Asteraceae • Sunflower Family

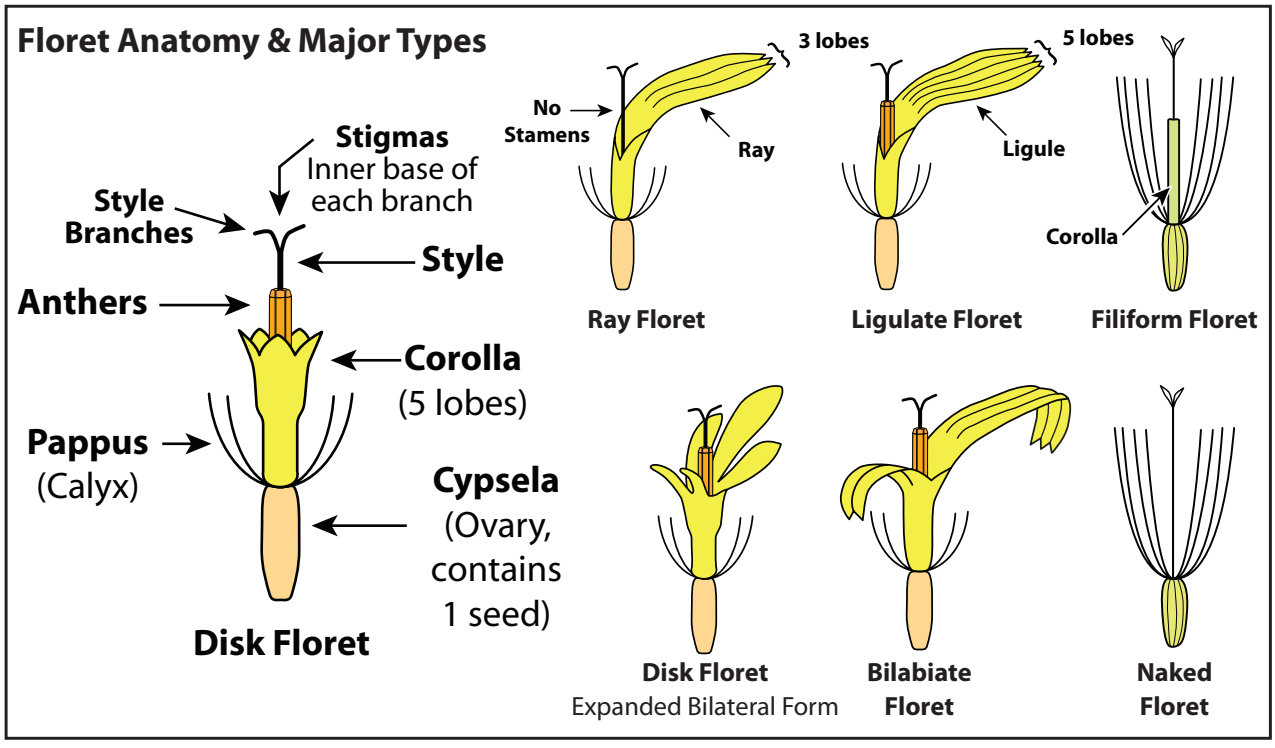
from Allen, R.L. & Roberts, F.M. (2013) Wildflowers of Orange County and the Santa Ana Mountains. Laguna Wilderness Press.

A family of diverse attributes, its members range from annuals to biennials and perennials; delicate herbs to woody vines, shrubs, and trees. Leaves basal and/or on stems; alternate, opposite, or whorled; undivided to 2-pinnate. Their tiny flowers (*florets*) are densely packed into a cluster and attached to a common receptacle; a unit called a *composite flowerhead*. Though each flowerhead superficially resembles a single flower, it actually contains several to many florets (rarely only one). On the upper surface of the receptacle in some flowerheads, slender bracts called *paleae* individually subtend (occur below) the florets; a receptacle with paleae is described as *paleate;* (paleae are also called pales, chaffy bracts, chaff scales, or receptacular bracts); these are lacking in species with *epaleate receptacles.* The lower outer surface of the flowerhead is surrounded by leaf-like or sepal-like overlapping bracts called *phyllaries* (or involucral bracts). Phyllaries are arranged in one or more whorls or spirals, sometimes crowded, sometimes spread out. They are often vital for identification. Together, the phyllaries form the *involucre*.

Each floret contains parts of both sexes (*bisexual*), only one sex (*staminate* [male] or *pistillate* [female]), or none (*sterile*). The *calyx* is modified into a *pappus,* which consists of one or more rings of hairlike *bristles* (sometimes with feather-like side branches), narrow to broad ±flat membranous *scales,* or long stiff, smooth or barbed *awns* (sometimes a mixture of bristles, scales, and/or awns); in some taxa the pappus is totally absent. Pappus units are whitish or brownish, never green nor sepal-like. The *corolla* is radial or bilateral (rarely absent); lobes (0)3-5. *Stamens (3-)5,* filament bases fused to the corolla, free above, *anthers fused into a cylinder that surrounds the style. Ovary inferior,* pistil 1, 1-chambered; ovule 1, attached in base of ovary. *Style 2-branched near tip; stigmas are borne on the basal facing (inner) sides of the style branches* and generally end below the tip. Fruit a dry 1-seeded *cypsela* (think of a sunflower seed still in its case, which is the ovary), sometimes called an achene (see the glossary). The pappus may remain attached to the fruit or may fall off. Fruit features are usually helpful for identification.

In bisexual florets, anthers release pollen *into* the cylinder they form around the style. Pollen adheres to the outside of the style and is carried upward as the style grows through the cylinder and elongates. Pollinating insects scramble among the styles, picking up pollen as they go, and inadvertently transfer it to stigmas of mature florets. In unfertilized florets, the style branches continue to grow and curl back, forcing contact of the stigmas with the pollen-laden style, thus effecting self-pollination.

The aster family displays quite a number of floret types. Those most commonly-encountered in our area are *disk, ray,* and *ligulate florets*. Other types are *filiform, naked,* and *bilabiate florets*. ***Disk floret*** – corolla radially symmetric (rarely ±bilateral), slender and tubular with 5 (rarely 4) small equal-sized lobes at the tip; each includes both sexes (*bisexual disk floret*); in a few genera the pistil is non-functional (*staminate disk floret*). ***Ray floret*** – corolla bilaterally symmetric, a short to long tube topped on one side with a strap-like blade that is generally 3-lobed at tip (occasionally unlobed or with a different number of teeth); ray florets lack stamens; each contains a fertile pistil (*pistillate ray floret*) or a small infertile pistil (*sterile ray floret*). ***Ligulate floret*** – corolla bilaterally symmetric, a short to long tube is topped on one side with a strap-like blade that is 5-lobed at tip; ligulate florets are always bisexual. ***Filiform floret*** – resembles disk florets in that the corolla is radially symmetric and tubular, but differ in the corolla being cylindric, very narrow, and blunt-tipped (rarely with minute lobes); plus they have no anthers. The female (pistillate) florets of *Baccharis* spp. are filiform. ***Naked florets*** – similar to filiform florets but have no corolla. The female (pistillate) florets of *Ambrosia* spp. and *Xanthium* spp. are naked. ***Bilabiate florets*** – corolla distinctly two-lipped, one lip has two slender lobes, the other has a single broad three-lobed ray. Our only aster with bilabiate florets is Sacapellote (*Acourtia microcephala*).

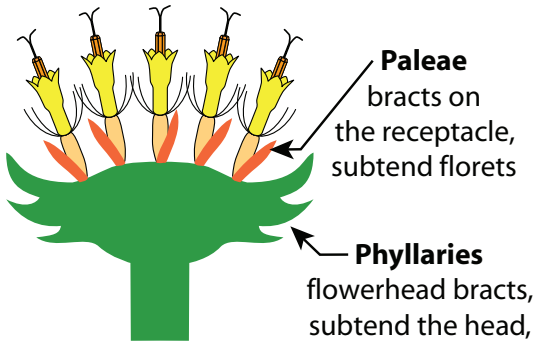


Flowerheads vary in form, floret composition, and sexuality. Some species have flowerheads with only disk, disk-like, or ligulate florets, others have both disk and ray florets in each flowerhead. Some species have male and female reproductive parts in each floret (*bisexual*), others have separate male and female florets on the same plant, still others have entire plants with only male or female florets. See the table and illustrations for details. For ease of use, we present the asters in three groups based on their flowerhead type: ***Discoid, Radiant, & Disciform*** (all disk or disk-like florets), ***Radiate*** (disk and ray florets), and ***Liguliflorous*** (ligulate florets only).

With 21,000 species worldwide and about 200 types in our area, this is the largest family of eudicots and the second largest family of vascular plants (second only to orchids).

	Discoid	***Radiant***	***Disciform***	***Radiate***	***Liguliflorous***
Florets	Disk florets only	A type of discoid head; disk florets only	Resembles discoid heads; typically disk florets in center, surrounded by filiform florets; filiform florets only in pistillate Baccharis heads	Disk florets in center, surrounded by a ring of ray florets	Ligulate florets only
Floret Size	All florets ±same-sized	Outer disk florets large, often bilateral	All florets ±same-sized	All disks ±same-sized	All florets ±same-sized
Floret Sex	Each floret bisexual (rarely male-only with sterile ovary, e.g. male florets of *Baccharis*)	Each floret bisexual	Disk florets (bisexual or male) surrounded by tubular female filiform or naked florets	Disk florets generally bisexual, all fertile, sometimes male; ray florets female or sterile	Each floret bisexual
Examples	*Artemisia tridentata, Cirsium, Bebbia, Pluchea;* male florets of *Baccharis* have a small sterile ovary	*Chaenactis, Lessingia; Centaurea has sterile outer florets*	*Artemisia californica & A. douglasiana, Pseudognaphalium,* female heads of *Baccharis*	*Encelia (rays sterile), Eriophyllum, Helianthus, Pentachaeta aurea*	*Agoseris, Malacothrix, Microseris, Tragopogon*

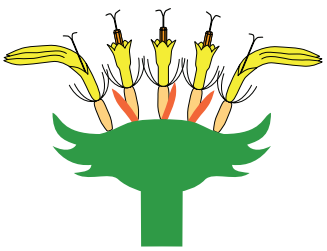
Flowerhead Anatomy & Major Types



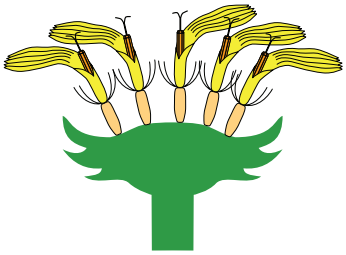
Paleae bracts on the receptacle, subtend florets

Phyllaries flowerhead bracts, subtend the head, form the **involucre**

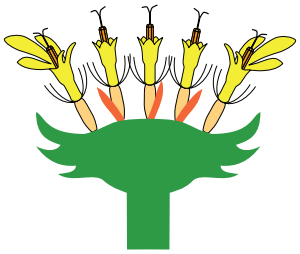
Discoid Head
disk florets only



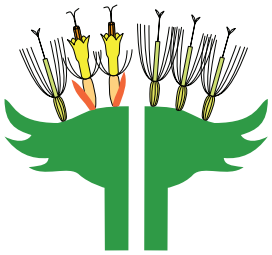
Radiate Head
disk & ray florets



Liguliflorous Head
ligulate florets only



Radiant Head
disk florets; outer large, ±bilateral



Disciform Head
disk florets surrounded by filiform, naked, or sterile florets; *or* all filiform *or* all naked