contains functional **stamens** and **pistils**. Also called bisexual.
- **Perigynous**—Flowers in which **calyx**, **corolla** and **stamens** are inserted around the **ovary** on a cup like structure. The ovary is called partially inferior.
- **Persistent**—Parts remaining on a plant after similar parts have generally fallen off, or persist after maturity.
- **Petal**—One of the inner floral leaves of a flower, often brightly colored.
- **Petiole**—The stalk of a leaf blade or compound leaf.
- **Pistil**—The female seed-producing organ of a flower consisting of an **ovary**, **style** and **stigma**.
- **Raceme**—An inflorescence with **pedicled** flowers upon a **rachis** with the youngest flower nearest the tip.
- **Rachis**—The central elongated axis to an inflorescence or a compound leaf.
- **Receptacle**—The part of the stem from which all flower parts arise.
- **Regular**—A flower that has **radial symmetry**. Also known as actinomorphic
- **Sepal**—One of the outer floral leaves of a flower, often greenish. Surrounds the **corolla** in bud.
- **Shrub**—A woody **perennial** plant generally smaller than a **tree**, and often with several base stems.
- **Species**—A group of plants that can interbreed with each other. They are reproductively compatible.
- **Stamen**—The male pollen-producing organ of a flower. Made up of a **filament** and **anther**.
- **Stigma**—The upper-most part of the pistil in which pollen grains collect and germinate.
- **Stipule**—An appendage (often leaf-like) at the base of a **petiole** or leaf.
- **Style**—The part of the pistil connecting the **stigma** to the **ovary**.
- **Subtending**—Situated directly below another plant part.
- **Tepals**—The petals and sepals when not differentiated in a flower, i.e.; they look the same (i.e., Iris spp)
- **Tree**—A woody **perennial** plant, generally over ten feet tall at maturity, with one or a few main trunks.
- **Umbel**—An inflorescence in which all the flowers arise from one point (axis) in a characteristic ‘umbrella’ shape.
- **Whorled**—Three or more leaves situated at the same node on a stem

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