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EC1265

Identifying Landscape Plants

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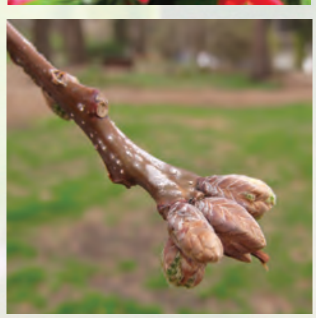

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Plant identification is a very important basic skill for people wanting to make correct management decisions for their landscape plants. Application of pest management strategies and timing of management practices, such as pruning, fertilizing, and planting, all depend on correct plant identification. Plant identification is commonly approached in four ways:

- **Expert identification.** This service is provided by professionals who work with plants extensively and can quickly look at a plant or use a reference to determine the name of a plant. Extension educators and specialists, along with other university professionals such as herbarium staff, and industry professionals may provide expertise in plant identification.
- **Recognition based on past experience**. Gardeners, landscape managers, and others who work with plants on a routine basis have familiarity with plants from repeated observations.
- **Comparison**. Direct comparison can be done with specimens from herbarium collections or books with images and descriptions. To identify a plant by comparison, a person must have a good idea of the genus, or if the family is small, the family of the plant in question. Otherwise, identification by comparison can be very time consuming. Additionally, plants requiring identification that are out of season with no available images or specimens may be very difficult to match through comparable characteristics.

Indented

1.	Leaves are alternate	
2.	Leaves are simple	
3.	Leaves are lobed	Species No. 1
3.	Leaves are not lobed	Species No. 2
2.	Leaves are compound	
4.	Leaves have toothed edges	Species No. 3
4.	Leaves have smooth edges	Species No. 4
1.	Leaves are opposite, sub-opposite, or whorled	

Bracket

1.	Leaves are alternate	go to 2
1.	Leaves are opposite, sub-opposite, or whorled	go to 5
2.	Leaves are simple	go to 3
2.	Leaves are compound	go to 4
3.	Leaves are lobed	Species No. 1
3.	Leaves are not lobed	Species No. 2
4.	Leaves have toothed edges	Species No. 3
4.	Leaves have smooth edges	Species No. 4

Figure 1. Dichotomous keys give users two choices. The user must select the most appropriate description and follow that path until the key gives the plant species, a plant family, or a genus. Keys come in indented and bracket formats. The examples above show how a tree key might begin in each format. The indented format is typically preferred for clarity.

Although significant numbers of images can be found on the Web, many websites narrowly focus images to highlight seasonal or unusual characteristics and salability. Some sites contain inaccurate images. Whenever possible, refer to university and botanical garden websites or other reputable sources.

- **Using a key**. Keys are based on a set of statements in which a user must select the one that best describes the plant being identified. Most plant keys are dichotomous keys that give users two options to choose from (*Figure 1*). Keys are based on morphological differences of flowers, fruits, leaves, stems, buds, and roots. Keys may range from very broad (Nebraska statewide trees) to very specific (oak trees in the wintertime in southeast Nebraska). Their usefulness as an identification tool will vary accordingly.

Figure 2. Some plant families are easy to identify because of similar morphological characteristics that are easily observed, such as the Asteraceae family, which has composite flowers with many ray and/or disk flowers (a). Other times, plants can easily be classified to genus because of their fruit, such as acorns (b) belonging to the genus *Quercus* (oaks). Plant reproduction typically defines plant classification. It is more likely that plants in a common family will have similar flowers and fruits rather than similar leaves or other vegetative characteristics.

Plant Identification Process

Plant identification is an organized process and identification experts often quickly move through the steps with little thought. For novices, it is important to understand the thought process to efficiently and correctly identify a plant. The steps in identifying a plant are:

- Observe the whole plant in the landscape, when possible. This strategy will provide useful information about preferred growing conditions.
- Categorize the plant into broad categories, such as growth habit and leaf persistence or ability to hold leaves throughout the year. This step can eliminate hundreds of plants based only on these general characteristics and can lead the observer to gathering more detailed information about specific plant parts.
- Gather additional information about plant-specific plant parts. Some plants have a unique characteristic that identifies them regardless of location, season, or size. Most often, plant identification in the field requires an observer to document a cross section of characteristics to ensure accuracy. Not all characteristics are always available. A typical approach based on the widest range of availability would be to use twig characteristics and leaf or branch arrangement (available all year), leaf type and characteristics (growing season or all year), fruit (though growth and development may persist through one or more seasons), and flowers (during bloom times, typically very limited).
- Collect representative plant samples to be used with plant keys and compared to plant references.

Once the plant is identified, homeowners and landscape managers should read the plant description in a book or other reference, be able to understand the most important identification characteristics, and compare those characteristics to the sample. Observing the plant within landscapes, at landscape nurseries, or on the Internet is a valuable learning experience.

Using Plant Keys

Keys are a valuable plant identification tool for plants that are unfamiliar to a landscape manager. Unfortunately, they can be challenging to use for a variety of reasons, including:

- Keys often use terms that many people are not familiar with, and some terms may vary in their exact meaning.
- Plant parts that the key depends on for identification may be nonexistent or too small to accurately observe.
- Plant parts in keys are typically described at an average size, which may not correspond to the actual plants being identified in the field.
- A key may not contain the plant in question, or may be referencing a time of year when the plant's parts in question are not present.
- Keys may include very small text and can often extend over several pages of information, which can make them difficult to use.

Hints for successful key use include:

- Initially look at the entire plant to observe its character, size, and growing conditions. Keys may include descriptions of plant character and where a plant is most likely to occur in a given landscape.
- When available, use photos or drawings to help with identification, but written descriptions are preferred due to their more precise information.
- Microscopes and hand lenses are essential tools when dissecting flowers and viewing other small plant structures.
- Read both choices before making a decision. If unsure of which way to proceed, mark the decision point in the key for reference and then try both directions to see which path leads to the information that best describes the plant.
- Measure or observe more than one leaf, stem, flower, or other observed plant parts. Use an average to slightly larger than average measurement to compare to the key description. Additional measurements and observations can provide a more reliable representation of a plant.
- Use family and genus keys if a plant is known to belong to a specific group (*Figure 2*). In addition, if a general plant type is known, such as trees, shrubs, grasses, or weeds, use a key specific to that plant type. Finally, use a key specific to the season and/or region, if available. Narrowing the key will decrease the decisions being made, therefore increasing the probability of the result being correct.

The following are terms used to describe plant structures and their location, texture, and shape. Knowing and understanding these basic terms is essential for identifying plants using the most simplistic plant keys and references.

Leaf Morphology

Blade is the flattened, expanded, thin structure on either side of the leaf midrib. Blades are usually the largest and most conspicuous part of the leaf (*Figures 3* and *4*). Their size and overall shape can vary, as can the shape of the leaf tip, the leaf base, the pattern of the margin along the edge of the blade, and the texture of the surface.

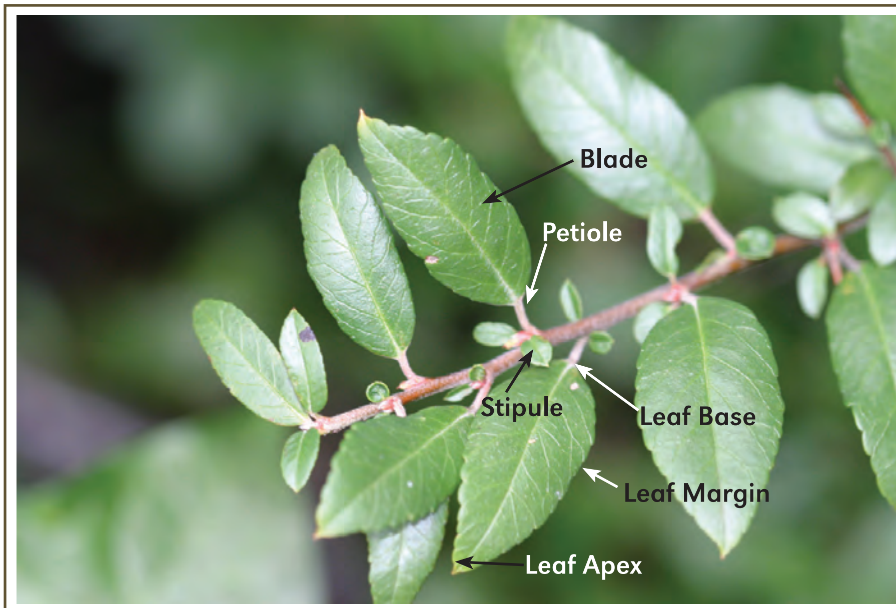


Figure 3. External leaf characteristics, such as those found on firethorn, *Pyracantha coccinea*, are valuable keys in plant identification.

Midrib is the central or main vein of a leaf.

Petiole is a stem-like appendage that supports the leaf away from the stem. It may vary in length, have specific characteristics, such as a groove or unique shape where it attaches to the stem, or may be lacking entirely in some cases.

Stipules are leaf-like appendages at the base of the leaf and may or may not be present.

Leaf Type

Simple leaves are those in which the leaf blade is a single, continuous unit. Most plants, including apple, maple, and oak, have simple leaves.

Compound leaves are divided and are composed of several separate leaflets. Leaflets do not have buds associated with them. All leaf parts, including and beyond the attached petiole, comprise a single leaf.

Pinnately compound leaves have leaflets arranged on both sides of the rachis (central leaf stem). Ash, hickory, sumac, and pecan have pinnately compound leaves.

Bipinnately compound leaves have a double set of leaflets. Kentucky coffeetree has bipinnately compound leaves.

Palmately compound leaves have leaflets radiating from a central point. Ohio buckeye and horsechestnut have palmately compound leaves (*Figure 5*).

Leaf Venation

Net- or reticulate-veined leaves have veins that branch from the midrib and then subdivide into finer veinlets that

Leaf Shapes

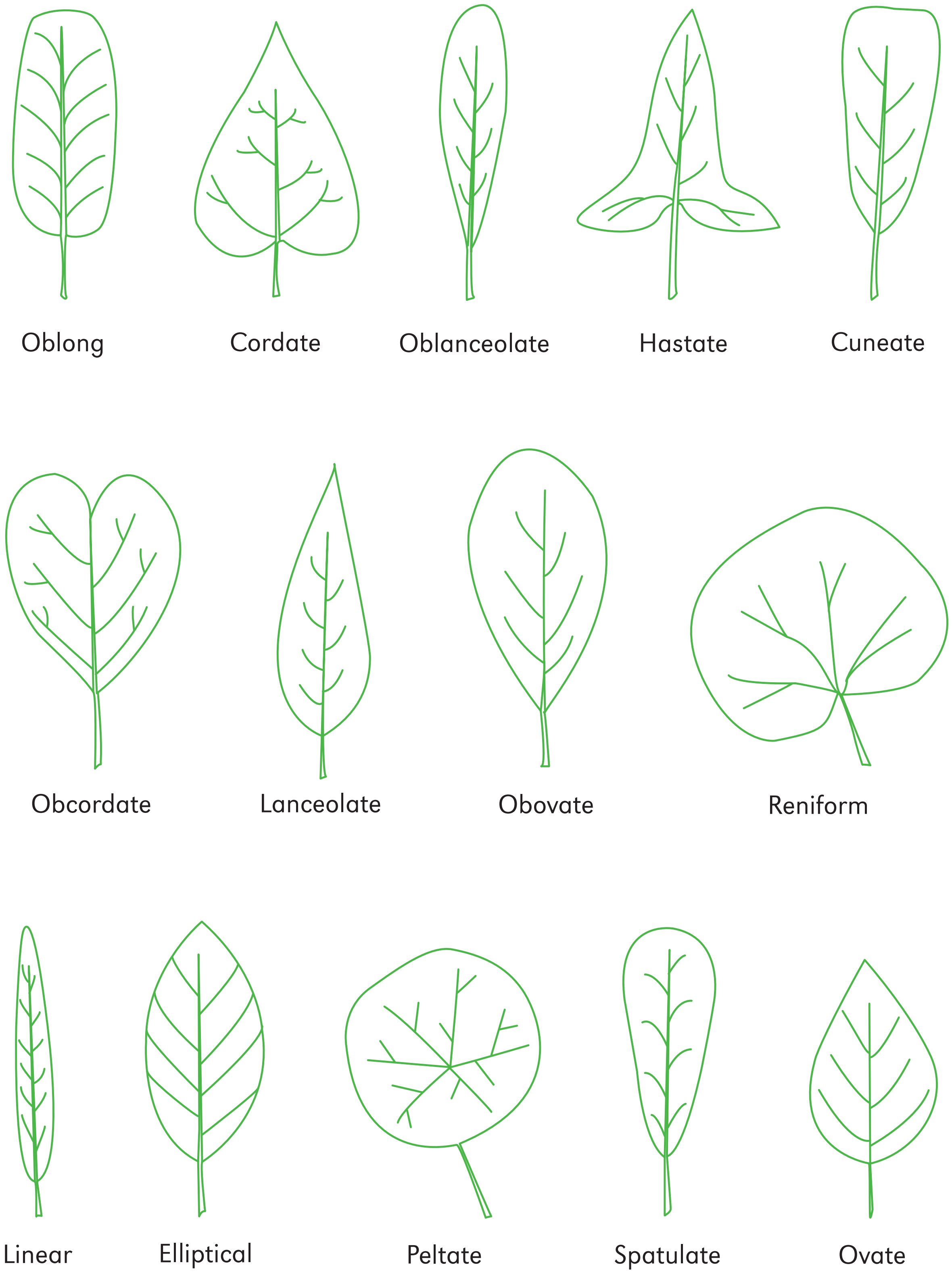
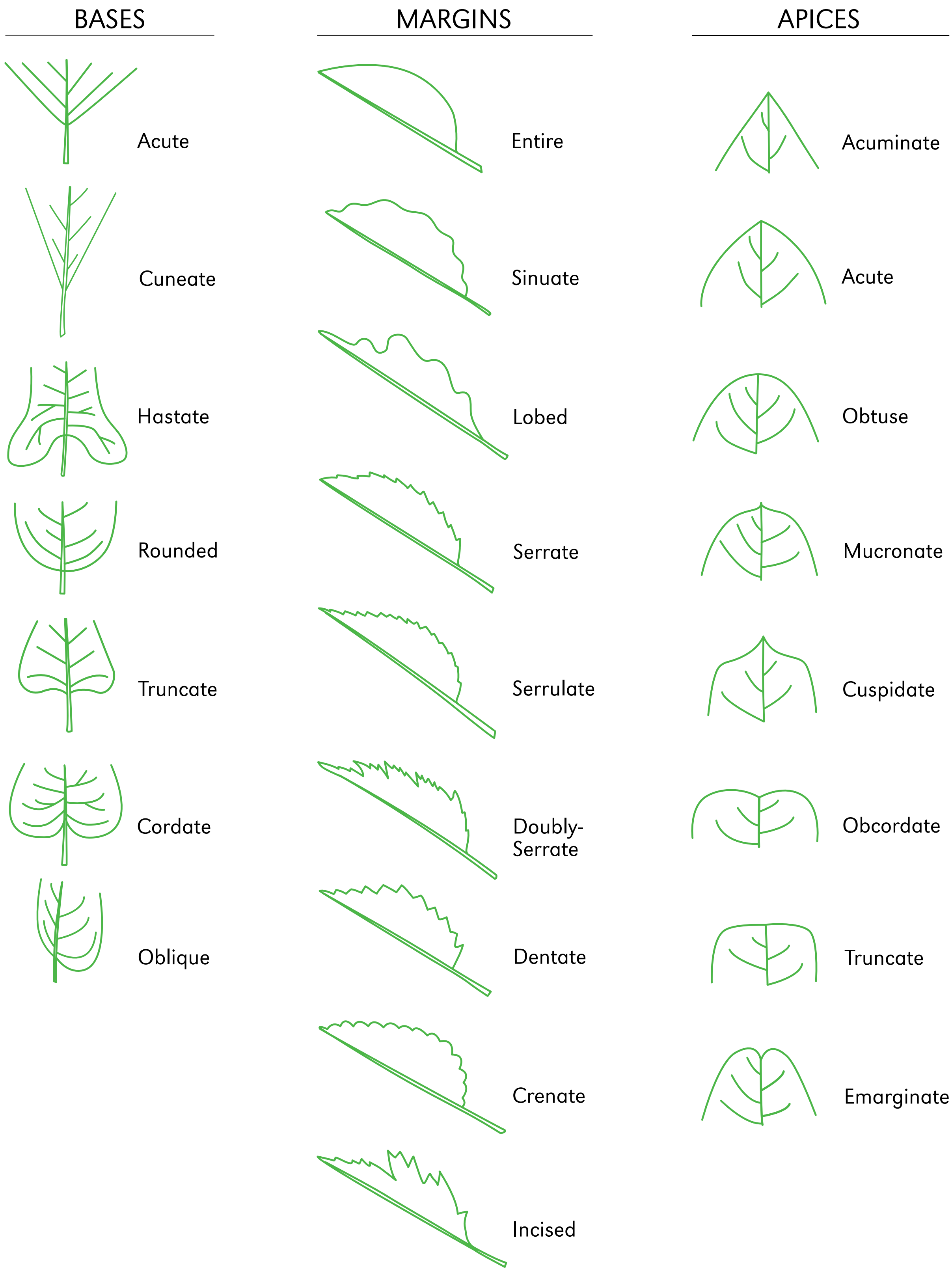


Figure 4. The leaf blade's shape and leaf base, tip, and margin characteristics are often used in plant identification. The leaf shape describes the overall shape of the leaf. Leaf bases and apices (tips) describe the shapes of the leaf blade at the base or tip. Leaf margins describe the shape of the leaf edge.

Leaf Bases, Margins, and Apices



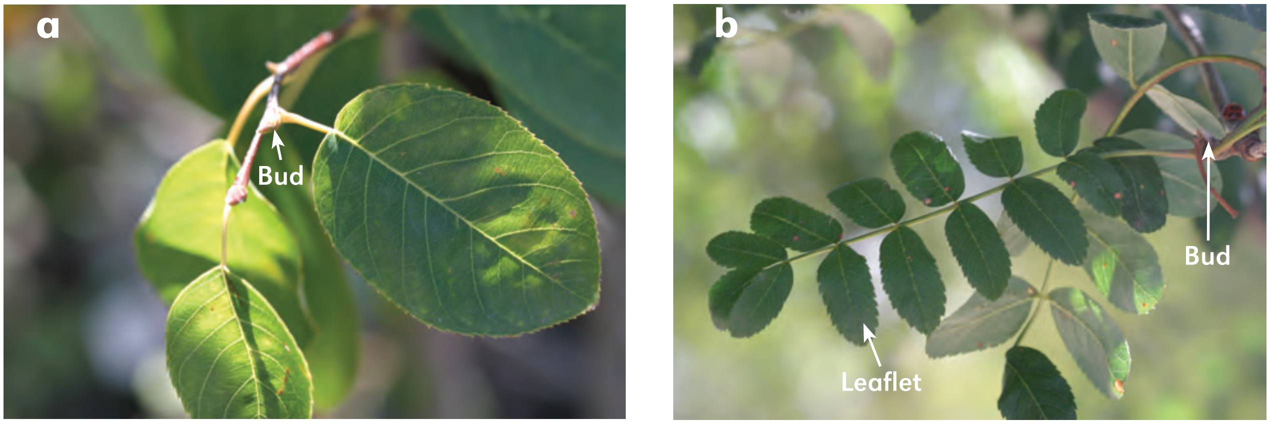


Figure 5. Simple (a) and compound (b) leaves can be differentiated by bud location. Leaflets of a compound leaf do not possess buds.

unite in a complicated network. Net-veined leaves occur on plants that are part of the dicotyledon group. Palmate and pinnate venations are forms of net-veined venation.

Palmate veined leaves have principle veins extending outward from one point, usually from near the base of the leaf blade. This type of venation is found in grape and maple leaves.

Pinnate veined leaves have veins extending laterally from the midrib to the edge. This is the most common type of venation among net-veined plants. Pinnate venation is found in plants such as apple, oak, and elm.

Dichotomous veined leaves have veins arranged in a unique Y-shaped formation. This relatively rare venation pattern is found in ginkgo.

Parallel veined leaves have numerous veins that run essentially parallel to each other and are connected laterally by minute, straight veinlets. Parallel veined leaves occur on plants that are part of the monocotyledon group (*Figure 6*).

Leaf Arrangement

Alternate leaves are positioned in steps along the stem with only one leaf at each node. Plants with this type of arrangement include oak, elm, linden, and cottonwood.

Opposite leaves are positioned across the stem from one another, two leaves at each node. Plants with this type of arrangement include maple, ash, dogwood, buckeye (the acronym used to help remember opposite-leaved plants is MAD Buck), viburnum, and lilac.

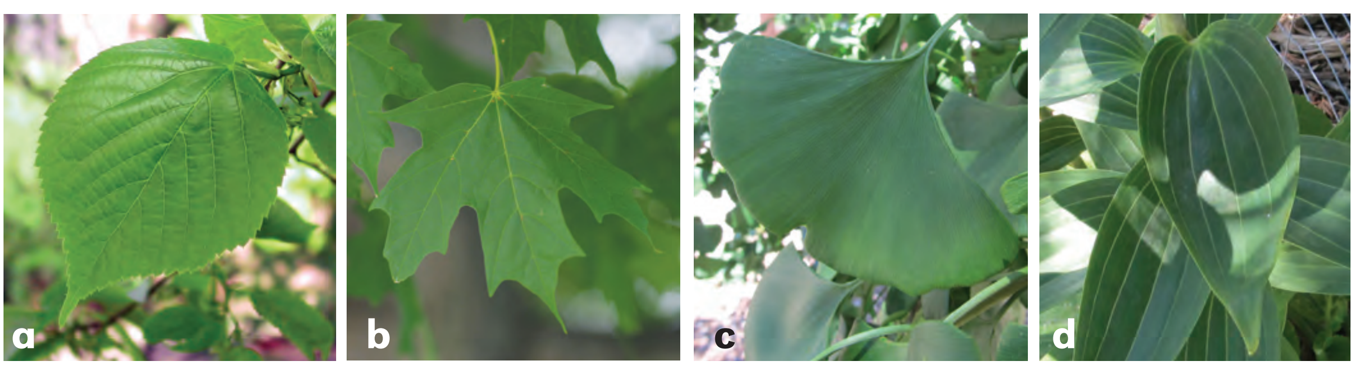


Figure 6. Plants exhibit different types of venation, including pinnate (a), palmate (b), dichotomous (c), and parallel (d). Plants with pinnate and palmate venation are classified as dicots, while plants with parallel leaves are classified as monocots. In addition to helping with plant identification, differentiating between monocot and dicot plants can help when making management recommendations due to their differences in growth characteristics as well as susceptibility to chemicals.

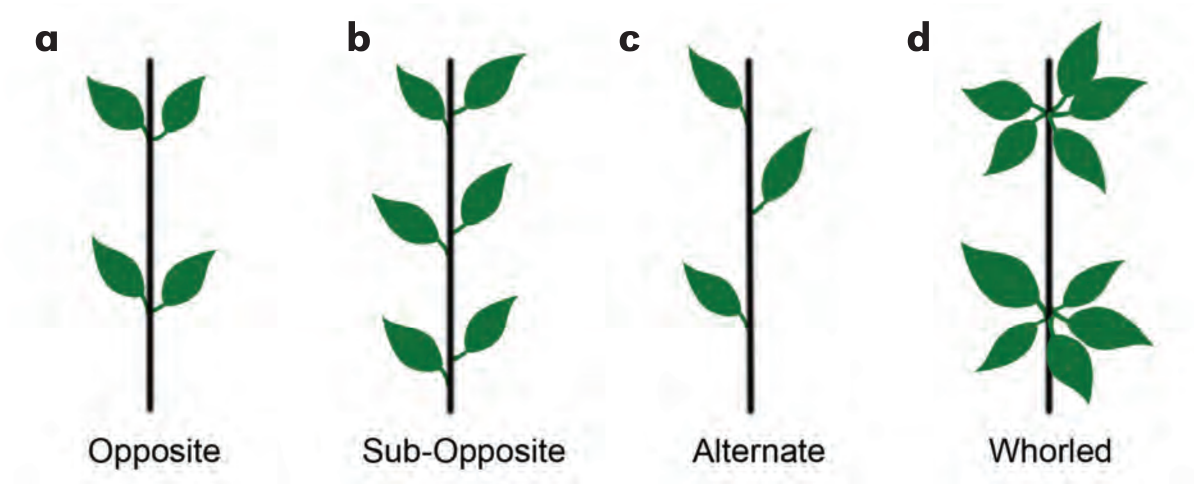


Figure 7. Leaf, twig, and branch arrangement is one of the primary characteristics used to help separate plants in vegetative plant keys. Most plants have alternate (a) or opposite (b) leaf arrangement, but sub-opposite (c) and whorled (d) arrangements are also observed on plants.

Sub-opposite leaves reflect an opposite pattern with a slight offset. European buckthorn has this type of leaf arrangement.

Whorled leaves are arranged in a cluster pattern of three or more leaves at a single node. Catalpa has this type of leaf arrangement.

Rosette leaves are arranged in a cluster at the base of the stem. Dandelion, biennials during their first year of growth, and most winter annuals have this type of leaf arrangement (*Figure 7*).

Leaf Persistence

Evergreen plants have green leaves that persist year-round, but typically lose a percentage of old leaves each year as new leaves are developed (*Figure 8*).

Deciduous plants lose their leaves once a year.

Semi-evergreen plants may retain leaves for more than one year, depending on environmental conditions.

Figure 8. Leaves of evergreen plants hold their leaves year-round, usually between two and seven years. Older needles, those found furthest from the branch tip or closest to the inside of the tree, will turn yellow, orange, or tan and drop each fall. Fall needle drop is easily distinguished from other damage because it affects only the interior leaves and is found throughout the tree.

Figure 9. Most gymnosperms have awl-shaped (a), needle-like (b), or scale-like (c) leaves. *Ginkgo biloba* is the exception. It has broad-shaped leaves with dichotomous leaf venation (as seen in Figure 6).

Gymnosperm Leaf Types

Awl-shaped leaves are sharp to the touch. Many junipers have awl-shaped leaves.

Needle-like leaves can be borne singly or in clusters or fascicles. Firs and spruces have needles borne singly. Pines have needles in clusters or fascicles.

Scale-like leaves have overlapping leaves that are soft to the touch. Plants with this type of leaf include arborvitae and many junipers (*Figure 9*). Plants also may have a combination of awl- and scale-like leaves.

Modified Leaves

Adhesive discs are modified leaves used for attaching to surfaces. Boston ivy clings to walls with adhesive discs.

Bracts are specialized leaves that are often brightly colored. The showy structures on flowering dogwood and poinsettias are bracts, not flower petals.

Spines are sharp-pointed, modified leaves. They are usually located at the base of a leaf. Cactus and barberry both have spines.

Tendrils are modified leaves that assist in supporting the stem by wrapping around small-diameter objects and structures. Woodbine, clematis, and porcelain vine produce tendrils for attaching to vertical structures.

Stem Morphology

Buds are the stem's primary growing points. They contain undeveloped shoots from which leaves (vegetative buds) and/or flowers (flower buds) may arise and are in various locations on the stem (*Figure 10*). Vegetative and flower buds are often distinct from one another in their shapes and locations on the same plant, and represent a key characteristic for identifying plants when leaves are not present.

Figure 10. Buds of most woody plants in the temperate zone develop a protective layer of bud scales (a). These buds come in many different shapes, sizes, and colors and can be used for plant identification during the dormant season. Buds of many species of *Viburnum* (b) as well as herbaceous plants (c) do not have thick, protective bud scales and are commonly called naked buds.

Terminal or apical buds are located at the tip of a stem. Most terminal buds are single, but double terminals and terminal clusters can be found in some plants, such as lilac and oak. Plants such as elm and redbud initiate growth each year from the last alternate bud on the end of a stem, which creates a characteristic zigzag pattern to twigs and stems.

Lateral or axillary buds are borne on the sides on the length of the stem.

Adventitious buds arise at unusual sites other than the terminal, lateral, or latent buds on the stem. Adventitious buds may develop from the internode of the stem, at the edge of a leaf blade, from callus tissue at the cut end of a stem or root, or laterally from the roots of plants.

Terminal bud scars are marks left around the entire stem at the place where the previous year's terminal bud was located. Measuring the distance between terminal bud scars is an effective method in determining annual growth rates.

Node is an area of the stem where buds and leaves are attached. Once leaves drop, leaf scars are left on the stem at the node. These scars vary in shape and size and can be helpful in plant identification (*Figure 11*).

Internode is the distance between two nodes. Internode lengths may depend on many factors, including fertility levels, light conditions, and plant competition.

Lenticels are pores on stems that allow for gas exchange. Lenticels may be of different shapes, sizes, orientations, and texture (*Figure 12*).

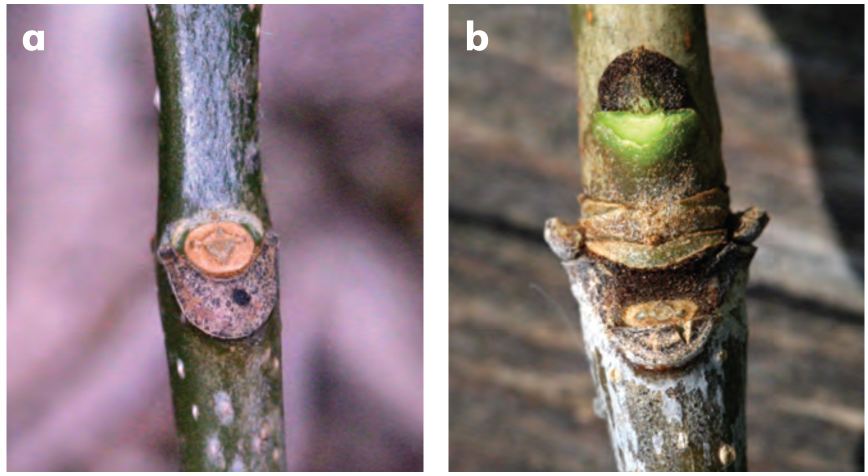


Figure 11. Leaf scars vary in size and shape and are valuable for identifying plants during the winter months. Leaf scars also may be helpful in distinguishing plants of the same genus, such as white ash (a) with a horseshoe or "C" shaped leaf scar, and green ash (b) with a flat-topped or "D" shaped leaf scar.

Figure 12. Often, the presence of lenticels can help classify plants into a genus, such as the horizontal lenticels commonly found in plants of *Prunus*.

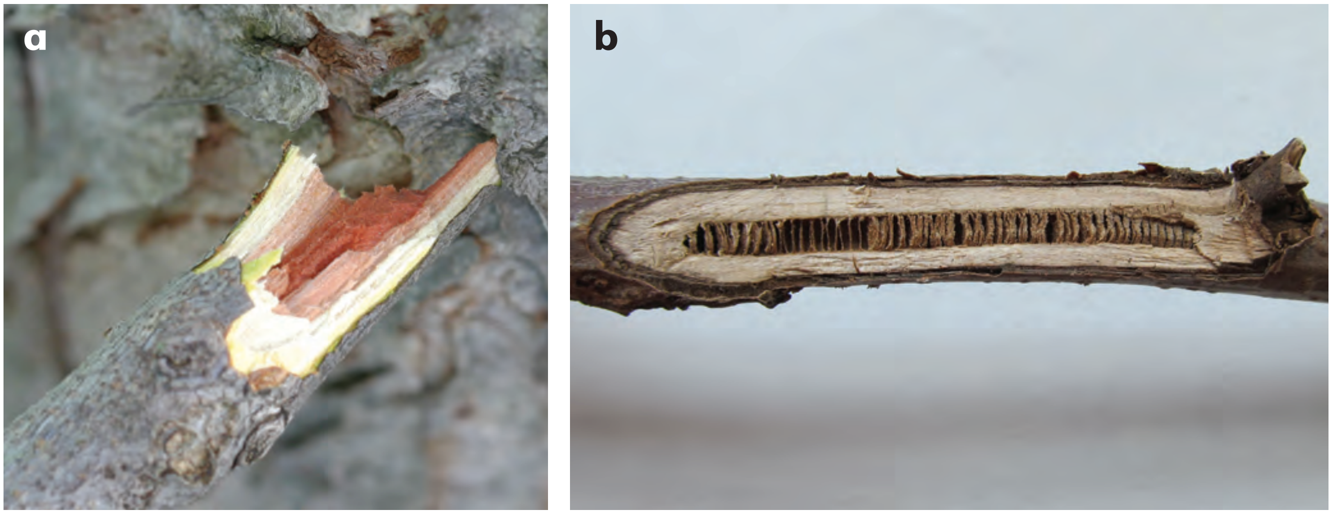


Figure 13. Unique piths, such as the salmon-colored pith found in Kentucky coffeetree, *Gymnocladus dioicus* (a) or the chambered pith in black walnut, *Juglans nigra* (b) are valuable characteristics that can help differentiate plants within a genus.

Pith is the center of a dicot stem. Piths may be of different colors, shapes, and sizes. They also may be hollow, solid, or chambered (*Figure 13*).

Bark is the protective outer layer of a woody stem that develops with age. Bark is a valued identification characteristic due to its year-round availability. Bark color and texture often vary with plant maturity, but can be distinct for many plants.

Stem Type

Woody plants have stems that live for several years, adding new growth (height and width) each year. Trees, shrubs, and some vines are woody plants.

Herbaceous plants have stems that die back to the ground each year. They may live for one year (annuals), parts of two growing seasons (biennials), or three or more years (perennials).

Suffrutescent plants are herbaceous or woody perennial plants that partially or fully die back annually to a woody base. Dieback varies, depending on plant type, climate, severity of winter weather, and relative plant health. Blue-mist spirea, Russian sage, and butterfly bush are suffrutescent plants.

Woody Stems

Branches are stems that are more than 1 year old and typically have lateral stems. Their pattern of growth is defined by the leaf and bud arrangement patterns discussed previously (alternate, opposite, sub-opposite, and whorled).

Canes are stems that have relatively large piths and usually live only one or two years. Plants with canes include roses, grapes, blackberries, and raspberries.

Shoots are first-year stems with leaves.

Spurs are short, stubby, side stems that arise from the main stem. They are common on fruit trees, such as pears and apples. Spurs typically contain the flower buds and serve as the attachment between the fruit stem and branch.

Suckers are adventitious shoots that arise from the roots of the plant. Many plants in the Rosaceae family sucker. Other plants may sucker as an indication of plant stress.

Thorns are modified, sharp-pointed stems that occur in the leaf axil. Buckthorn, hawthorn, and honeylocust commonly have thorns.

Trunks are the main stems of woody plants. Most large shade trees have a single trunk, but many smaller ornamental trees, such as birch, serviceberry, and Japanese tree lilac, typically have a multi-trunk habit.

Twigs are stems that are 1 year old or younger and have no leaves. They are still in the winter dormant stage.

Water sprouts are shoots that arise from stems. They grow rapidly and typically have an upright growth orientation. Over-pruning promotes water sprout growth. Crabapple trees often contain water sprouts.

Modified Stems

Bulbs are compressed underground stems surrounded by fleshy leaves that attach at the base. Almost all bulbs are monocot plants. They are generally grouped into two types, tunicate and nontunicate.

Figure 14. Plants with fibrous root systems (a) have a large mass of similarly sized roots. They generally do not penetrate as deeply into the soils as plants with taproot systems (b).

Tunicate bulbs have a dry outer layer of leaves, which helps keep the bulb from drying out. This layer can reduce damage during handling and also can help protect the bulb from insects and diseases. Plants classified as tunicate bulbs include onions, daffodils, and tulips.

Nontunicate bulbs have large fleshy leaves that are attached to the basal plate. They are very susceptible to damage and drying out. Lilies are nontunicate bulbs.

Corms are swollen, compressed underground stems with reduced scaly leaves. Gladiolus grows from a corm.

Tubers are swollen, enlarged underground stems. They have clusters of buds or eyes that contain nodes and internodes from which the shoots of new plants arise. Potato and caladium grow from tubers.

Tuberous stems are short, flat, and enlarged stems found between the regular stem and the roots. Tuberous begonia and cyclamen grow from tuberous stems.

Rhizomes are specialized stems that grow horizontally below the soil surface. Some rhizomes are compressed and fleshy such as iris. Others are slender with elongated internodes, such as Kentucky bluegrass.

Stolons or runners are specialized stems that grow from the crown horizontally above the soil surface and form a new plant at one or more of its nodes. Plants such as strawberry, buffalograss, and ajuga spread by stolons.

Root Morphology

Fibrous roots are formed when the primary root (first seedling root) ceases to elongate. A mass of heavily branched adventitious roots develop. The greatest concentration of fibrous roots occurs in the top 18 inches of soil. Grasses and other monocot plants, along with dicot plants grown from cuttings, have fibrous root systems.

Taproots are the primary root system from the seed. Taproots are created when the primary root elongates downward into the soil and becomes the central and most important feature of the root system. Lateral roots emerge from the taproot, but are less prominent and extend beyond the plant canopy. Many nut trees, such as oak, pecan, hickory, and walnut, are known for their taproots, which make them very difficult to transplant (*Figure 14*).

Root hairs, epidermal cell extensions found in roots, are present in almost all plants. They increase the surface area in which water and nutrients can be absorbed.

Root caps are located at the tips of roots and protect the root apical meristem.

Specialized Roots

Adventitious or aerial roots arise from aboveground stem tissue.

Tuberous roots are underground storage organs. They are often confused with tubers but do not contain stems, so they are classified as roots. Dahlias have tuberous roots; sweet potatoes are tuberous roots.

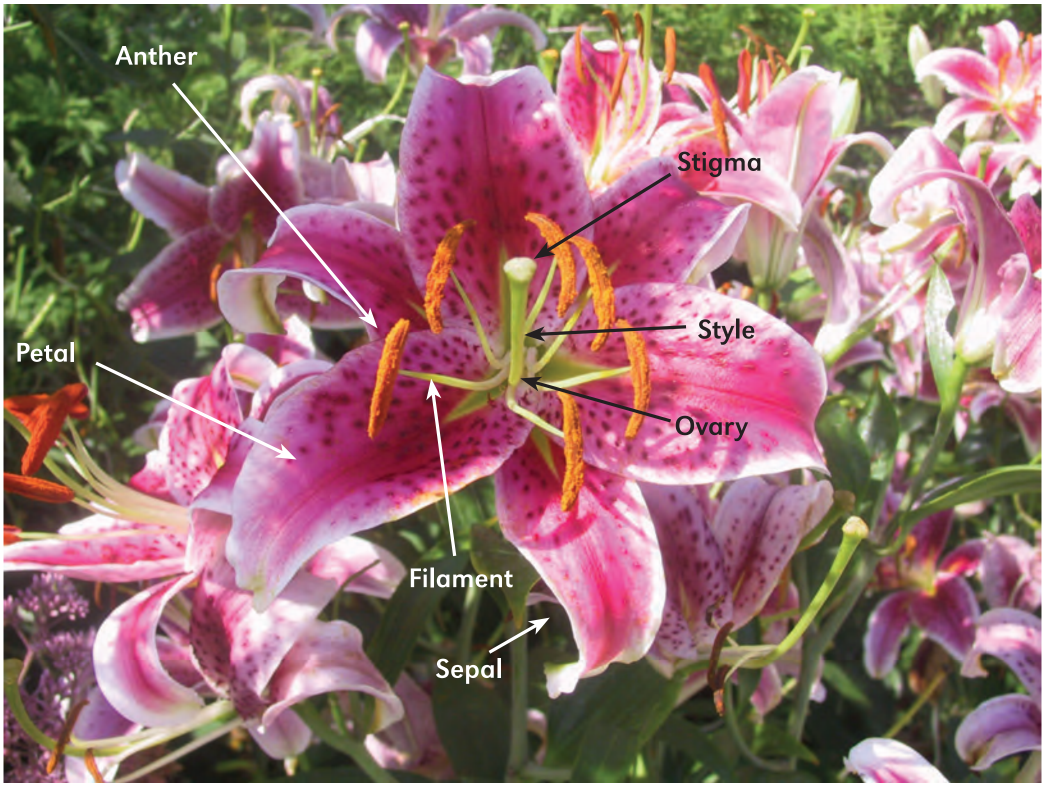


Figure 15. Flowers are very important in plant identification because they offer consistent characteristics that are not generally affected by environmental conditions. Unfortunately, many flowers are only available for short periods of time.

Flower Morphology

Petals are usually the highly colored structures of the flower. They are collectively called the corolla (*Figure 15*).

Sepals are leaf-like structures that protect the flower bud. They are usually green and collectively are called the calyx. Sometimes they are highly colored and similar in appearance to petals.

Pistil is the female part of the flower and is made up of the stigma, style, and ovary.

Stigmas are at the top of the style and receive pollen from the male flower. They are commonly flattened and sticky.

Styles are long stalks that connect the stigma and ovary.

Ovaries contain ovules. After successful fertilization an ovary becomes a fruit.

Ovules are unfertilized, immature seed that contains genetic information from the maternal (female) parent plant.

Stamen is the male part of the flower, which includes the anthers and filaments.

Anthers are the pollen-producing organ.

Filaments are long supporting stalks for the anthers.

Pollen is a fine, powder-like reproductive material that contains genetic information from the paternal (male) parent plant.

Receptacle is the base that holds the flower.

Pedicel is the stalk that directly supports a flower or fruit.

Peduncle is the primary stalk supporting a single or cluster of flowers or fruits.

Inflorescence is the arrangement of the flowers on the floral stem. Several arrangements and slight variations can be found in angiosperm plants (*Figure 16*).

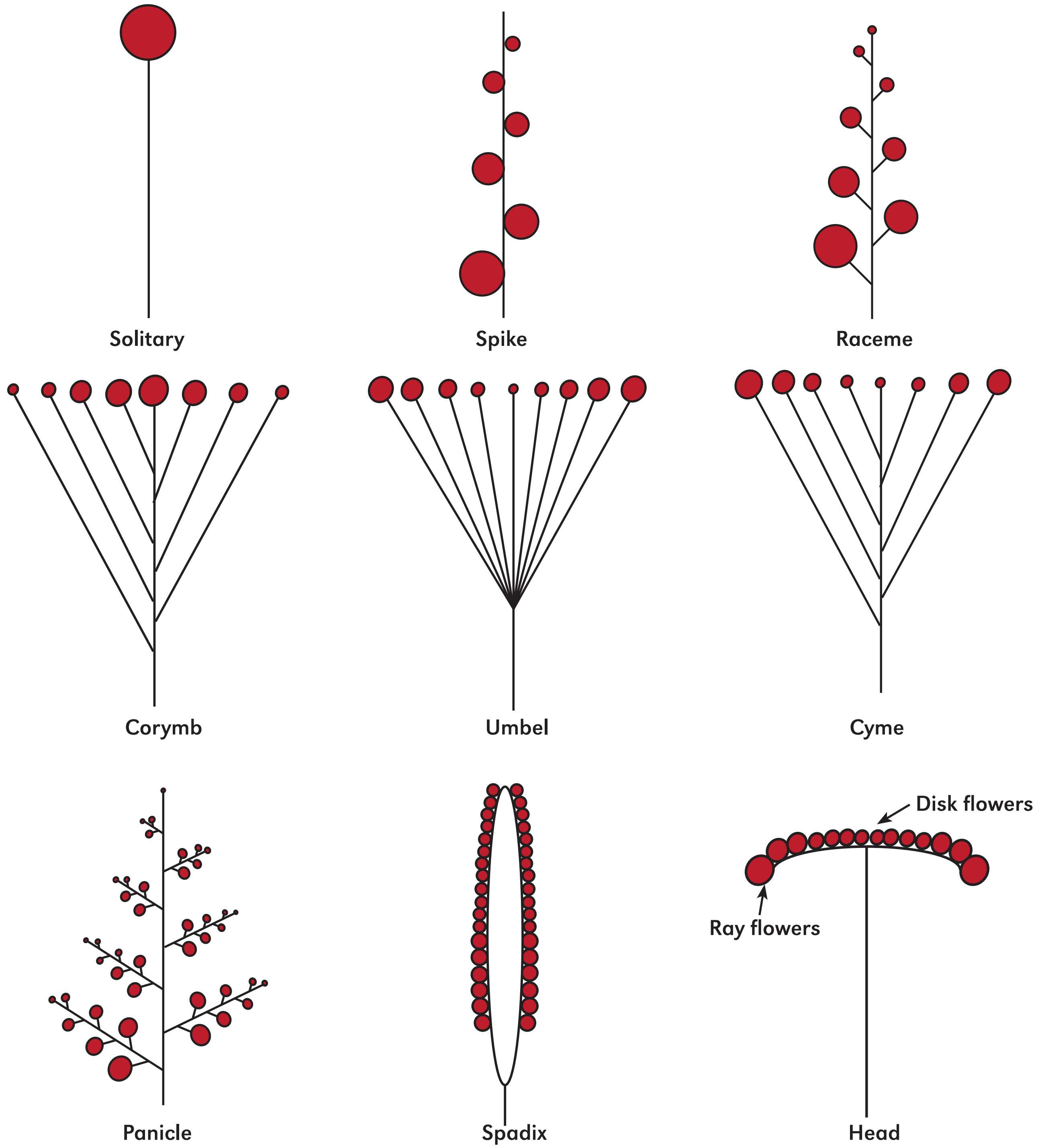


Figure 16. The most common inflorescence arrangements are solitary, spike, raceme, panicle, umbel, corymb, cyme, spadix, and head. Different-sized dots represent the order of bloom time (bottom up, middle out, etc.) Solitary flowers have one flower per stem. Spike inflorescences are unbranched and have flowers attached to the stalk. Raceme inflorescences have clusters of flowers on individual stalks. Panicle inflorescences have flowers on stalks with repeated branching. Umbel inflorescences have clusters of flowers with stalks that radiate from the same point. Corymb inflorescences are flat-topped racemes that flower from the outer flowers to the inner flowers. Cyme inflorescences are flat-topped inflorescences that flower from the middle flowers outward. Spadix inflorescences have a showy bract that partially surrounds the male and female flowers on an erect central spike. Head or composite flowers have both disk (center) and ray (along the edge) flowers. Disk and ray flowers can look similar and are different based on the specific plant.

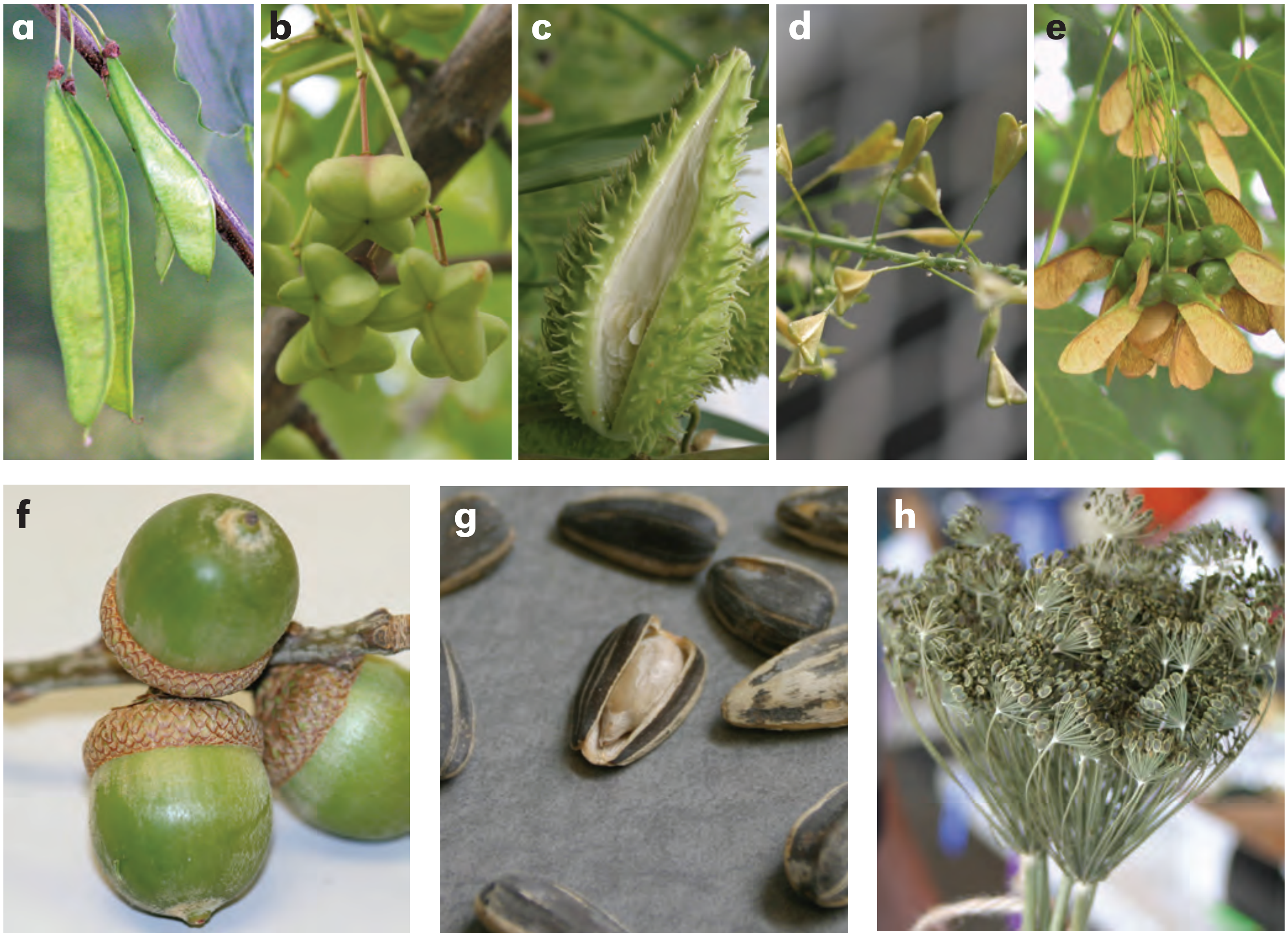


Figure 17. Dry fruits are classified as either dehiscent or indehiscent, depending on whether they split open at maturity. Legumes (a) contain several seeds and open along two sides. They are found in the bean or pea family (Fabaceae). Capsules (b) contain many seeds, split along more than two sides, and often contain separate compartments. Follicles (c) contain several seeds and open along one seam. Siliques/silicles (d) leave a thin partition in which seeds are attached after the fruit opens. Siliques/silicles are found in the mustard family (Brassicaceae). Samaras (e) are winged fruits. Nuts (f) are hard, one-seeded fruits. Acorns, walnuts, and chestnuts are examples of nuts. Achenes (g) are one-seeded fruits without wings. Schizocarps (h) split to form one-seeded segments.

Flower Types

Complete flowers contain the stamen, pistil, petals, and sepals. Flowers are called “incomplete” if they have one or more of these parts missing. Plants that contain incomplete flowers may be considered monecious or dioecious plants.

Monecious plants have separate male and female flowers on the same plant. Oak and corn are monecious plants.

Dioecious plants have male and female flowers on different plants. Cottonwood and buffalograss are dioecious plants.

Perfect flowers contain both the male and female flower parts within each flower. If either the male or female flower parts are missing, the flower is called “imperfect.” Imperfect flowers include two types, pistillate flowers and staminate flowers.

Pistillate (female) flowers are those that possess a functional pistil or pistils but lack stamens.

Staminate (male) flowers are those that possess functional stamens but lack a pistil.

Fruit Types

Dry fruits have fruit walls that become papery or leathery as they mature and may become quite hard. They can either open at maturity or remain sealed (*Figure 17*).

Figure 18. Drupes, pomes, berries, pepos, and hesperidiums are fleshy fruits. Drupes (a) contain one seed that is surrounded by a hard stony layer (pit) and an outside fleshy layer (plum, cherry, viburnum). Pomes (b) have several seeds that are contained near the center of the fruit (apple and pear). Berries (c) have two or more seeds found in a fleshy layer that comprises the entire fruit (tomato). Pepos (d) are specialized berries with a hard ring enclosing a fleshy interior containing several seeds (cucumber, melons, squash). Hesperidiums (e) are specialized berries with a leathery rind and several juicy sections in the interior (citrus).

Figure 19. Gymnosperm cones are not fruit because they do not develop from an ovary. Seeds found in cones are said to be "naked" and are found in woody (a) and fleshy cones (b). Cone size, shape, texture, and color are helpful characteristics in identifying plants.

Dehiscent fruits split or open at maturity. Dry fruits that open at maturity include legumes, capsules, follicles, and siliques. Eastern redbud, euonymus, milkweed, and shepherd's purse have dehiscent fruits.

Indehiscent fruits do not open at maturity. Samaras, nuts, achenes, and schizocarps are examples of indehiscent fruits. Maple, oak, sunflower, and dill have indehiscent fruits.

Fleshy fruits are usually soft and juicy. Examples include drupes, pomes, berries, pepos, and hesperidiums (*Figure 18*). Peaches, apples, tomatoes, cucumbers, and oranges are fleshy fruits.

Simple fruits develop from a single ovary (*Figure 19*)**.**

Aggregate fruits develop from a single flower that has many ovaries. The flower appears as a simple flower with one corolla, one calyx, and one stem but many pistils or ovaries. The ovaries are fertilized separately and independently. Strawberry, raspberry, and blackberry are aggregate fruits (*Figure 20*).

Multiple fruits are derived from a tight cluster of separate, independent flowers borne on a single structure. Each flower has its own calyx and corolla (*Figure 21*). Pineapple and figs are multiple fruits.

Figure 20. Aggregate fruits develop from a single flower that has many pistils. Blackberries are aggregates of drupes. Each section on a blackberry represents an ovary that has been fertilized separately. The dark-colored “hairs” are style remnants.

Figure 21. Multiple fruits form from many flowers. Each section (a) on a pineapple represents one flower.

References

Identifying plants with confidence takes time and practice. Several references are available to help learn the terminology associated with plant identification and identify unknown plant samples. They are listed below.

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