



1 Botany Basics

BOTANY TAXONOMY

The classification system for categorizing organisms (aka **Taxonomy**) was created in the 1700's by Linneus, a Swedish botanist. For herbalists, the Plant Kingdom tends to be of particular interest, namely the grouping of **angiosperms** (or flowering plants). Angiosperms make up approx. 80% of the plant population and are our focus for today.

An important part of the botanical taxonomy system is the formal “naming” of plants which is known as **binomial nomenclature**. As the name implies, plants are given two names. The first name represents the **Genus** or generic name (i.e. *Rosa*) and is always capitalized. The second name represents the **species** or specific epithet (i.e. *rugosa*) and is written in all lowercase. These formal names are either *italicized* or underlined.

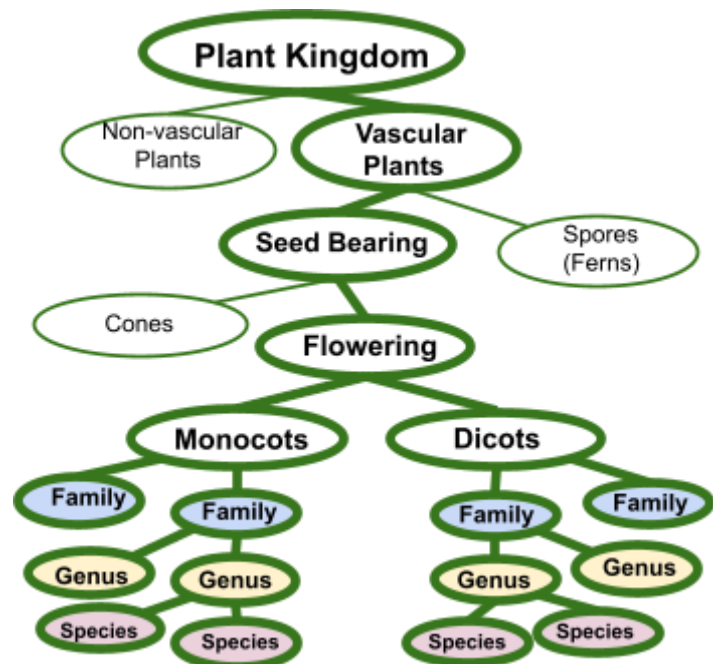
Genera (the plural for genus) are lumped together into **plant families**. The names of the families always end in **-aceae**. Learning about the family groupings and their typical patterns is one way to make Botany a little less overwhelming.

PLANT FAMILY TREE

Just to situate us in the bigger picture, here is a diagram that shows the different lineages of plants and where we, as herbalists, spend a bulk of our time.

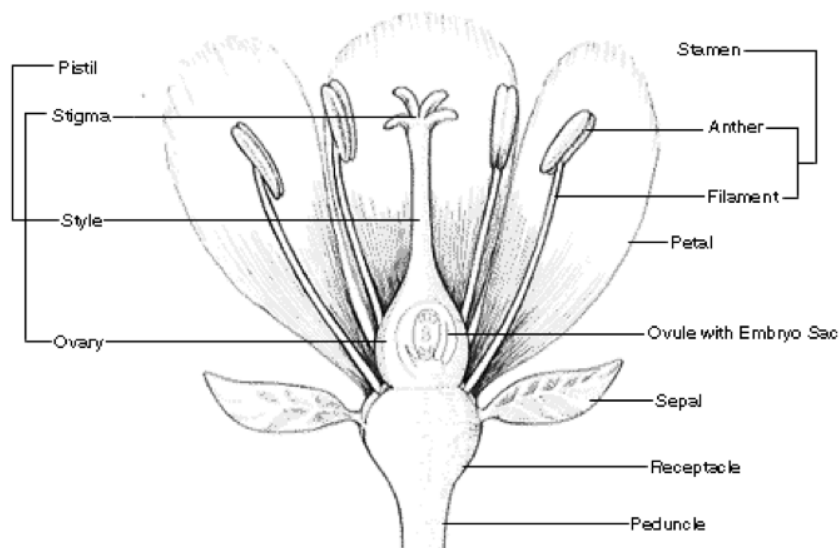
Most of the herbs in our apothecary are VASCULARIZED (internal plumbing), SEED BEARING, FLOWERING PLANTS.

These flowering plants are further divided into what are known as MONOCOTS and DICOTS based on the number of leaves they produce when they first sprout from seed.

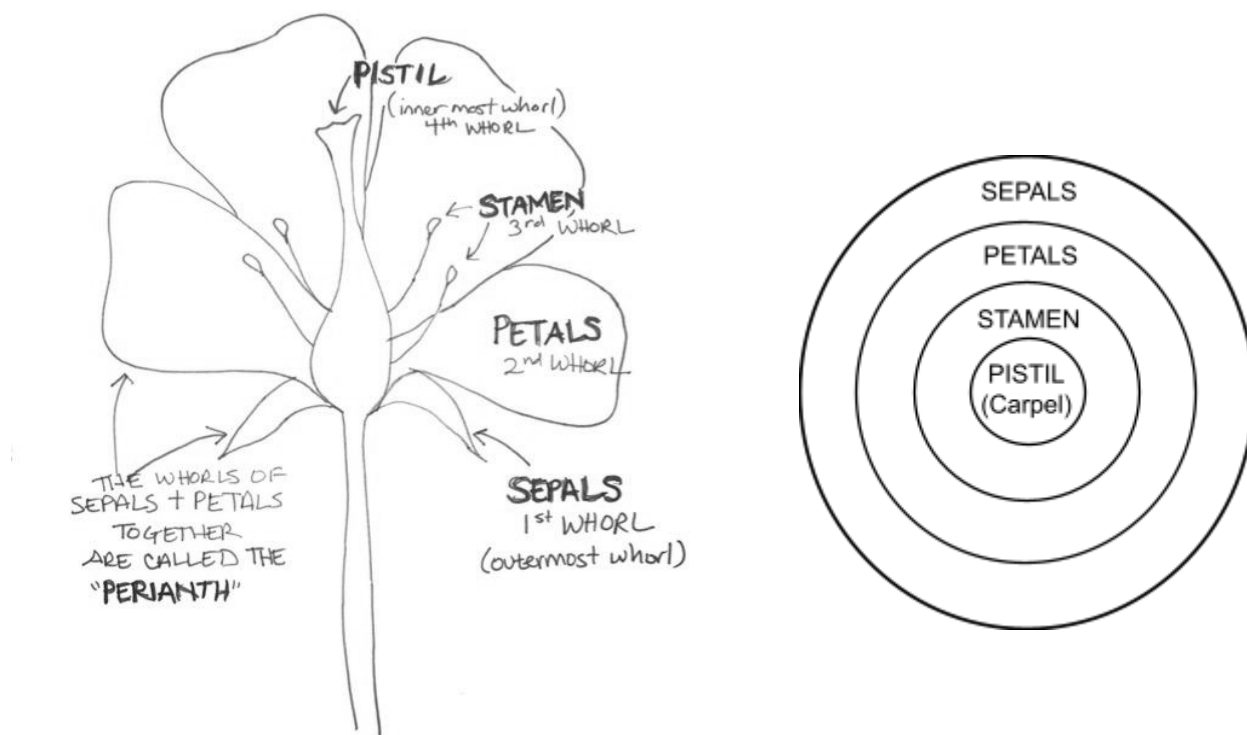


PARTS OF A FLOWER

diagram Amer. Museum of Nat. Hist. website



FOUR WHORLS OF A FLOWER



COMMON PLANT FAMILY PATTERNS

While there are over 400 plant families of flowering plants, it is helpful to start by familiarizing yourself with a few of the most common. Here you'll find seven plant families that are pretty common in our work as herbalists.

Each family lists the common name, botanical name, a few herbal members, and then common characteristics of each family.

For more practice learning your plant families, please check out:

Botany in a Day Website by Thomas J. Elpel: <https://www.wildflowers-and-weeds.com/>

- Botany in a Day Tutorial on YouTube:
<https://www.youtube.com/watch?v=D1DePIU15z4>
- [Shanleya's Quest Patterns in Plants Card Game](#)

7Song's website: www.7song.com - [Botany for the Herbalist: Common Plant Families](#)

Please use our flashcards sets to help you study!

[Plant Family Botanical Names Flashcards](#)

[Plant Family Patterns Flashcards](#)

All the illustrations are from King's Dispensatory of 1898 and sourced from [Henriette's Herbal Website](#).

Mint Family

Lamiaceae fka Labiatae

Herbal Members: Rosemary, Skullcap, Lavender, Oregano, Thyme, Lemon Balm, Sage, Catnip, Peppermint, Basil, etc.

Characteristics:

- Dicot
- Two-lipped flower (thus the old name "Labiatae")
- Irregular, tubular flower that is bi-laterally symmetrical
- Square stem
- Opposite paired simple leaves
- 4-lobed superior ovary (ripens into four one-seeded nutlets)
- The aromatic members have many uses from emotional support to infection control.



- They are also often diaphoretic and/ or digestive and carminative

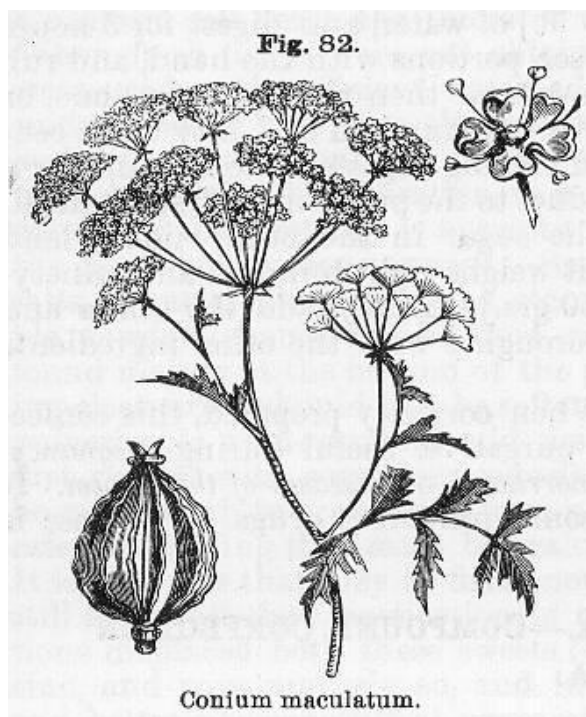
Celery Family

Apiaceae fka Umbelliferae

Herbal Members: Fennel, Dill, Caraway, Anise, Osha, Queen Anne's Lace. etc.

Characteristics:

- Dicot
- 5 petals and 5 stamens
- Compound umbels of small flowers (thus the old name "Umbelliferae")
- Hollow stems between nodes
- While this family has many of our common edibles (such as celery, parsley, dill, carrot, etc.) it also contains our strongest POISONS such as Poison Hemlock, pictured here. It's important to learn your poisons so you can respect them and give them space.



Sunflower Family

(Asteraceae fka Compositae)

Herbal Members: Calendula, Yarrow, Burdock, Chamomile, Goldenrod, Boneset, Milk Thistle, Artemisia, Elecampane, Dandelion, Echinacea, etc.

Characteristics:

- A compound flower (thus the old name "Compositae") made up of many tiny disk and ray flowers which together look like one big "flower"
- Leaves can be opposite or alternate
- Produces a dry, single seeded fruit (think sunflower seeds)
- Some folks have allergies to members in this family so can be helpful to ask



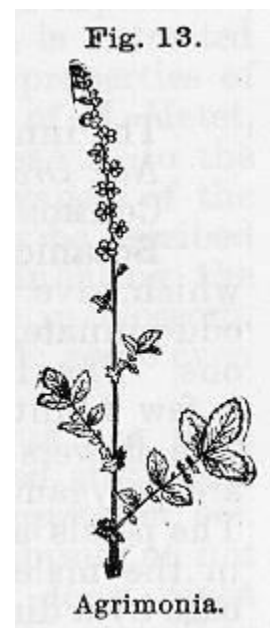
Rose Family

Rosaceae

Herbal Members: Rose, Blackberry, Raspberry, Hawthorne, Lady's Mantle, Peach, Cherry, Meadowsweet, etc.

Characteristics:

- Dicot
- Regular flowers of 5 separate petals, 5 separate sepals and numerous stamen
- Generally woody, small shrubs or trees
- Leaves alternate, often oval shaped with serrated edges.
- Produce different types of often edible fruit: pome fruits (apple, pear); aggregate fruits (raspberry, blackberry); stone fruits (cherry, apricot).
- Often high in tannins and used as astringents. As the herbalist Michael Moore would often say "Here we have a YARFA (Yet Another Rose Family Astringent)."



Lily Family

Liliaceae

Herbal Members: Garlic, Onion, Solomon Seal (pictured here #1), Asparagus, Lily-of-the-Valley (pictured here #2), etc.

Characteristics:

- Monocot
- Regular flowers of 3 sepals and 3 petals (that look alike and so are referred to as 6 **tepals**)
- Plant parts in multiples of 3 - 3 or 6 stamen, 3 parted pistil, 3 petal, 3 sepal
- Leaves simple with parallel venation
- This family was recently broken up into other separate families (such as Asparagus and the Alliums), but many herbalists (myself included) are slow to make the change.



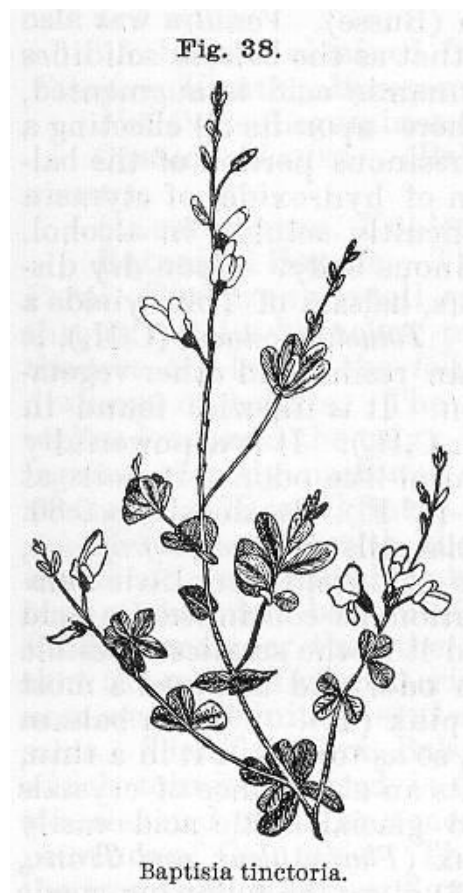
Pea Family

Fabaceae fka Leguminosae

Herbal Members: Licorice, Red Clover, Kudzu, Senna, Astragalus, Wild Indigo, Red Bud, etc.

Characteristics:

- Dicot
- Irregular flowers with a “banner, wings and keel” petal arrangement.
- Fruit a legume (thus the old name “Leguminosae”)
- Leaves alternate and often compound
- This large family is an important one agriculturally, both as food and as a nitrogen fixer.
- They have little root nodules that contain nitrogen-fixing bacteria.



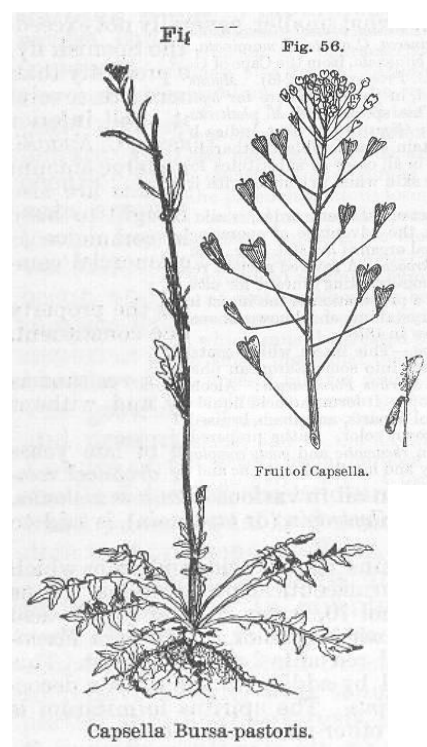
Mustard Family

Brassicaceae fka Cruciferae

Herbal Members: Shepherd's Purse, Horseradish, Broccoli, Brussel Sprouts, Cabbage, Mustard, Cress, Arugula, etc.

Characteristics:

- Dicot
- 4 petal regular perfect flower (like a cross thus the old plant family name of “Cruciferae”)
- 4 sepals
- 6 stamen – 4 tall and 2 short
- ALL ARE EDIBLE
- Wild mustards make great spicy additions to salads and wraps. In the spring is a great time to find your local cress greens.



FLOWER POWER VOCABULARY

Anther: The part of the stamen where pollen is produced. Held up by the filament.

Calyx: All of the sepals collectively.

Complete: all 4 whorls (sepals, petals, stamen, and pistil)

Corolla: All of the petals collectively

Dicotyledon: Flowering plant whose seed contains 2 embryonic leaves. Also simply known as a dicot.

Filament: The stalk-like part of the Stamen that holds up the Anther.

Imperfect: Unisexual (pistillate or staminate)

Inflorescence: Arrangement of flowers along a stem.

Irregular: Diametrically symmetrical, like an inkblot

Incomplete: missing one or more whorls

Ovary: The enlarged basal portion of the pistil where ovules are produced.

Monocotyledon: Flowering plant whose seed contains only 1 embryonic leaf. Also simply known as a monocot.

Peduncle: The stalk of a flower.

Perfect: both female and male parts on one flower

Perianth: The calyx and corolla together (the two outer whorls).

Petal: The parts of a flower that are often conspicuously colored. Collectively known as the corolla. This makes up the 2nd whorl of a flower.

Pistil: The ovule producing part of a flower. The ovary often supports a long style, topped by a stigma. The mature ovary is a fruit, and the mature ovule is a seed. The pistil(s) along with the stamen make up one of the inner whorls of the flower.

Receptacle: The place where the parts of the flower attach to the stalk.

Regular: Radially symmetrical, can cut like a pie and give everyone a similar piece.

Sepal: The outer parts of the flower (often green and leaf-like) that enclose a developing bud. Sepals make up the 1st whorl of a flower. Collectively they are known as the calyx.

Stamen: The pollen producing part of a flower, usually with a slender filament supporting the anther. Along with the pistil(s), this is an inner whorl of the flower.

Stigma: The part of the pistil where pollen germinates. Often sticky or rough textured.

OBSERVING A FLOWER

- Start with a **wide view** of the flower as it grows in relation to the rest of the plant. Where does it grow from? Is it a solitary flower at the top of the plant? Does it grow from where a leaf meets the stem? Is there only one per plant? Are there many flowers on each stem of the plant?
- Once you have removed your flower, it can help to begin your more intimate flower gazing by turning the flower over and starting at the bottom with the outer whorls.
- Look at the bottom and check for flaps. These flaps are the **sepals**. If you can't find flaps, then what you thought were petals are actually sepals.
- Now look inside for **stamens** and **pistils**. If the flower is not open enough to easily see the inner whorls, you can pull off a petal. Be careful as you do this because sometimes the stamen are actually attached to the petal!
- Now remove all of the **petals** and take a look at the 2 inner whorls remaining attached to the stem which are the stamens and pistils.
- Look for stalks (known as **filaments**) holding little pollen sacs (known as **anthers**) This entire structure is the **stamen**.
- Now look for a stalk with nothing on top. It is usually in the center of the flower, surrounded by stamen. The stalk can have a swollen bottom and sometimes a rough textured tip. This type of structure is the **pistil**.
- If you want to examine the **ovary**, it can be hard to see the ovaries on a young flower so find an older, more mature flower with a fully ripened ovary.
- Things to note about the **pistil**:
 - Are there many or only one?
 - Are there many styles attached to each ovary?
 - How is the ovary positioned? Do the stamen attach above the ovary, at the midpoint, or underneath it?
 - Note: if an anther falls off a stamen, don't confuse it with a style which is attached to a swollen ovary.
- **TIP:** Always check for lost parts by double checking another flower!

BOTANIZING TOOLS FOR YOUR DAYPACK:

- Your local field guide/ flora/ plant key (or 3!)
- Hand lens/ jeweler's loupe - 10x or 15x
- Ruler
- Journal + Pen
- Dissecting Tools (clamping tweezers, pins, single edge razor blade, etc.)
- Plant Press
- Clippers, Trimming Scissors

Example Field Guides I would carry in my S. Appalachian stomping grounds:

- [Newcombe's Wildflower Guide](#) by Lawrence Newcomb
- [Wildflowers of Tennessee, the Ohio Valley and the Southern Appalachians](#) by Lone Pine
- [Guide to Vascular Plants of the Blue Ridge](#) by B. Eugene Wofford
- [Plant Identification Terminology: An Illustrated Glossary](#) by Harris and Harris

ONLINE RESOURCES

Herbalista Resources: www.Herbalista.org

- [Forage ATL Resources Page](#) with tips on harvesting safely
- ["Official" Herbal Endings](#)
- Herbalista Free School Class Videos available in the [Toolkit](#):
 - Botany for Herbalists
 - Urban Foraging
- Herbalista Free School Course: [In the Field](#)
- [Herbalista Grow-a-Row Project + Learning Garden](#)

7Song's Website: www.7Song.com

7Song's Botany Related Handouts:

- [Botany for the Herbalist: Common Plant Families](#)
- [Botany Identification Steps](#)
- [Plant Phylogeny Chart](#)
- [Guidelines for Using Newcomb's Wildflower Guide](#)

Botany in a Day Website by Thomas J. Elpel: <https://www.wildflowers-and-weeds.com/>

- Botany in a Day Tutorial on YouTube:
<https://www.youtube.com/watch?v=D1DePIU15z4>
- [Shanleya's Quest Patterns in Plants Card Game](#)

Botany Everyday by marc williams and Frank Cook: www.BotanyEveryday.com

- [Botany Everyday Recommended Reading List](#)
- [Botany Everyday Useful Websites](#)
- [Facebook Botany Everyday Page](#)
- Marc Williams Handouts: [Useful Plant Families Overview](#)
- Marc Williams Handouts: [Electronic Resources for Studying Botany](#)

Chestnut School: www.chestnutherbs.com

- [Book list for General Botany and Regional Foraging](#)

Plant Identification App (and Online database) www.Plantnet.org

You Tube Videos

- [Plant Science: An Introduction to Botany](#)
- [Botany in a Day Tutorial The Patterns Method of Plant Identification](#)

For Field Guides and other Resource sections such as Foraging Ethics and Safety, please see the [URBAN FORAGING RESOURCES PAGE](#)