



# Plant Families

## Botany for the Herbalist

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This handout is designed to help herbalists learn some of the elementary principles of plant identification through the study of plant families.

Plant families are one of the most useful starting points to identify plants as plants within them may share obvious traits both botanical (anatomical similarities) and other qualities such as for food or medicine. Though as far as these non-anatomical traits there are often more exceptions of shared qualities than similarities.

As an example, the Carrot family (Apiaceae or Umbelliferae) shows both sides of this aspect. The family includes many aromatic, flavorful plants (Dill, Fennel, Parsley, Carrot) *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 potentially toxic Veratrum and Lily-of-the-valley (Convallaria). Both of these 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, but it also shows people's continual interest in plants. I have joined the 'lumper' (putting broad groupings of plants together) camp here to make it less complicated, but still practical. Some families are in the midst of major revisions and will be noted so readers can consult current sources for changes

Once one begins identifying (keying) plants out in a 'flora' (inclusive plant field guide), some of the shared traits within a family will become more obvious.

There is a glossary and reference literature listed below to help further guide your education into the world of plant families and plant identification.

**Plant Families:** Below are some of the more common families found throughout the US and Canada. The monographs 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, there will be exceptions galore.

## **Apiaceae (Umbelliferae) – Parsley Family**

Genera: 280      Species: 3,000

**Stems:** Often hollow between nodes. **Fruit:** Indehiscent, hard, often with oil ducts, often aromatic. **Inflorescence:** Simple or compound umbel, usually with ring of 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; **Daucus**-Carrot; **Ferula** -Asafoetida; **Foeniculum** -Fennel; **Heracleum** -Cow parsnip; **Hydrocotyle**-Gotu kola; **Ligusticum** -Osha; **Lomatium**; **Osmorhiza** -Sweetroot; **Pastinaca**-Parsnip; **Petroselinum**-Parsley; **Pimpinella**-Anise

## **Araliaceae**-Ginseng Family

Genera: 65      Species: 800

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

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

## **Asteraceae (Compositae) – Daisy Family**

Genera: 800      Species: 20,000 +

**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; *Symphotrichum*, *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 grape root, 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**-Shepherds purse; **Cardamine**-Toothwort, Bittercress; **Eruca**-Arugula; **Erysimum**-Wallflower; **Nasturtium**-Watercress; **Raphanus**- Radish; **Sinapis**-Mustard

## **Caprifoliaceae** – Honeysuckle Family-**Note**-two former genera are now moved to a new family which is listed next to the genera

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 has been divided into a number of individual families. Many of the below genera are now in these separated-out families. The new family is listed next to the genera below

(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, Sarsparilla; **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 (Graminae) – 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** (Agropyron)-Quack Grass; **Avena**-Oat; **Bambusa**-Bamboo; **Hierochloe**-Sweet grass; **Hordeum**-Barley; **Oryza**-Rice; **Phragmites** -Lu Gen, 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 a number of smaller families. The new separated-out family is listed next to the genus (Former Genera: 190 Species: 4000)

**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**: Capitulate. **Carpel**: Two- united, single style. **Ovary**: Superior, 1 style, 1 stigma

**Atropa**-Belladonna; **Capsicum**-Cayenne; **Datura**-Jimsonweed; **Hyoscyamus**- Henbane; **Lycium** -Wolfberry, Gou qi zi; **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
- **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 which 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 which 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.
- **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

## References-Books

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2. **Botany in a Day**-4<sup>th</sup> ed- Elpel
3. **Common Weeds of the United States** –USDA
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5. **Flowering Plant Families**-Zomlefer
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8. **How to Identify Grasses and Grasslike Plants**–Harrington
9. **How to Identify Plants**- Harrington
10. **Photographic Atlas of Botany and Guide to Plant Identification**-Castner
11. **Plant Identification Terminology**- Harris/Harris
12. **The Visual Dictionary of Plants** – Eyewitness Visual Dictionaries
13. **Vascular Plant Taxonomy**- Walters and Keil
  - Also helpful are flora's that provide keys to identify local plants

## References-Websites

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