

**BRASSICACEAE: THE MUSTARD FAMILY  
(FORMERLY CRUCIFERAE)**

FAMILY OF VEGETABLES,  
MEDICINALS, AND ORNAMENTALS

The Brassicaceae is a well distributed family worldwide, with considerable diversity in temperate Eurasia and North America, California included.

- The family is adapted to a wide range of environmental conditions, including wetlands, disturbed habitats (many are weeds), foothills, high mountains, and deserts although few occur in marshes.
- The family is noted for its many vegetables in the genus *Brassica* including rutabagas and turnips, mustard, the various cole crops (cabbage, broccoli, cauliflower, brussel sprouts, and more)
- The family also is high in sulfurous compounds, some which are used medicinally
- Several ornamentals grow in California gardens, especially from Europe and the Mediterranean region

The Brassicaceae is easily identified in most cases, the only sometimes confusing related family being the Capparaceae or caper family

- Capers are distinguished by often being woody, having ill-smelling compound leaves, sometimes irregular flowers, and ovaries borne on long stalks (*stipes*)
- The floral pattern for the mustard family is 4 separate sepals and (clawed) petals; 6 stamens of two lengths; and a pistil with a superior ovary, single style, and sometimes lobed stigma
- The ovary develops into a capsulelike fruit of two kinds: the *siliqua* is long and slender, the *silicle* as broad as long. Shape and details of these seed pods are often useful in sorting out genera and even species

A cut-away view of a field mustard flower reveals the two lengths of stamens



This photo displays both fruit types, siliques on the left, and silicles on the right. This is the only family to have these kinds of seed pods



California is home to many species and genera, some introduced and often weedy, others native in a variety of habitats

- We'll start with the weeds, usually found in disturbed soils on road- and trailsides, pastures, gardens, and more, although a couple also occur in more natural habitats
- These weeds can be sorted into two groups: those with siliques and those with silicles
- Even though it seems inconvenient to wait for fruits to develop, the racemes of flowers often have several stages at the same time, and even the flowers display the shape of the ovary that later becomes the seed pod

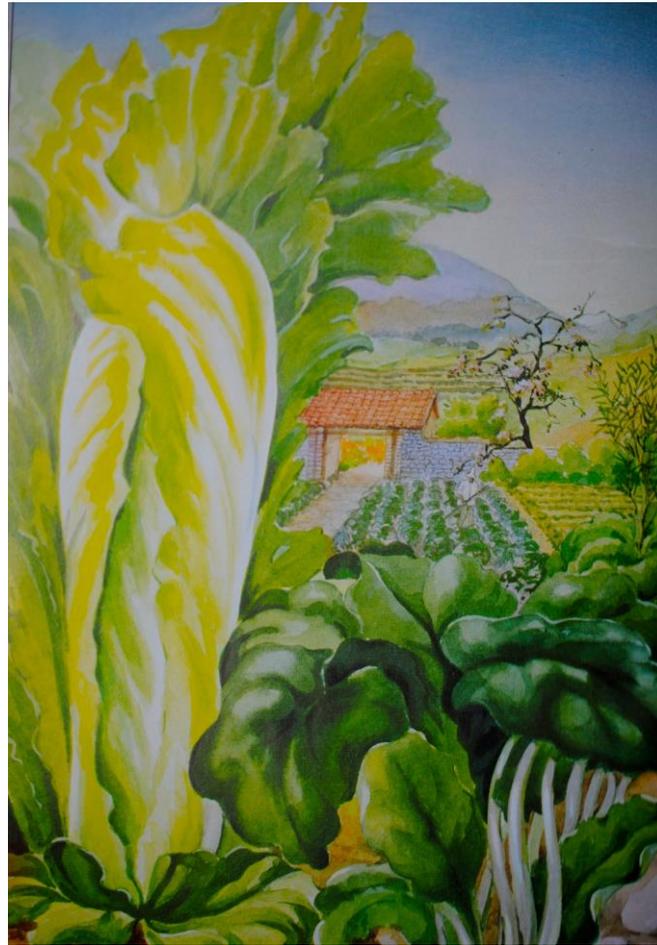
With siliques first, we'll look at two of the most widespread spring weeds, often coloring large fields. The first is the genus *Brassica*, easily identified by the bright yellow flowers. The most common is the field mustard, *B. rapa*



The cole vegetables belong to the species *B. oleracea*. Here you see the familiar head cabbage and the flowers of broccoli, both selections of that species.



*B. chinensis*, the Chinese cabbage, is another commonly used species for food



Another abundant spring weed is wild radish, *Raphanus sativa*, which is merely the cultivated radish gone wild. It often grows with field mustard.



This close view of wild radish flowers shows the 4 crosslike petals and stamens of different lengths, a sure sign it belongs to the Brassicaceae.



The wild radish has lost the fleshy taproot of the cultivated kind seen here. Instead, the flowers and seed pods of wild radish can be added to salads for their radish flavor.



The sea-rocket, *Cakile* spp., is a nonnative widespread on coastal dunes. Here you see the fleshy leaves and attractive purple flowers.



Sea-rocket shows a silique type seed pods, but with a difference. The rocket part or top 2/3 breaks off at maturity and is washed out to sea on high tides, carrying the pods a long ways, while the bottom part remains on the plant and restarts new plants where the parent grew.



One of the controversial plants is water-cress (*Nasturtium aquaticum*), the edible salad green that grows in wet ditches and sluggish streams. Sometimes considered native, the current idea is that it comes from Europe.



Besides its aquatic habitat and peppery flavor, watercress is identified by its pinnately compound leaves.



Two other nonnative weeds include *Isatis tinctoria* better known as woad, a plant producing a source of purple dye. It is prolific in the mountains in the Shasta area and features silicles in fruit.



The weed known as shepherd's purse, *Capsella bursa-pastoris*, is a small annual in disturbed grasslands with minute white flowers followed by triangular silicles, said to resemble an old time shepherd's purse.



One more nonnative from Europe is sweet alyssum (*Lobularia maritima*), a garden flower with headlike clusters of white or purple flowers and silicle seed pods that sometimes is “naturalized” along the coast



One more naturalized nonnative is the money plant, *Lunaria annua*, occasional in wooded areas. The ordinary purple flowers are followed by decorative seed pods that are translucent and look like coins.



Now let's turn to the natives, starting with those genera bearing slender siliques in fruit. Our first genus, *Stanleya* or prince's plume, is a desert perennial with long plumes of bright yellow flowers.



Prince's plume stands apart by having long stipes that carry the ovary, a feature resembling members of the caper family.

California has only 3 species.

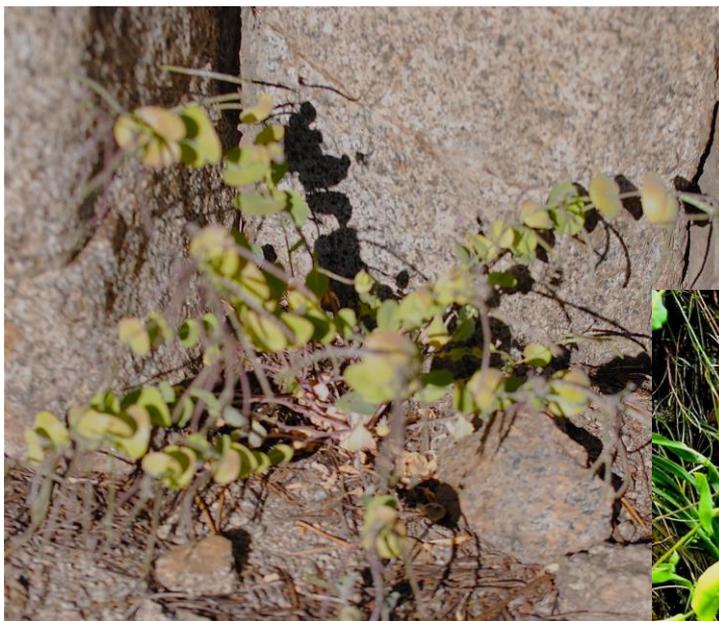


Our next group is distinguished by having crimped, somewhat irregular petals, a feature not found in most other Brassicaceae.

This group includes *Streptanthus* and *Caulanthus*, aka jewel flowers.

- The two genera differ in that *Streptanthus* seed pods are usually flattened while *Caulanthus* has cylindrical seed pods.
- While *Caulanthus* features only annuals, many of them from dry grasslands and deserts, *Streptanthus* has both annuals and perennials from a variety of dry, rocky habitats
- A few species of perennial *Streptanthus*, such as *S. tortuosus* (shield-leaf) are widespread, but most of the annual ones are restricted to serpentine-derived soils, some with a very restricted distribution

Shield-leaf occurs throughout the mountains on granite and other rocks, as well as in a few outposts in the Coast Ranges. Its upper leaves are yellow tinted and shield shaped, and the flowers are white to yellowish.



Here's a close view of *S. tortuosus* with pale yellow flowers showing the crimped petals and inflated sepals. This variety grows on volcanic rocks in the Sierra foothills.



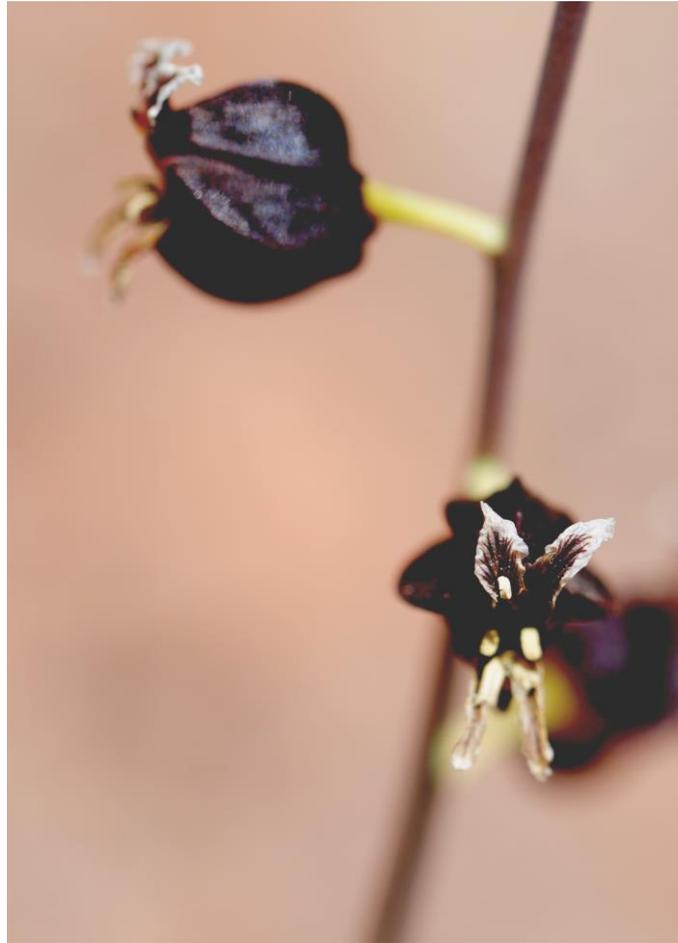
One of the rare perennial streptanthuses, is *S. barbatus* from the southern Klamath Mountains, featuring grayish leaves that look like strings of sea shells. The flowers are inconspicuous.



Brewer's jewelflower, *S. breweri*, is a relatively common annual on serpentine in central California. Note the inflated red-purple sepals, the sepals more conspicuous than the tiny white petals.



Another widespread serpentine species is *S. glandulosus*. Note the very dark sepals and tiny petals with a central purple stripe.



A narrow endemic jewelflower, *S. glandulosus niger*, is confined to serpentine on the east end of the Tiburon Peninsula in Marin County. The specific epithet refers to the near-black color of the sepals.



Another narrow endemic is *S. hispidus*, the Mt Diablo jewelflower found on loose rock scree with stiff hairs on leaves and stems and less inflated sepals.



*S. polygaloides*, difficult to photograph, grows on serpentine in the central and northern Sierra foothills. Its strange flowers feature sulfur yellow sepals.



From serpentine outcrops in the Southern Sierra comes *S. farnsworthianus*, whose main color comes not from flowers but from upper leaflike bracts colored bright purple. This plant and a few others are sometimes offered at Annie's Annuals.



A closer view of *S. farnsworthianus* showing long, arched seed pods with those purple bracts



Even less known in Northern California is the genus *Caulanthus*. Here you see *C. coulteri*, an annual from grassy areas in the Transverse Ranges. Note the dark purple buds at the tops of the flowering stalks.



The most distinctive of all of these “jewelflowers” is *C. inflatus*, aka desert candles, which occurs by the thousands on clay flats in the western Mojave Desert. The flowering stalks are inflated and carry red buds that open to pale cream colored flowers.



Returning now to more “normal” genera with siliques, we’ll start with the rock cresses in the genus *Arabis*. These are mostly rock-inhabiting perennials with matted leaves and racemes of white, pink, or purple flowers. Here you see *A. breweri*, widespread in rocky mountains at middle elevations.



A close view of Brewer's rockcress shows the 4 petals in a cross typical of the family. These beautiful gem is found on rock outcrops near the top of Mt. Diablo.



By contrast, the coast rock cress, *A. blepharophylla*, is restricted to rocky bluffs near the ocean in the Bay Area. So showy are its flowers, that it is widely offered for sale.



Besides flower size and color and distribution, rock cresses are identified by the position of their fruits. In coast rock cress, the siliques are stiffly upright.



By contrast, the attractive *A. pulchra* from rock outcrops in the southern Sierra has widely arching siliques. This species also has attractive flowers, but the majority of rock cresses have rather insignificant flowers for use in gardens.



*A. pulchra* showing the arching siliques



The genus *Barbarea*, winter cress, looks a lot like the nonnative brassicas but differs in leaf detail, the pinnately compound leaf with a large terminal leaflet. It grows in spring-moist places.



The common species seen here is *B. orthoceras*



Another native genus with (usually) yellow flowers is *Erysimum* or wallflower. Most species are biennial, starting their first year with a low rosette of leaves on a taproot.



*E. concinnum* is typical of coastal dunes and bluffs in the north Bay. It features fragrant cream colored flowers that open early in the year and makes an excellent garden plant.



Similar overall to *E. concinnum* is the rare and endangered Franciscan wallflower, *E. franciscanum*, which has pale yellow flowers that age white. It is found on San Bruno Mt. and is easy to grow in gardens.



From coastal prairies in Mendocino County comes *E. menziesii*, with large bright yellow flowers, again easy to grow in gardens.



This unusual wallflower, *E. suffrutescens*, comes from coastal Southern California. It has woody stems, may live more than 2 years, and readily reseeds as well as being a long bloomer in gardens.



While most wallflowers are coastal, *E. capitatum*, the foothill wallflower, occurs inland in oak woodlands, normally featuring orange flowers. A close relative, *E. perenne* lives in the higher mountains.



Here is the more usual orange form of foothill wallflower. As well, its flowering stalks may reach over 3 feet high making it a wonderful plant for dry shade.



The genus *Cardamine* has white to purplish flowers. Most are attractive perennials but there is one rather nasty annual, *C. oligosperma* or bitter-cress, that is the bane of gardeners. This is its leaf rosette.



Bitter-cress makes tiny, self-pollinated white flowers followed by seed pods that explode to shoot the seeds everywhere.



By contrast, *C. californica*, aka pepperroot or milkmaids, springs from a tuber and produces attractive flowers. Here you see the basal leaves.



In bloom, milkmaids usually has compound stem leaves as seen here.



Milkmaids produces showy white or purple tinted blossoms from winter into spring, and lives in forests and woodlands throughout the foothills.



Near the coast, milkmaids grows in coastal prairies, often providing the only early color.



Spear-pod, *Phoenicaulis cheiranthoides*, forms mats with bluish green leaves in rocky places in the high mountains, later producing pale purple flowers.



The signature feature of spear-pod is evident in the fruits, each fruit resembling a pointed spear.



Let's now take a look at genera with silicles, seed pods as broad as long. The lepidiums qualify, producing rounded but flattened seed pods with a notch at the tip. Here you see the desert alyssum, *L. fremontii*, a woody perennial with white flowers.



L. Displays large silicles. Here you can clearly see the notches in the silicles.



Yellow peppergrass, *L. flavum*, is an annual that likes alkaline soils in the low deserts. It too is native.



Some lepidiums like this *L.* are obnoxious nonnative weeds. This one invades salty soils in wetlands.



Another silicle genus is *Draba*, sometimes known as whitlow grass although it has no grasslike characteristics. Most drabas form tiny cushions in high mountain rock crevices, but this annual one, *D. verna*, grows in the foothills.



*Dithyrea californica*, the spectacle pod, is a desert annual on sand dunes with fragrant white flowers and double silicles that resemble a pair of spectacles.



*Thlaspi alpestre* is a small perennial from rocky mountain areas with white flowers followed by rounded silicles.



Perhaps the most distinctive silicles of all belong to *Thysanocarpus*, aka fringe or lace-pod, with circular silicles surrounded by a lacy or crimped border



Here is a closer view of the silicles. The flowers, by contrast, are tiny white, self-pollinated, and the plants are seldom noticed until the fruits develop.



As you can see the Brassicaceae grows in many places but sometimes the flowers are so small that they make insignificant plants for the garden.

- The most attractive species are the wallflowers, *Erysimum*,
- *Arabis blepharophylla* and *A. breweri* (and a handful of others not well known), and...
- The milkmaids
- A few others are sometimes available such as various jewelflowers as well as desert candle (Annie's Annuals) and lacepods (again Annie's Annuals), but...
- A few more like the prince's plumes await a garden trial.