

THE ASTERACEAE: DAISY, SUNFLOWER, OR COMPOSITE FAMILY

A MAJOR FAMILY WORLDWIDE WITH
GREAT VARIATION AND MANY
HIDDEN DETAILS

Worldwide, the Asteraceae embraces at least 20,000 species of flowering plants.

- The family includes annuals, perennials, ground covers, vines, shrubs, and a few small trees
- The plants live in almost every conceivable environment from seashore to mountain tops, from forests to scrubs and grasslands, from wetlands to deserts
- The vegetative features are highly variable with many different leaf designs, branch patterns, root systems, and arrangement of flowers
- Although the family is important in gardens, only a handful of species are widely used for food, including artichokes, sunflowers, lettuce, chicory, dandelions, and few others

Most members of the Asteraceae are easily identified by the flower structure, which is that many flowers are massed together in a head that looks like a single large flower

- Some species have only, flat, tongue-shaped ray flowers, others tiny starlike disc flowers, but a great number have a combination with ray flowers around the head, resembling petals, and disc flowers in the center
- A few other flowering plants mimic this design as with the flowering dogwoods and yerba mansa
- Details of the flowers, therefore will confirm correct identification
- Disc flowers are the best to use because they're almost always fertile with all the flower parts

The typical disc flower is small enough that a good hand lens or microscope is needed to aid seeing all the structures clearly

- Each disc flower has an inferior, one-seeded ovary that later ripens into an achene
- The sepals and petals are thus on top of the ovary
- The sepals are highly modified into a *pappus*, consisting of hairs or scales or awns
- The petals are joined at the base into a tube topped by five, starlike lobes
- The five stamens are fused by their anthers to form a hollow cone above the petals
- The style splits into two branches, which elongate when the pollen has been shed from the anthers

Because the family is so large and diverse, it is divided into a number of tribes, some of which are native to California and some not

- The tribes are based on various characteristics including fragrance of leaves, kind of pappus, details of the *phyllaries* (bracts surrounding the flower head), presence or absence of ray and/or disc flowers, and details of the stigmas
- Some tribes are easy to learn, others difficult, but most have exceptions to the general rules of recognition

We'll start our survey with the easy tribes such as *Cichorieae*, the chicory tribe

- The chicory tribe has only ray flowers, the only such tribe in the family
- In addition, there is a milky sap in leaves and stems (when fresh)
- Other traits, like details of the phyllaries and pappus vary
- The tribe contains many nonnative weeds like dandelion, cat's ear, chicory, prickly ox-tongue, and sow thistle

Perhaps dandelion, *Taraxacum officinale*, is the most widely recognized and often reviled nonnative weed in the tribe. Notice the single flower per stem.



One of the reasons for dandelions widespread success is the readily wind-carried fruits with their parachute of a hairy pappus



Similar in appearance to dandelion, is another widespread nonnative weed, hairy cat's ear (*Hypochaeris radicata*)



Another nasty nonnative weed is prickly ox-tongue, *Helminthotheca echioides*, noted for its stiff prickly leaves



The Mediterranean chicory, *Cichorium intybus*, is another roadside weed in summer, easily recognized by its sky-blue flowers



Here you see the purple anthers, white pollen, and two-pronged stigmas of chicory's ray flowers



Our native dune dandelion, *Agoseris apargioides*, forms beautiful mounds on sand dunes and is not invasive



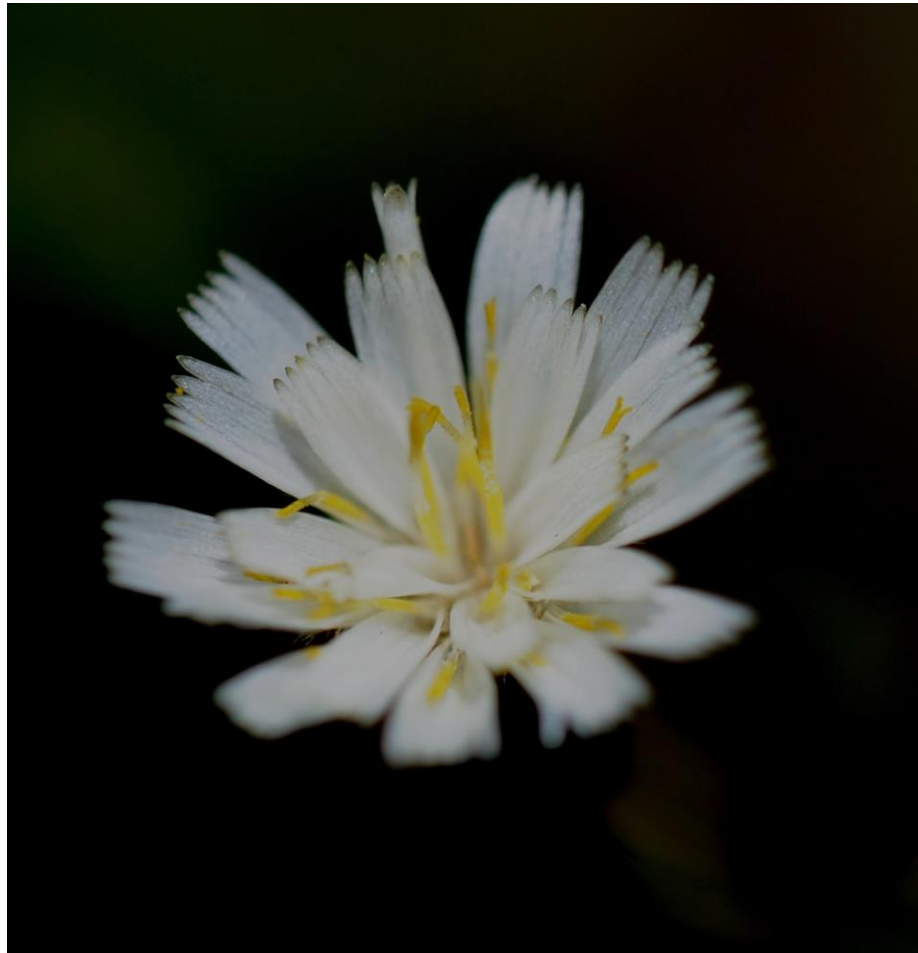
A close view of dune dandelion's flowers shows the similarity to the weed



Inland, *Agoseris grandiflora*, another native dandelion can be found in dry woods. Note the distinctive leaf pattern



Despite the common name, hawkweed (*Hieracium albiflorum*),
this native perennial also lives in woods



The mountain hawkweed, *Hieracium horridum*, displays the shaggy hairs on the leaves, typical of many species in the genus



Mountain hawkweed has yellow flowers unlike the lowland *H. albiflorum*



This native annual with dandelion-like flowers is *Uropappus lindleyi*, common in foothill grasslands



While many cichoriaceous plants have a hairy pappus, *Uropappus* features long tapered, silvery scales giving it the common name of silver puffs



The genus *Malacothrix* contains another so-called dandelion, desert dandelion (*M. glabrata*), paints deserts pale yellow in a year of generous rain



Desert dandelion can be identified by the paler yellow flowers with a red center, when the inner ray flowers are still in bud



Malacothrix saxatilis, the bush dandelion, grows along the southern California coast



Desert chicory, *Rafinesquia neomexicana*, not a chicory at all, is another desert wildflower with a similar color to the bush dandelion, but the rays are pink striped underneath



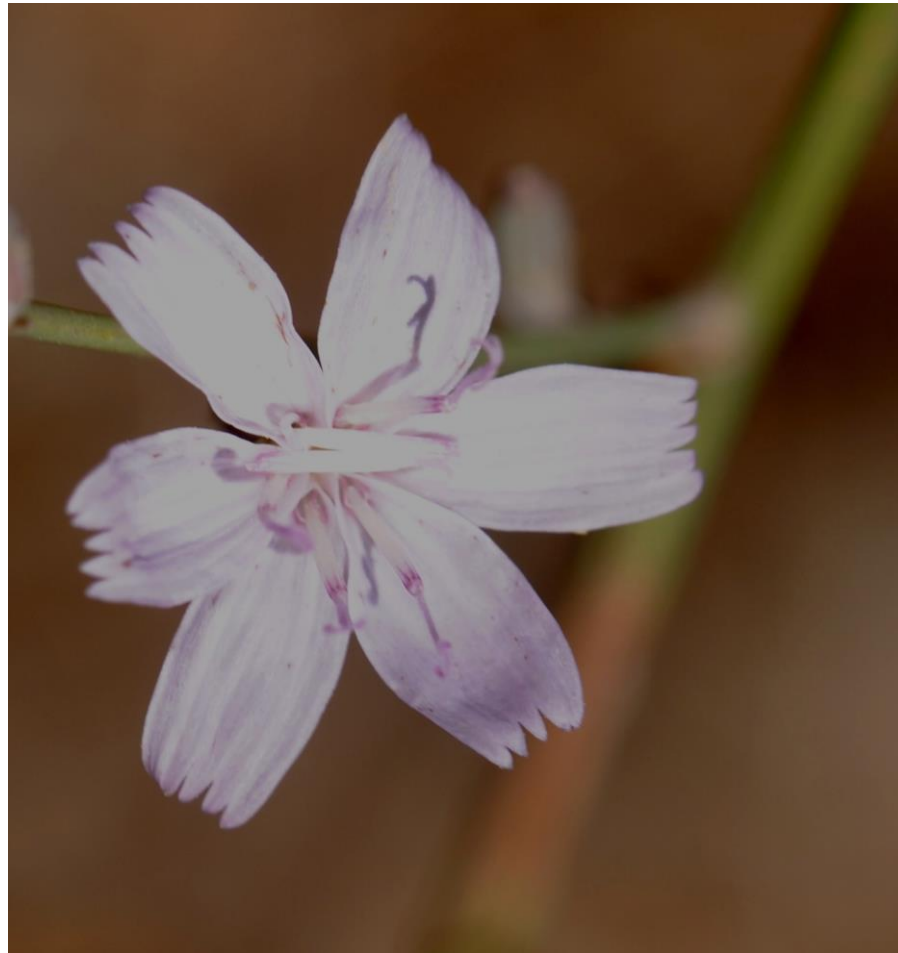
Hawksbeard, a genus of mountain perennials, has flowers featuring fewer rays. The name probably comes from the allusion of the hairy pappus to the hairs on a hawk's chin



This species of hawkbeard has only one row of ray flowers, making it look like it has a fixed number of petals



Easily distinguished from most others in the tribe, *Stephanomeria* features pink-tinted flowers, often again with one row of ray flowers in species like this *S. virgata*



The next tribe, easy to recognize, is Cynareae the thistle tribe

- The thistles are especially diverse in the Mediterranean region, and many of our weedy thistles come from there, while California has a single native genus, *Cirsium*
- Most but not all thistles feature spiny phyllaries around the flower head
- Many also have spiny stems and/or leaves
- But the main feature that distinguishes them all are the very long, tubular disc flowers (and lack of ray flowers)
- As a consequence, many thistles are pollinated by bumblebees, butterflies, and in some cases, hummingbirds

The genus *Centaurea* contains some of our most pernicious, harmful weeds such as the yellow star thistle, *C. solstitialis*. This species has long spiny phyllaries but some species in the genus do not



The star thistle can be identified before flowering by the special leaf patterns. Note the leaves in this genus are not spiny



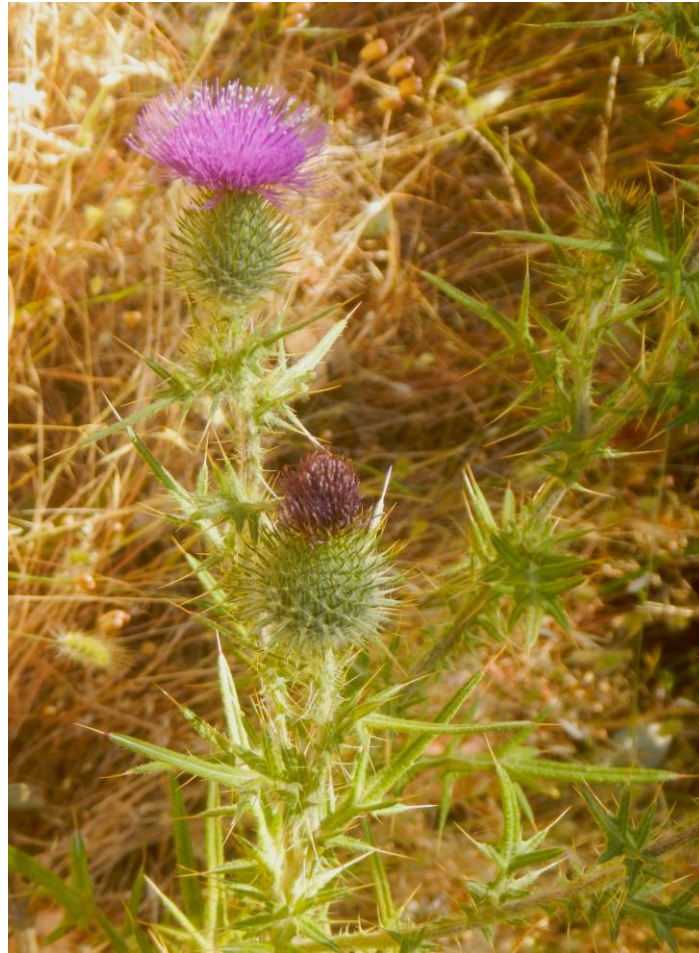
Another rampant weed is the Italian thistle, *Carduus pycnocephala*, which features decurrent leaves, small purple flowers, and a hairy pappus



The milk thistle, *Silybum marianum*, is another invader but with heavily armed leaves that sport milky white patches. The plant is an important player in the medicinal medicine arena



Heavily armed with spines all over, is the nonnative bull thistle, *Cirsium vulgare*. The flowers are highly attractive to bumblebees and butterflies.



The genus *Cirsium* has spiny leaves and phyllaries, and a plumose (feathery) pappus. It is well represented in California. Here you see the native *C. occidentale*, aka cobweb thistle because of the cobwebby hairs



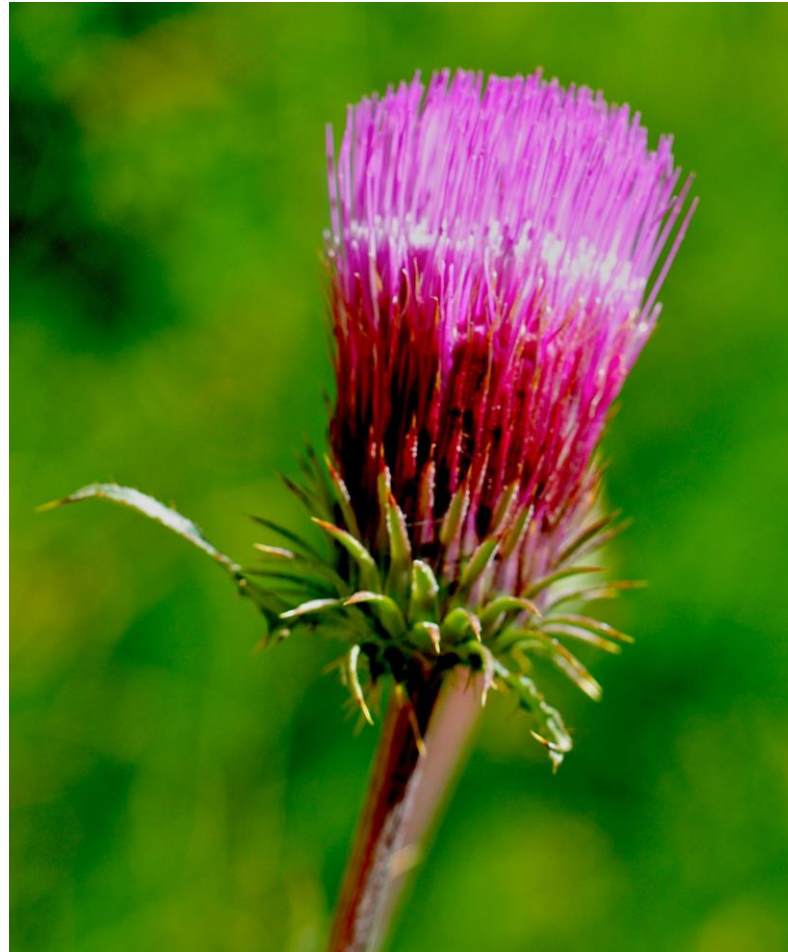
Cobweb thistle is widespread in California, often on dry rocky slopes or sometimes on sand dunes. Here you see the beautiful red-flowered form visited by hummingbirds



Cobweb thistle is variable in color and height. This rose-purple form grows on Mt. Diablo.



While cobweb thistle is taprooted, the Sierra thistle, *C. andersonii*, spreads by rhizomes in humusy soils near conifer forests



The brownie thistle, *C. quercetorum*, grows low to the ground to avoid its windy habitat on coastal bluffs



Similarly, the alpine thistle, *C. scariosum*, from high montane meadows, grows close to the ground because it's often covered by heavy snow



Although most native thistles grow in dry soils, a few like this seep thistle, *C. hydrophilum*, grow in permanent seeps. Note the nodding flowers.



The everlasting tribe, *Inuleae*, is also easy to recognize. Most of its species, at least in California, feature tiny disc flowers of no special beauty but other traits render the plants attractive

- Many species have wool-covered leaves and stems, and are often fragrant
- Perhaps the most salient feature is the phyllaries, which are either...
- Wool covered and white or...
- Papery and persistent.
- In fact many mistake these phyllaries for ray flowers
- The reason for the common name of the tribe is that the dried flowers last a long time due to the persistent, tough phyllaries

Here, I'll deal with the species of larger stature. There are many tiny annuals, difficult to differentiate. Our largest genus is *Gnaphalium* or cudweed now moved to *Pseudognaphalium*. This species is *P. californicum*



P. californicum is a short-lived perennial with wonderfully fragrant leaves (some say like curry) and tiny flower heads surrounded by pearly white phyllaries



P. microcephalum is similar to the first but with fragrant, white woolly leaves attractive in their own right. Many other cudweeds are annual and weedy.



Pearly everlasting, *Anaphalis margaritacea*, is often confused with the cudweeds but this herbaceous perennial spreads by rhizomes to form larger interconnected patches. Here you see the pearly white phyllaries



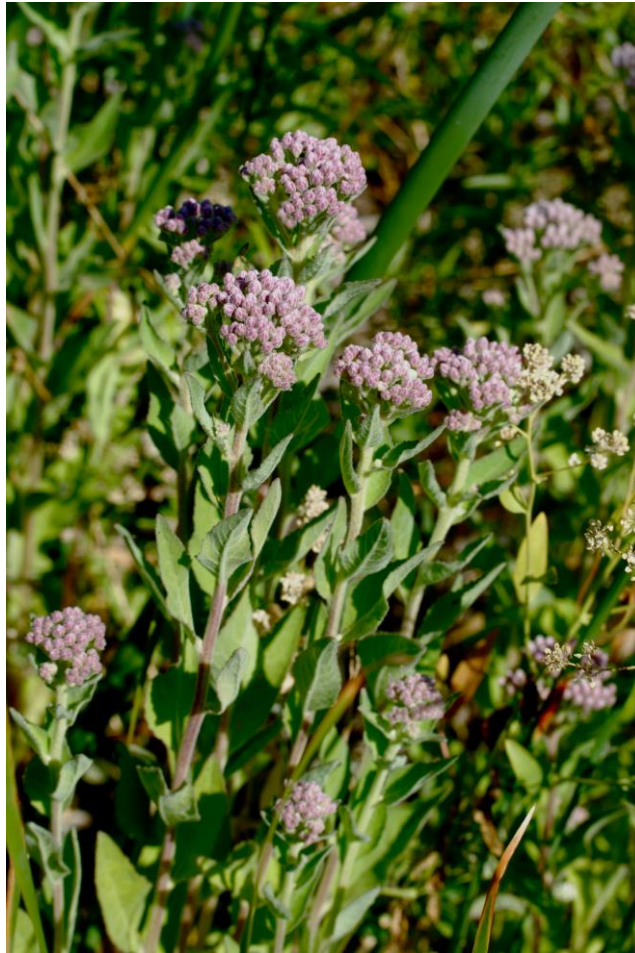
A close view of pearly everlasting flower shows the tiny yellow disc flowers



Antennaria or pussy toes is a group of several species that form low woody mats in the mountains. The small flowers resemble the cudweeds, usually with white or pink-tinged phyllaries



An unusual member of this tribe is the marsh fleabane, *Pluchea odorata*, common in brackish marshes, especially along the Delta. The color comes from the pink phyllaries



Here are the lovely flower buds of marsh fleabane. A second species of *Pluchea*, *P. sericea* or arrowweed, is a desert shrub growing near seeps and oases



Next, we'll turn our attention to two very small tribes, the *Eupatorieae* or eupatorium tribe, and the *Mutisieae*.

- The eupatorium group consists of perennials and shrubs with several overlapping rows of phyllaries around the flower head, and disc flowers only colored mostly white, blue, purple, or pink
- The pappus is hairy
- Only two native genera are found in California...
- *Brickellia* or brickel bush, and...
- *Ageratina* or thoroughwort

Ageratina occidentalis (once known as *Eupatorium o.*), aka western thoroughwort, is a woody perennial with beautiful rose purple flowers from rocky places in the mountains



A close view of thoroughwort flowers shows the exceptionally long stamens and styles, suggesting butterfly and bird pollination



Brickellia californica, California brickel bush, and others in the genus are mostly small shrubs with aromatic leaves from rocky habitats and often go unnoticed because their flowers...



...are pale yellow, white, or greenish and inconspicuous. For California brickelbush, however, the flowers are sweetly fragrant in the evening, suggesting moth pollination



Brickel bush achenes have long, white hairs attached



The *Mutiseae* is mostly a tropical American tribe, barely getting into Southern California. Here is the flower head of *Trixis californica*, a fairly common desert shrub. The special feature is the two-lipped, irregular disc flowers as seen here



Trixis (ncn) is quite showy in flower, often blooming as early as winter in the southern deserts



Acourtia microcephala (ncn) is another member of this unique tribe. It's a stout perennial from the coastal ranges in Southern California



The flowers of *Acourtia*



Here are the two-lipped flowers of *Acourtia*



The trio of this tribe is completed with *Hecastocleis shockleyi*, a strange desert shrub found in Death Valley



Hecastocleis flowers are surrounded by unique spiny, white, papery phyllaries



The aster tribe, *Astereae*, is among the most prominent in California with many genera and species

- Most members of the tribe can be identified by a combination of several rows of *overlapping* (shingle like) phyllaries and...
- A hairy pappus on the achenes
- The flower heads often have both ray and disc flowers but...
- Several have disc flowers exclusively
- Currently, the most difficult part of identification in the aster tribe lies with differentiating some of the genera, which superficially look similar

I'm grouping the genera into two categories: those with yellow rays and discs, and those with white, blue, purple, or pink rays around yellow discs. The gumplants, *Grindelia*, are a good example of the first group



Here you see the imbricated phyllaries of gumplants in bud. Note the white gum that covers the bud, a good way of recognizing the genus



Many grindelias look similar. The most distinctive is the prostrate dune gumplant, *G. stricta platyphylla*.



The goldenbushes, *Ericameria*, are another example of this group. They are small evergreen shrubs found in many dry habitats. Here is the flower of *E. linearifolia*



E. linearifolia grows in many dry places, including Mines Road and Mt. Diablo and blooms in spring. True to its name, it has narrowly linear leaves



E. linearifolia showing the seed head with a white hairy pappus



Some ericamerias, like *E. arborescens* or golden fleece, is a tall shrub in chaparral that blooms in late summer



Golden fleece is an example of a species without ray flowers, just discs



Ericameria ericoides or mock heather is a low, mounded shrub growing on coastal dunes. Its leaves smell like pine needles and the small flowers appear in summer



Another late bloomer is *E. cuneata*, which forms low woody mats on rocky slopes in the dry mountains. It differs from most ericamerias in having broad, wedge-shaped leaves instead of linear ones.



Previously, the rabbit brushes were in the genus *Chrysothamnus* but many have now been lumped with *Ericameria*. This one is *E. nauseosa*, a common shrub in the high desert and other dry habitats.



While chrysothamnuses are now partly in *Ericameria*, other former relatives belong to other genera. Such is the case with the island goldenbush, *Hazardia detonsa*, which has broad, silvery leaves



Island golden bush has heads of disc flowers only and the phyllaries are covered with white woolly hairs



Heterotheca is a small genus of woody perennials and annuals. This one, *H. grandiflora* or telegraph weed, is a common follower of dry roadsides, producing sticky toothed leaves and...



...bright yellow daisies in summer, usually dying by fall



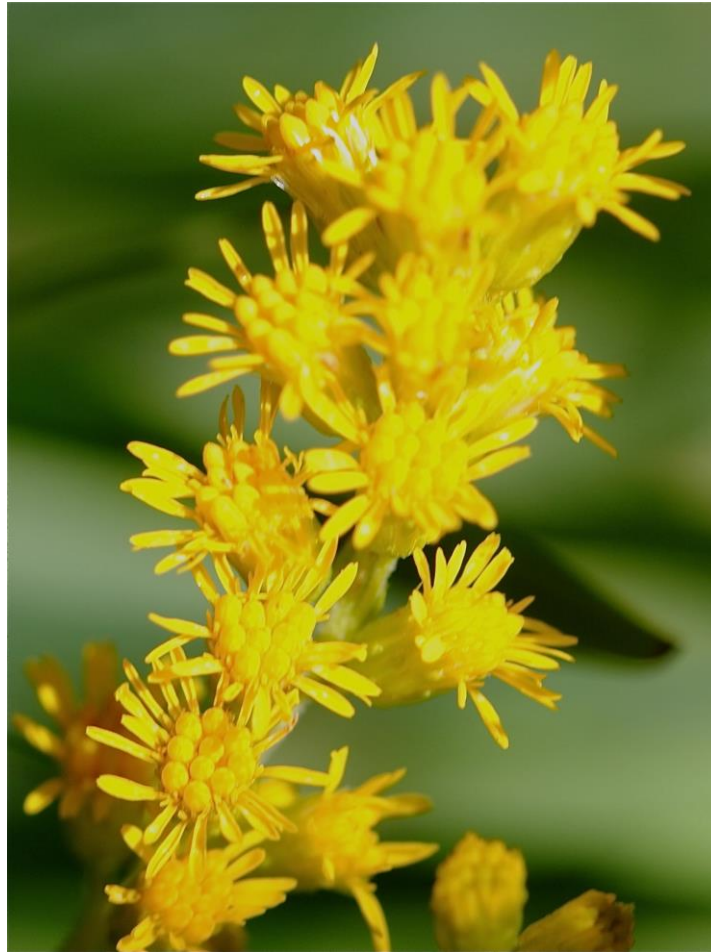
By contrast, *Heterotheca sessiliflora*, aka golden aster, forms a low woody perennial ground cover. Here it is in bloom in summer



The goldenrods are a distinctive genus, massing numerous tiny flower heads in dense spikelike sprays. This one is *S. californica*, and like other goldenrods is a woody based perennial blooming in summer.



A close view of goldenrod flower heads shows that, despite their small size, they have both ray and disc flowers



Solidago spathulata is a low growing, matted plant found on coastal bluffs, while...



...a similarly low growing species, *S. multiradiata* or alpine goldenrod lives in the high mountains



Let's turn now to members of *Astereae* that feature contrasting colors of ray and disc flowers. The genus for which the tribe is named, *Aster*, is no longer maintained in California. Instead, species have been relegated to other genera. Here you see the alpine aster, now *Oreostemma alpigena*



Meanwhile the woodland aster has been moved to *Eurybia*, and is now known as *E. radulina*. This spreading ground cover grows in dry woods and blooms late, with modest flowers.



Most of the rest of the asters are *Symphyotrichum*, such as this coast aster, *S. chilensis*, not from Chile at all.



Coast aster blooms in summer. Note that most of the asters shown have few, rather coarse ray flowers.



The Delta aster, *S. lentus*, grows tall among the tules and cattails, also blooming in late summer.



The true daisies or fleabanes, *Erigeron*, have always been easily confused with the former asters. In general, erigerons have many narrow rays. Here you see the seaside daisy, *E. glaucus* growing on a coastal dune.



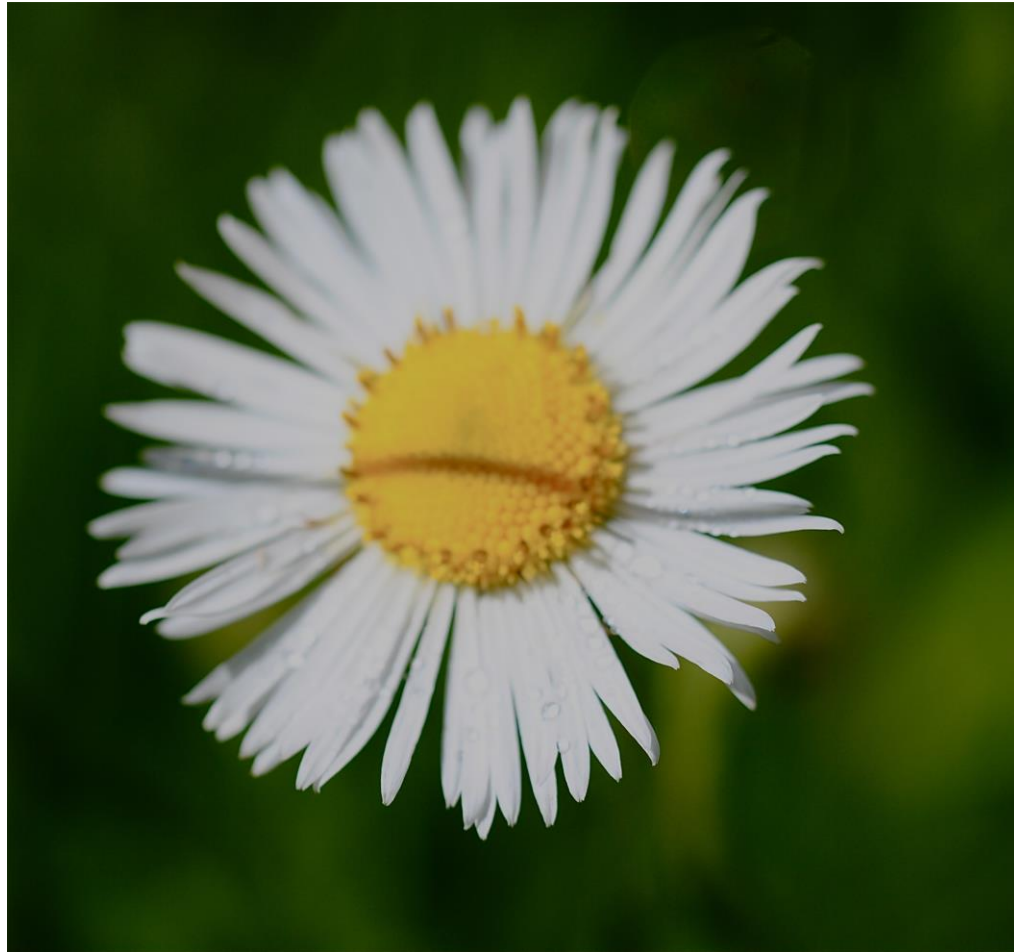
Here you see the multiple narrow rays typical of erigerons on the
seaside daisy



While many erigerons are perennial, the dry-growing *E. divergens* is an annual



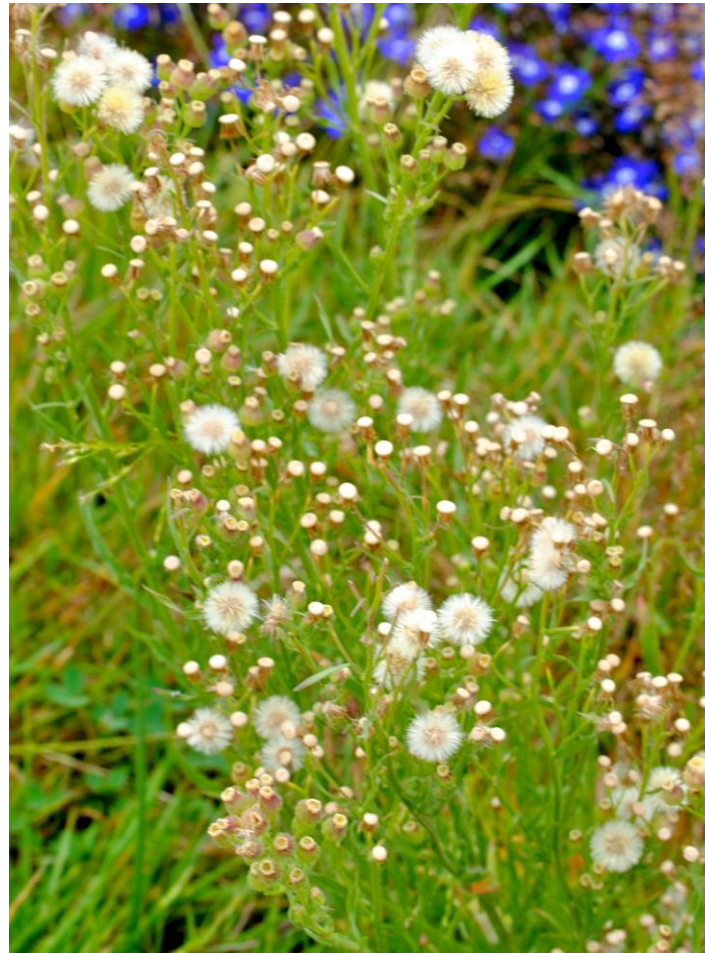
Many erigerons live in the mountains. Coulter's daisy, *E. coulteri*, grows in meadows and is recognized by its white rays.



By contrast, the alpine daisy, *E. compositus*, forms low mats on rocky scree often above timberline



One of our most common summer weeds, horseweed or *Conyza canadensis*, is now *Erigeron canadensis*. Despite the tiny flower heads, each head has white ray flowers



Another weed, the English daisy *Bellis perennis*, naturalizes along the coast. While looking like an *Erigeron*, it lacks an obvious pappus.



Several other members of the tribe are often called daisies or asters, such as this bluff aster, *Corethrogyne filaginifolia*.



Dune aster grows on coastal dunes and bluffs, and features tawny pappus hairs on its fruits.



Closely related to *Corethrogyne* is a group of annuals with only disc flowers in the genus *Lessingia*. This one is *L. leptoclada*, an annual abundant along roadsides in the Sierra



Another aster look alike is *Xylorhiza* such as this *X. cognata*. This desert genus consists of small shrubs and woody perennials with large flowers opening in spring. The genus name means woody root.



Finally, the genus *Baccharis* stands apart by having white, rayless flower heads that are unisexual, the male flowers on separate plants from the females. The most common is the nearly ubiquitous coyote bush, *B. pilularis*



The previous photo showed the female coyote bush in seed, here you see the male flowers. Note the yellow stamens



Most people don't realize we have several other species of *Baccharis*. This one is mule-fat, *B. salicifolia*, which grows in dry washes. It blooms in summer on branches with willowlike leaves



Still another species is the marsh baccharis, *B. douglasii*, which dies back every winter and forms large colonies.

