GLOSSARY
of Botanical and Horticultural Terms

LArch 245 Fall 2023 | Prof. Ken Tamminga

- Definitions compiled by Ken Tamminga from sources given below.
- Terms marked with an asterix (*) are keywords that you should regularly use in your field notebooks.
- For Leaf and plant shapes and parts, see other LArch 245 material provided.

Achenes – A dry non-fleshy fruit containing a seed; the coat of this fruit is somewhat hard. Such seeds are typical of the *Asteraceae* (Aster family) and other plant families.

***Alternate** – Refers to leaves arising singly along a stem, not in pairs. The leaves are arranged alternately along the stems of a plant. This is a common arrangement.

***Annual** – A plant that completes its life cycle in less than one year. Some plants are summer annuals that germinate during the spring or early summer and mature by the fall of the same year; other plants are winter annuals that germinate during the fall and mature during the spring or summer of the following year.

Anther – The pollen-producing end part of the stamen. Anthers bear the pollen of the flowers; they are located at the tip of the stamens (male reproductive organs). The anthers of a flower are often powdery yellow or orange in appearance (from the grains of pollen) and each anther is usually oblongoid in shape.

***Apex** – The tip of a leaf**.**

Awn – This refers to a needle-like bristle at the tip of a floral scale in grasses, sedges, and other plants.

***Axil of a Leaf** – The angle where a leaf attaches to the stem. Where the stem of a leaf (the petiole) joins the stem; this is where a side stem or flowering stalk may develop.

Banner – The uppermost petal in a Pea Family flower.

***Basal Leaf** – A leaf that develops from the rootstalk, rather than a stem.

Beak – This is a pointed slender appendage that defines the outer tip of a seedpod; the seedpods of many plant species lack beaks. For *Carex* spp. (Sedges), this term has a different meaning. The perigynium of a *Carex* specie can have a slender beak at its apex to enclose the long style of a female floret, or the perigynium can be nearly beakless when the style of the female floret is quite short.

Biennial – A plant that requires two years to complete its life cycle. During the first year, a biennial typically consists of a rosette of basal leaves, while during the second year it bolts and develops one or more flowering stalks.

Bifurcated – A structure that is divided into two parts along some portion of its length. This often refers to petals that are deeply notched at their tips, as occurs in the flowers of *Stellaria* spp. (Chickweeds).

***Bilateral symmetry** – Having mirror image right and left halves, like a face.

***Bipinnate Leaf** – A compound leaf with pairs of side stems arranged oppositely along its central stem (petiolule). On each side stem are pairs of leaflets that are arranged oppositely from each other. Also, the central stem usually terminates in pairs of opposite leaflets. Terminal leaflets may, or may not, be present.

Blade – This the extension of the leaf that spreads away from the stem (or culm). Most plants have leaf blades, although *Eleocharis* spp. (Spike Rushes) are an exception. The 'leaf' of a forb usually refers to its blade. In contrast, grasses, sedges, and some forbs have an extension of the leaf that wraps around the stem (or culm) of a plant. This is the 'sheath' of a leaf.

Bloom – A whitish powdery coating on a stem or fruit. Wipes off easily.

***Bract** – A modified leaf immediately under a flower. Collectively, an involucre of bracts. Bracts appear at the base of an inflorescence; they often resemble narrow leaves. While most bracts are simple, they are sometimes divided into branching lobes.

Bractlets – Small secondary bracts that may appear near the flowers of an inflorescence. They often resemble small linear leaves, but some of them are stiff and spine-like.

Branchlets – This refers to the side stems that develop from the central stem of some *Equisetum spp.* (Horsetails). Sometimes these side stems (or branchlets) divide into secondary side stems (or secondary branchlets).

Bulb – This is a short underground stem that is enlarged by modified, fleshy leaves. These modified leaves contain no chlorophyll and are appressed together; they store nutrients and water for rapid growth and development during the spring. A bulb is spheroid in shape, with short coarse roots radiating from the bottom.

Bulbets – Small bulbs that are produced underground or above ground as an alternative to seeds. Above ground bulbs are produced in the inflorescence and are called "aerial bulbets." Such bulbets are often produced by some *Allium* spp. (Onions).

Bulrushes – A common name that refers to species in the genus *Scirpus*. Because *Scirpus* spp. (Bulrushes) are members of the Cyperaceae (Sedge family), they are actually sedges, notwithstanding the common name.

***C3 Metabolism** – Cool-season plants use a C3 metabolism to convert sunlight into carbohydrates using chlorophyll. They often grow best during the spring or fall when the weather is cool and moist. Most forbs and some grasses and sedges have a C3 metabolism. The chemical pathway of C3 metabolism is slightly different from that of C4 metabolism (see the description below).

***C4 Metabolism** – Warm-season plants use a C4 metabolism to convert sunlight into carbohydrates using chlorophyll. These plants often grow best during the summer when the weather is warm and somewhat dry. Some grasses and most *Cyperus* spp. (Flat Sedges) have a C4 metabolism. The chemical pathway of C4 metabolism is slightly different from that of C3 metabolism (see the description above).

***Calyx** – The outer ring of flower parts. Called sepals if separate, a calyx tube if joined. Usually green but may be petal-like.

***Capsule** – A dry fruit with 1 or more compartments.

Central Axis – This expression usually refers to the central stalk of an inflorescence that is a spike, raceme, or panicle. Sometimes it refers to the central stalk (or rachis) of a compound leaf.

Ciliate – There are fine hairs along the leaf margin. A ciliate margin is often smooth (entire) as well.

***Clasping** – Refers to a leaf with a base that partly surrounds the stem.

***Composite Flower** – A flowerhead consisting of numerous small florets. This flowerhead may have ray florets (a small flower resembling a petal) and/or disk florets (a small tubular flower with tiny lobes). The florets are held together by floral bracts surrounding the base of the flower.

***Compound** – Refers to a leaf made up of 3 or more separate leaflets.

***Cordate** – The leaf is rather wide and heart-shaped (but upside-down). The broad base of the leaf curves upward toward the end of the petiole (leaf stem), while the apex narrows to a point.

Corm – A corm is similar to a bulb (see above), except the modified underground leaves are usually woody and scaly. Occasionally, the spheroid surface of a corm is irregular and contains ridges. Coarse roots radiate below.

Corolla – The inner ring of flower parts. The often colorful part of the flower above the calyx consisting of petals; sometimes the petals are united into a floral tube that has spreading lobes along its outer rim. Called petals if separate, a corolla tube if united.

Corymb – Similar to a raceme, except that the flower cluster is flat at the top; the outer flowers usually open first. The pedicels of the outer flowers are longer than the inner flowers.

Crenate – The leaf has blunt teeth with convex sides; the indentations between teeth are somewhat angular, rather than rounded.

Culm – The central stem of grasses and sedges. This stem is usually unbranched and it terminates in an inflorescence. The culm is often largely hidden by the sheaths of the leaves, which wrap around it.

***Deltoid** – A triangular-shaped structure of a plant; this term often refers to the shape of a leaf blade.

***Dentate** – The leaf has widely spaced teeth that are pointed at their tips, but with concave spaces between them; this dentation can be irregular.

Dioecious – Plant species that produce either all female flowers or all male flowers, but not both on the same plant. The *Thalictrum* spp. (Meadow Rues) are examples of dioecious species.

Disc – The round center of a composite flower. Made up of numerous tiny tubular disc flowers. Usually surrounded by flat, strap-like ray flowers.

***Dissected** – Refers to a deeply cut leaf, the cuts not reaching the midline**.**

***Doubly Serrate** – The leaf margin has smaller teeth interspersed between larger teeth.

Drupe (compound) – A compound fleshy fruit consisting of numerous drupelets. Each fleshy drupelet has a single seed with a hard covering. Raspberries, blackberries, and dewberries are examples of compound drupes.

***Drupe (simple)** – A fleshy fruit containing a single large seed with a hard covering. Cherries and plums are examples of simple drupes.

***Ellipsoid** – Refers to a slightly flattened 3-dimensional structure that is more broad toward the middle than at its two outermost edges. For example, a seed can have an ellipsoid shape. The 2-dimensional counterpart of ellipsoid is the term 'elliptic.'

***Elliptic** – A 2-dimensional curvilinear structure that is more broad toward the middle than at its two outer edges. An elliptic leaf has the same shape as an ovate leaf, except it is more narrow. Refers to a leaf that is egg-shaped with the widest part near the middle.

***Entire** – Refers to a leaf with margins that are not toothed.

***Evenly Pinnate Leaf** – A compound leaf with pairs of leaflets arranged oppositely along its central stem (petiolule), but without a terminal leaflet. There is always an even number of leaflets.

Fibrous – The root system consists of a loose collection of more or less thin branching roots that originate from the base of the plant.

Filament – The slender stalk-like part of the stamen. Bears an anther at the tip.

Fleshy – A fleshy root is a central taproot that can be nearly as wide as it is long. This is a very stout taproot that is sometimes incorrectly described as "tuberous." Sometimes fibrous roots are described as "fleshy." This means that they are somewhat thicker than ordinary fibrous roots, and they have a softer texture.

Floral Bracts – A compound flower often has floral bracts that circumscribe its base, particularly among members of the *Asteraceae* (Aster family).

Floret – A small flower that lacks sepals and petals. This often refers to the flowers of grasses and sedges and other wind-pollinated species. For plants in the Asteraceae (Aster family), this refers to the disk florets and/or ray florets of a flowerhead (a compound flower). A ray floret has a petal-like appendage to which is attached the reproductive organs of the floret; the ray florets of some species are sterile. A disk floret consists of a tiny tubular corolla and the reproductive organs of the floret; sometimes the disk florets are sterile as well.

Flowerhead – A crowded cluster of stemless or nearly stemless flowers; these flowers are either disk florets or ray florets. The shape of the flowerhead can be convex or rather flat.

Follicle – A seedpod that splits along one side to release the seeds; Milkweeds and other plant species produce such seedpods.

***Forb** – These are plants that produce flowers with conspicuous petals and/or sepals; the flowers of such plants are often showy and insect-pollinated. In contrast, grasses (Poaceae), sedges (Cyperaceae), and miscellaneous other plants are not forbs because their wind-pollinated flowers lack petals and sepals, or their petals and sepals are tiny and inconspicuous. Such wind-pollinated flowers are not very showy, although there are some exceptions.

***Fruit** – This is a very broad botanical term that refers to the seeds and their surrounding covering; a seed may be contained with a papery membrane, hard coat, fleshy pulp, spongy pod, or other structures.

Funnelform – A corolla that is shaped like a funnel, being narrow and tubular at the base, but flaring outward toward the outer margin. The corollas of *Ipomoea* spp. (Morning Glories) and *Calystegia* spp. (Bindweeds) are funnelform.

***Glabrous** – The surface of a stem or leaf that is smooth and hairless.

Glaucous – The surface of a stem or leaf that is smooth with a white bloom that can be rubbed off.

Glume – A glume is one of the lowermost scales in a spikelet of grass; each spikelet of grass has a pair of glumes at the bottom. The glumes are usually keeled and somewhat flattened; they are infertile and don't contain any florets. The 1st glume may be very similar in size and shape to the 2nd glume, or they may be quite different in appearance from each other. The tips of the glumes are sometimes awned.

***Grass** – Members of the Poaceae (Grass family) are true grasses.

Head – A crowded cluster of stalkless or near-stalkless flowers.

***Herb** – A non-woody plant. i.e., not a tree, bush or woody vine.

Involucre – (of bracts) Circular row(s) of bracts supporting a flower.

Joints – The central stems and branchlets of *Equisetum spp.* (Horsetails) consist of several stem-like joints that are connected together at their ends by ring-like sheaths.

***Lance-shaped** – Refers to a leaf that is much longer than wide and pointed at the tip. Also termed lanceolate.

***Leaf Nodes** – Where the leaves join the stem; some species of plants (primarily forbs) will develop rootlets at the leaf nodes where a stem touches moist ground.

***Leaflet** – An individual part of a compound leaf.

Lemma – A lemma is one of the floral scales in a spikelet of grass; the lemmas are located above the glumes. Lemmas usually occur in pairs in each spikelet, although sometimes they occur individually. Typically, one lemma in a pair is fertile and contains a floret, while the other lemma is sterile. The lemmas provide some protection for the reproductive organs of the florets and its developing seed (or grain). Like the glumes, the lemmas are often keeled and somewhat flattened.

Ligule – A structure on the inner side of a leaf at the junction of the sheath and blade. This structure consists of thickened tissue that may contain papery membranes or a row of hairs. The characteristics of a ligule are more observable when the blade of a leaf is pulled away from the culm. Sometimes the ligule is used in the identification of grasses and sedges.

Lip – A division of the end of a corolla tube. May itself be lobed.

***Lobed** – Refers to a leaf with indentations in the margin that do not reach the midline if pinnately lobed, or the midpoint if palmately lobed.

***Monoecious** – Plant species that produce both male and female flowers, but not perfect flowers, on the same plant. An example of a monoecious species is *Xanthium strumarium* (Common Cocklebur).

***Node** – The place on a stem where leaves or branches arise. A node is a small bulge on the culm (or stem) of a grass at the base of a sheath. Sometimes the appearance of the nodes is useful in the identification of a grass species.

***Obcordate** – The leaf is rather wide and heart-shaped. The base of the leaf narrows to a point, while the broad apex curves downward in the middle.

Oblanceolate – The leaf is broader at the apex than at the base; the apex is rounded.

***Oblique** – The base of a leaf is asymmetric; one side of the base is lower than the other.

***Oblong** – The leaf is somewhat narrow, but rounded on both ends.

Obovate – The leaf is rather wide and rounded at the apex, but narrows considerably at the base. An obovate leaf is similar to an oblanceolate leaf, but broader. Also termed "obovoid."

***Oddly Pinnate Leaf** – A compound leaf with pairs of leaflets arranged oppositely along its central stem (petiolule), with a single terminal leaflet at the end of this stem. There is always an odd number of leaflets.

***Opposite** – Refers to leaves that are in pairs on the stem, one leaf on each side. The leaves are arranged in opposite pairs along the stems of a plant; these pairs of opposite leaves often rotate 90 degrees as they ascend up a stem.

Orbicular – The leaf is very wide and nearly round.

***Oval** – The leaf is rather wide and rounded on both ends.

Ovaries – The female reproductive organs of a flower that contain the developing seeds (ovules). An ovary is usually ovoid or globoid in shape with a protective outer wall. The ovary may have a single internal chamber, or it may be divided into several internal chambers.

Ovary – The swollen seed-producing base of the pistil.

***Ovate** – Refers to leaves that are egg-shaped and widest near the base. Also termed "ovoid."

Palea – This is a thin inner scale that encloses the developing seed in a spikelet of grass. The palea resembles a fertile lemma (the outer scale), but it is usually smaller and more difficult to observe. Not all species of grass have a palea as a structure in their flowers.

***Palmate Leaf** – A compound leaf with leaflets originating from the same location at the end of the petiole (leaf stem), like fingers from a hand. It often has 5 leaflets, but may consist of a fewer or greater number of leaflets.

Palmate Venation – The major veins radiate outward from a central location near the base of the leaf. There are often 5 such veins, but a fewer or greater number is possible. This type of venation is often associated with leaves that are palmately lobed.

***Palmately Lobed** – The leaf has lobes that radiate outward from a central location at its base; there are often 5 lobes, although they may be fewer or greater in number.

Panicle – A cluster of flowers that branches regularly; each flower usually has its own pedicel (flower stem). A panicle can be narrow and elongated, or rather broad.

***Parallel** – The veins of a leaf are more or less parallel to each other along its length. Leaves with parallel venation are often linear and strap-like.

Pedicel – The stem of an individual flower. Flowers without pedicels are sessile.

***Perennial** – A plant that lives for several or more years, often producing flowers on an annual basis.

Perfect Flowers – A flower that contains both male and female reproductive organs. This is the most common type of flower.

Perfoliate – Where the bases of two opposite leaves wrap completely around the stem. It is also possible for the base of an alternate leaf to wrap completely around a stem, but this is less common.

***Petal** – A blade-like segment of a flower; the petals often spread outward to attract pollinating insects and/or provide a landing platform for them.

***Petiole** – The stem of a leaf; it connects the blade of a leaf with the stem.

* **Petiolule** - the stalk of any of the leaflets making up a compound leaf.

***Pinnate** – Describes lobes or leaflets arranged along a midline, like the parts of a feather. There is a central vein along the length of the leaf, from which side veins radiate outward from an acute angle. This is the most common type of venation.

***Pinnately Lobed** – The leaf has pairs of lobes arranged oppositely from each other along its length. Another name for this shape is 'pinnatifid'. Sometimes the lobes are not strictly opposite from each other, but appear alternately or irregularly along the side margins of the leaf.

Pistil – The female organ of a flower consisting of a stigma, style, and the ovulum (ovary). The latter is the swollen base of the pistil that contains the ovules (immature seeds). The pistil is usually located at the center of a flower. Some flowers have compound pistils that are called "carpels."

Pistillate Flowers – Female flowers that have pistils, but no stamens; these flowers produce seeds, but no pollen.

Plumose – This means 'feathery.' For example, wind-pollinated female flowers often have plumose stigmata so that they are more likely to receive the pollen of male flowers.

***Pubescent** – The surface of a leaf or stem that is densely covered with fine short hairs.

***Raceme** – A long cluster of stalked flowers along a central stem.

***Rachis** – Beyond the petiole, this is the central stalk of a compound leaf.

***Radial symmetry** – Symmetry around a central axis, like the spokes of a wheel.

Rays – Flat, strap-like flowers that surround the central disc in a composite flower.

Reticulate – The veins of a leaf form an interconnected network that is often angular and irregular; this is more typical of the lower side of a leaf, rather than the upper side. Reticulate veins are usually rather fine.

***Rhizomatous** – A rhizomatous root system has shallow underground runners (rhizomes) that can produce new plantlets some distance away from the mother plant.

Rosette, basal – A crowded circle of leaves around the base of a stem.

Rugose – The rough-wrinkly surface of a seed.

***Rushes** – This refers to species in the Juncaceae (Rush family), particularly *Juncus* spp. (Rushes). Rushes are distinct from plants in the Grass family (Poaceae) and Sedge family (Cyperaceae).

Scabrous – This refers to a leaf margin with a rough texture. This rough texture is the result of minute teeth along the leaf margin that are hard to see without magnification. Sometimes a scabrous leaf margin can cause lacerations on human flesh.

Scales – Among grasses (Poaceae), scales form the outer surface of the flowers in a spikelet; they are usually keeled and somewhat flattened. The lowest pair of scales in a spikelet are called the 'glumes,' while the remaining pairs of scales are called 'lemmas.' Among sedges (Cyperaceae), scales are small bractlets underneath the flowers in a spikelet. There is one scale per flower.

***Sedges** – Members of the Cyperaceae (Sedge family) are collectively known as 'sedges,' although some groups of plants in this family have other common names. The term 'sedge' is used to describe *Carex* spp. in particular.

Seed Capsule – This consists of the exterior wall and inner cells (if any) of the ovulum (the base of a pistil) after they have become dried out. The seed capsule contains one or more mature or nearly mature seeds. The seed capsule is often ovoid in shape and more or less open at the top, although there are many variations in form.

Seedpod – This is a more or less spongy fruit that contains one or more seeds, often in rows; it often splits apart along one or two sides to release the seeds. Seedpods have variable shapes; in the *Brassicaceae* (Mustard family), they are often long and cylindrical, while in the *Fabaceae* (Bean family), they are often flattened and oblong.

Sepal – A separate segment of the calyx. Usually green but may be petal-like. Corresponds to a calyx lobe if the calyx is undivided. Sometimes the sepals have a petal-like appearance that helps to attract pollinating insects.

***Serrate** – The leaf margin is divided into sharp teeth of approximately the same size, like a saw. "Finely serrate" refers to small teeth, while "coarsely serrate" refers to large teeth.

***Sessile** – Refers to a leaf, flower, or fruit that has no stalk.

***Sheath** – Grasses, sedges, and some forbs have an extension of the leaf that wraps around the stem (or culm). This portion of the leaf is the sheath. In contrast, the blade of a leaf is the extension of the leaf that spreads away from the stem (or culm). An 'open sheath' has a margin along the length of the culm that can be pried open and unfolded. In contrast, a 'closed sheath' completely wraps around the culm and lacks any margin.

***Shrub** – A relatively low woody plant having several branches from near the base.

***Simple Leaf** – The leaves of most plants are simple; they are not divided into leaflets.

***Sinus** – This refers to the indentation or bottom of a margin between two adjacent lobes of a leaf blade. Whether lateral veins terminate near the tips of leaf lobes or at their sinuses is occasionally useful in the identification of a fern.

***Smooth** – The leaf margin is simply and smoothly curved; this type of margin is also called "entire."

Spadix – A spadix is a fleshy spike that bears both male and female flowers; it is often surrounded by a modified bract called a "spathe." An inflorescence with a spadix is typical of members in the Araceae (Arum family).

Spike – A long cluster of un-stalked flowers along a central stem.

Spikelet – This typically refers to a floral structure in the grass and sedge families that consists of pairs of floral scales that are stacked on top of each other. Aside from the bottom pair, each pair of scales in a spikelet contains a single floret. For grasses, the bottom pair of scales in a spikelet are referred to as 'glumes,' while the remaining scales are called 'lemmas.'

Spur – A hollow tubular extension of the corolla.

***Stamen** – The male organ of a flower, made up of a slender stalk (filament) tipped with a pollen-bearing anther.

Staminate Flowers – Male flowers that have stamens, but no pistils; these flowers produce pollen, but no seeds.

Stigma – The tip of a pistil that receives the pollen. The stigma is often knobby or swollen; sometimes it is divided into 2 or 3 short segments, in which case the stigma is bipartite or tripartite.

***Stipule** – A small leaf-like structure at the base of a leaf stalk; stipules occur in pairs.

***Stoloniferous** – A stoloniferous root system has above ground runners (stolons) that can produce new plantlets some distance away from the mother plant. Stolons are actually modified stems, rather than roots, but their function is similar to rhizomes.

Style – The slender stalk of the pistil, bearing the stigma at its tip. A flower may have a single style, or several of them.

Subleaflet – Some compound leaves have compound leaflets that are subdivided into simple subleaflets. An example of a plant with such subleaflets is *Osmunda regalis* (Royal Fern).

Succulent – Refers to a fleshy, watery stem or leaf.

Taproot – The root system consists of a central taproot that originates from the base of the plant. This taproot can be slender or rather stout, and usually has fine rootlets towards the growing point.

***Toothed** – Refers to a leaf with a saw tooth edge.

Tuber – Fleshy, enlarged part of an underground stem (like a potato).

***Trifoliate Leaf** – A compound leaf with 3 leaflets originating from the same location at the end the petiole (leaf stem). This is a special case of a palmate compound leaf.

Truncate – This often refers to the shape of ray florets or achenes among members of the Asteraceae (Aster family). A ray floret with a flattened outer tip is "truncate." Similarly, an achene with a flattened upper end is "truncate."

Tubercle – This is a small bump or wart-like structure on the surface of a floral structure. This typically refers to the surface of an achene (seed), which may have a single tubercle, or its surface may be more or less covered with a multitude of minute tubercles. Sometimes 'tubercle' refers to the spore-bearing structures on horsetails and ferns, which often have a bumpy appearance.

Tuberous – A tuberous root system consists of a loose collection of coarse roots that occasionally thicken into fleshy underground tubers. These tubers store water and energy for the plant. Occasionally, rhizomes develop from the tubers that can produce new plantlets.

Umbel – A cluster of flowers in which the pedicels (flower stems) originate from the same central location.

***Undulate** – The leaf margin gently undulates like a wave; the undulation is often irregular. See line drawing of Undulate margin.

***Whorled** – The leaves are arranged in whorls of 3 or more leaves along the stems of a plant. The petioles or bases of a whorl of leaves meet together at the same location of the stem, while their tips point outward in different directions, like the spokes of a wheel.

Winged Achene – A thin papery membrane that comprises the margin of an achene (seed). As a result, the achene is more readily dispersed by the wind.

Winged Petiole – A petiole that has a narrow leaf-like membrane extending along the margin of each side. These leafy margins are the "wings" of the petiole.

Sources

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