

POLYGONACEAE, THE BUCKWHEAT FAMILY

A FAMILY OF MINOR ECONOMIC
IMPORTANCE BUT PROMINENTLY
REPRESENTED IN WESTERN NORTH
AMERICA

The Polygonaceae, a family centered on the Northern Hemisphere, has two major subfamilies described farther on

- The family is found in a wide range of habitats, with most of the Californians adapted to our summer-dry Mediterranean climate
- The main subfamily has certain classical features not shared with the predominantly Western-North-American subfamily
- The family consists of annuals, perennials, and small shrubs, some of which are subtropical
- The leaves are universally simple and untoothed
- The main subfamily features *ochrea* at the base of the leaves, sheath-forming, papery stipules, while the other subfamily lacks this feature

The floral features of Polygonaceae are fairly straightforward

- The individual flowers are tiny with tepals (not separate sepals and petals) in white, pink, red or yellow
- The flowers are usually arranged into complex clusters such as spikes, racemes, panicles, and heads
- The stamens are often in multiples of 3,
- The single superior ovary is (mostly) 3-sided, and ripens into a hard, one-seeded achene

We'll start with the genera whose leaves have ochrea. The (formerly) largest of these is *Polygonum* or knotweed, which has now been split into several genera.

- This large, diverse genus has flower parts in 4s and 5s, and ranges from tiny annuals to giant perennials that live in sand dunes, dry mountains, marshes, wet meadows, and more
- The flowers are either white, pink, or rose colored
- The native species mostly fall out into three genera:
- *Bistorta* (single species) with leaves all basal and flowers in a long spike;
- *Persicaria* (several species) with leaves on the stems, ochrea that are opaque and simple, and plants the mostly live in wetlands, and...
- *Polygonum* (several species) similar to the persicarias except the ochrea are translucent and 2 lobed, and the plants live in mostly dry habitats

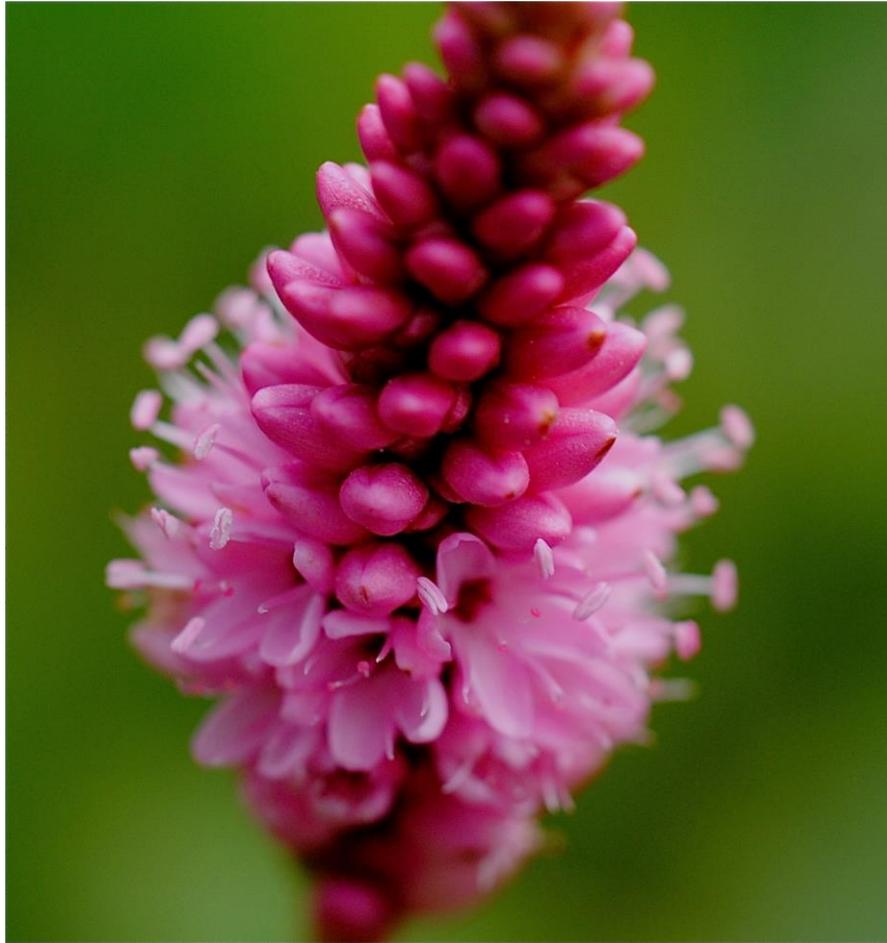
California has a single species of *Bistorta*, *B. bistortoides*, aka bistort, a lover of wet mountain meadows. It is abundant where it occurs, and features narrow spikes of white flowers



Persicaria amphibia, the floating bistort, lives in quiet marshes and lakes and sports bright pink flowers in summer



A close view of *P. amphibia* flowers showing the pink tepals



Many of the other aquatic persicarias like this *P. hydropiperoides* look similar and feature white to palest pink flowers.



Here you see the characteristic ochrea on *P. hydropiperoides*
stem



Polygonum paronychia, the dune knotweed, is a creeping perennial with clusters of white flowers in summer. Note the narrow leaves



The flowers of dune knotweed



Another typical knotweed is *Polygonum minimum*, a tiny annual on rocky outcrops in the mountains



The genus *Oxyria* has one circumboreal species, *O. digyna* or mountain sorrel, an exception to the family for having a 2-sided ovary rather than 3. Note the kidney-shaped leaves and the habitat in mountain rock crevices



By contrast, the sorrels and docks in the genus *Rumex* look similar but have 3-sided ovaries. They are also distinctive in having 6 tepals, 3 of which form wings around the achene in the fruiting stage

- The docks are a varied group of annuals and perennials, with mostly ovate and elliptical leaves, a high content of tannins and oxalic acid, and...
- Many with a stout taproot from Europe that make pesky garden weeds as well as...
- Several natives that live in wetlands or on sand dunes near the coast

Curly dock, *Rumex crispus*, is among the most abundant weedy docks, the fruits turning bronze when ripe



The immature fruits of curly dock showy the enlarged sepals, each with a *callosity* or wartlike structure



Another pernicious weed is sheep sorrel, *R. acetosella*, whose panicles of red-tinted fruits are easy to recognize



Sheep sorrel also has characteristic, arrowhead-shaped leaves



Two native docks include *R. salicifolius* or willow-leaved dock, a sprawling perennial especially common on coastal sand dunes near wet places. Note the bright red fruits



By contrast, the western dock, *R. occidentalis*, is a giant perennial found in wetlands with very large red-tinted fruits



Canaigre or desert dock, *R. hymenosepalus*, is another native perennial found on desert dunes. In fruit, the branched spikes display bright red fruits



One of the economically useful genera is *Rheum* or rhubarb from northern Eurasia with gigantic leaves and panicles of whitish flowers. The leaf stalk but *not* the blade is edible when cooked.



The mattress vine, *Muhlenbeckia axillaris*, is a sprawling woody shrub from New Zealand, whose exuberance may cause it to smother plants it's growing over. The tiny flowers are white.



One of the seldom known genera is *Coccoloba uvifera* or sea-grape, an evergreen shrub whose flowers ripen into purple, edible, grapelike fruits. It is tropical in origin.



Finally, the world-renowned edible buckwheat from northern Eurasia, *Fagopyrum esculentum*, is a perennial with white flowers. It is not to be confused with our native buckwheats in the genus *Eriogonum*



So far, all of our examples are in the main subfamily and feature ochrea. The Western North American subfamily, by contrast, lacks ochrea and is the most prominent in California.

- The most outstanding genus is *Eriogonum* or wild buckwheat, which contains hundreds of species, many with ornamental qualities for a dry garden
- There are several other less commonly talked about and seldom cultivated genera, including...
- *Chorizanthe* or spine flower,
- *Oxytheca* (no well established common name),
- *Gilmania lutea* or desert gold, a rare annual, and...
- *Dedeckera eurekaensis* or goldbush, a rare woody perennial from the White Mountains

The chorizanthes or spine flowers have a basal rosette of leaves much like some of the eriogonums, but the flower is enclosed in a vase-shaped involucre of bracts which bear spiny tips. Here you see the local spineflower, *C. cuspidata* from coastal dunes



Here you see a close view of *C. cuspidata* flowers. The tepals are white and petal like but the involucrel bracts are narrow and spiny



Chorizanthe membranacea is another local species, abundant on rocky slopes on Mt. Diablo. It features pale pink flowers in late spring.



The dried flower heads of *C. membranacea* display the papery spine-tipped involucre



The viciously spiny *C. rigida* has a conspicuous bright green involucre around minute green flowers. It is one of many desert species of spine flower



Oxytheca is another genus of desert annuals. *O. perfoliata* features pairs of spine-tipped leaves around the stems making it easy to identify even in the dried up stage.



The tiny annual, *Gilmania luteola*, is mostly restricted to Death Valley and only appears in years of abundant rains. Note the round leaves and tiny starlike yellow flowers



The small shrubby July gold, *Dedeckera eurekaensis*, is restricted to limestone soils near the White Mountains



July gold has flowers similar to the wild buckwheats, but...



The genus *Eriogonum* contains over 100 species in California. The genus is found from seashore to timberline and out onto the deserts

- Eriogonums are identified by the tiny yellow, white, pink, or red flowers being clustered inside *involucre*s, bracts that are fused into a cup or vase shape
- Eriogonum foliage is often spatula shaped but there are several exceptions
- Eriogonums range from tiny annuals to matted and upright perennials as well as small shrubs

Eriogonums make excellent plants for the native garden and can be used as fillers, rock garden plants, container plants, and plants for dry borders

- Eriogonums are usually propagated from seed collected in summer and fall, although a few also develop roots from cuttings
- Eriogonums prefer full sun, well drained soils (essential), and little summer water when established
- Many species are available from native nurseries, the majority perennials and shrubs
- The annuals and matted perennials are difficult to find

We'll now sample members of these four groups, starting with annuals with ribbed, sessile involucre. The majority of these are desert annuals. A good hand lens or microscope is necessary

- Some of the lead features to look for in this group include
- Whether the flowers are hairy or glabrous
- Whether the outer tepals are fan or arrowhead shaped or not
- The shape of the leaf blades

E. caninum is a typical member of this group, a late-blooming tiny annual found mostly on serpentine soils in the North Bay.



Often, *E. caninum* is considered a variety of the more widespread, yellow-flowered *E. luteolum*, the specific epithet meaning yellowish



Many of the other group 1 species are uncommon. Group 2, annuals with a smooth involucre, has several common examples including *E. parishii*



Parish's buckwheat, from the foothills of the southern Sierra, features rosettes of spoon-shaped leaves,

- Tiny white flowers arranged in highly branched, treelike inflorescences,
- Which, when dry turn to a brilliant red making the skeleton of the plant showier than the living plant

E. rixfordii, the pagoda buckwheat is so named because of its pagodalike tiers of branches in the inflorescence



The humble buckwheat, *E. pusillum*, has tiny yellow flowers that make a show only due to their sheer numbers. These were photographed in Joshua Tree National Park growing with chia



E. reniforme, the kidney-leaved buckwheat also features a highly branched, treelike inflorescence and distinctive kidney-shaped leaves



The common desert trumpet, *E. inflatum*, leaves behind a skeleton with inflated stems. Contrary to what seems likely, these stems are hollow but don't hold water



Desert trumpet flowers are tiny, yellow, and starlike in shape



The spurrey buckwheat, *E. spergulinum*, is a common ephemeral annual on rocky slopes in the mountains



These were a few examples of groups 1 and 2, species that are seldom grown in gardens but prominent in dry habitats

- Group 3 features a wide range of perennial species with that special stipelike base to the flower. This can be seen under magnification as a joint separating the perianth tube from the stipe below it.
- This group is also noted for having flowers in large, umbel-like clusters
- Perhaps the most widespread and highly variable species of the group is the colorful sulfur buckwheat, *E. umbellatum*

This close-up of *E. siskiyouense* flowers clearly shows the greenish stipe below the pale yellow flower tube, the feature that distinguishes this group



E. umbellatum grows in rocky scree and slopes from as low as 3,000 feet on Mt. Diablo to above timberline. Here you see a population at Cook and Green Pass in the Siskiyou Mountains



Many buckwheat flowers turn shades of bronze and red in fruit but perhaps none are more striking than *E. umbellatum*. This form occurs on the top of Mt. Diablo



E. umbellatum sometimes forms matted clumps as seen here, often with woolly, gray leaves



Or it may form more upright stems with less gray foliage as seen in this form from the foothills of the White Mountains



Often confused with *E. umbellatum* is *E. marifolium*, a species often found in the same habitats. It can be told by the less intensely yellow, unisexual flowers



The Bear Valley buckwheat, *E. ursinum*, also resembles *E. umbellatum* in habit and habitat but has whitish to pink-tinted flowers instead



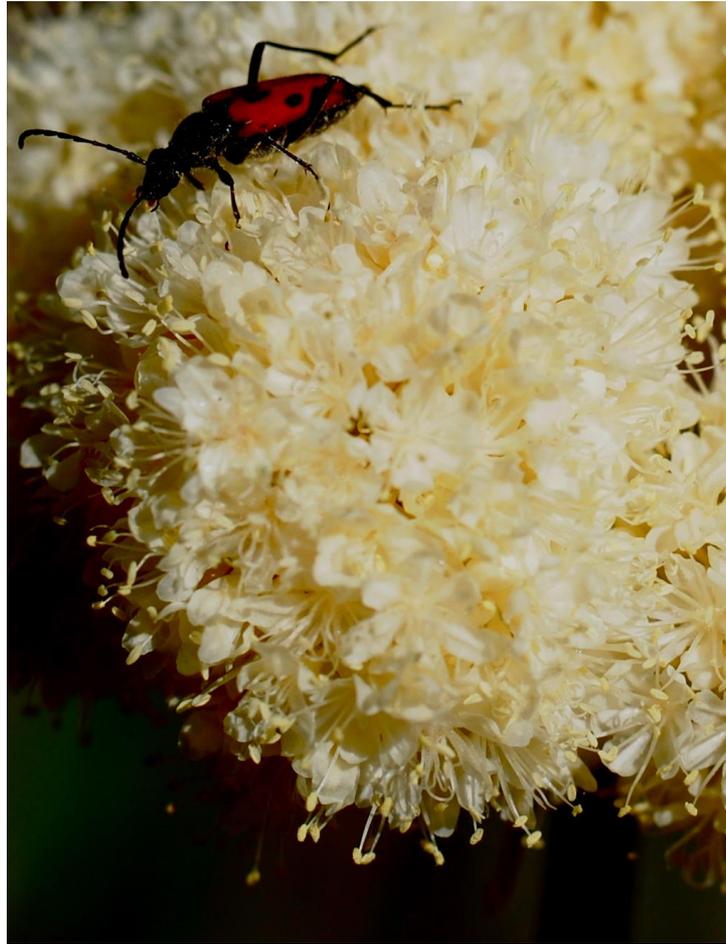
E. ursinum is also distinguished by having leaves that turn deep red in the winter, when conditions have turned cold



E. compositum (arrow-leaf buckwheat) is a bigger, bolder plant with stems up to 3 feet tall and large clusters of white to pale yellow flowers



Like other buckwheats, *E. compositum* flowers lure a wide array of pollinators such as this beetle. Arrow-leaf buckwheat lives in the northern mountains.



E. compositum also comes in a pale yellow form. The two colors often grow intermixed.



The Shasta buckwheat (*E. pyrolifolium*) features bright green leaves that are shaped like some pyrolas (wild wintergreens) and



And short stems with white flowers. Note the dark red anthers. This species is seldom cultivated.



One of the rare species from this group is the alpine buckwheat, *E. alpinum*, found on serpentine scree on Mt. Eddy west of Mt. Shasta



Group 4, the perennials without a stipe at the base of the flower, comprise the largest group of buckwheats grown in California gardens

- This group consists of 4 distinctive sections
- The first has two unusual species that don't fit completely into either group 3 or 4. The main garden species here is the Conejo buckwheat, *E. crocatum*
- The second group contains mat- or cushion-forming plants, often with the flowers in ball-like heads
- The third group consists of truly shrubby species
- The fourth group has flowers in arrangements other than umbels or heads

The Conejo or saffron buckwheat, *E. crocatum*, is a narrow endemic near Conejo Pass on Hwy 101 going into L.A.



Long blooming and with silvery leaves, Conejo buckwheat offers one of the best contrasts between leaves and flowers



E. saxatile, the rock buckwheat, true to its name, grows in exposed rocky places in central and southern California. Its flowers are white to cream colored



Our second section of group 4 features some alpines with very tight mats of woolly leaves and flowers raised on short stalks. Most of these are difficult to grow in Bay Area gardens

- The two most characteristic of these is the alpine buckwheat, *E. ovalifolium*, that comes in several color forms and varieties and
- *E. gracilipes*, the ruby buckwheat from the White Mountains in bristlecone pine country

The following are images of different forms of *E. ovalifolium*. Here is a plain white form. Notice how dense the leaf mats are.



Some, like this *E. ovalifolium* feature flowers that change color as they age



Still other forms of *E. ovalifolium* have soft yellow flowers



E. gracilipes from the White Mountains looks similar but has flowers whose tepals are all alike, while in *E. ovalifolium* they have different shapes. Colors of the species range from pale, as seen here, to



A deep ruby red. Unfortunately, this species appears difficult to grow.



Another cluster of buckwheats from group 4 includes species with spoon-shaped leaves in rosettes or along stems and globe-shaped heads of flowers carried on long, usually branched stalks

- Many of these are widely available and easy to grow in gardens. The main species here look similar
- *E. grande rubescens* (rose buckwheat) is an island endemic with pale to deep rose-red flowers and favors coastal bluffs and sand dunes
- *E. latifolium* (coast buckwheat) is a highly branched, low-growing plant with near-white to deep rose flowers, and
- *E. nudum* (naked stem buckwheat) is a highly variable species found throughout the dry hills and mountains with white, yellow, or pink flowers.

Here is an old sprawling clump of rose buckwheat in its sand dune habitat on Santa Cruz Island



Rose buckwheat can make a spectacular container plant as seen here



Coast buckwheat on a sand dune at Abbott's Lagoon,
Pt. Reyes. This form has rather pale, washed out
flowers



By contrast, deep rose forms of coast buckwheat grow along Humboldt Bay near Eureka



Both forms of coast buckwheat fade to a beautiful rust color



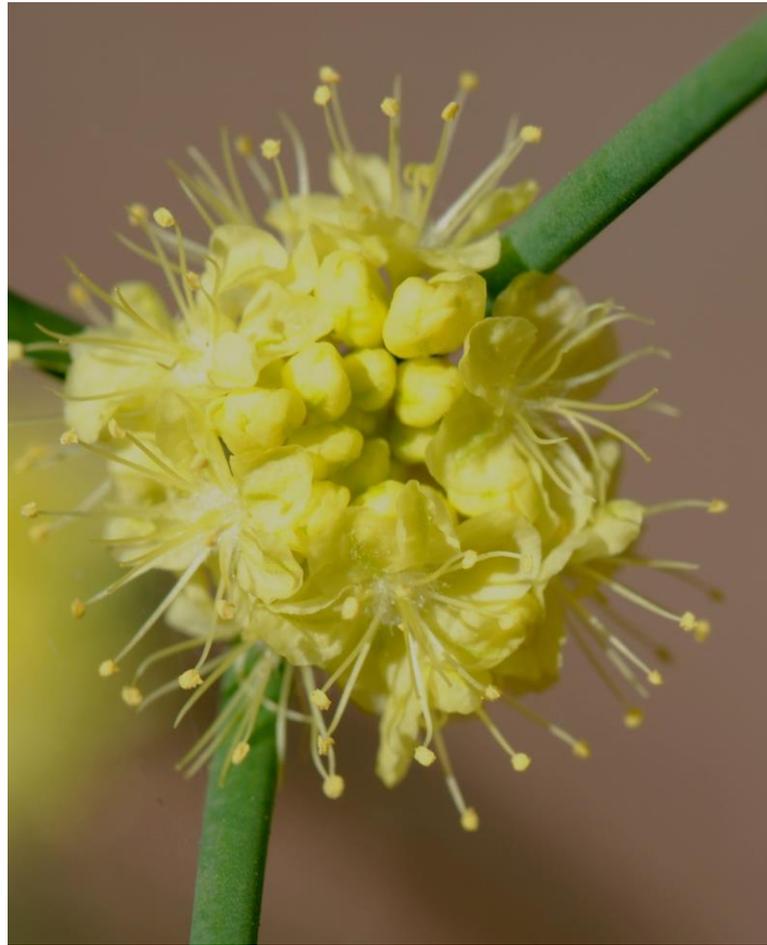
Typical local forms of naked buckwheat are white and not showy unless massed.



However, scattered individuals display pink-tinted flowers and



And forms from the Sierra and northern corner of the state bear lovely yellow flowers



Still another cluster of species from group 4 features flowers spread out along stems rather than in a headlike arrangement

- Prominent species here include *E. elongatum* (wand buckwheat)
- *E. heermanii* (Heerman's buckwheat)
- *E. wrightii* (Wright's buckwheat),
- *E. microthecum* (no common name), and
- *E. plumatella* (feather or plumed buckwheat)
- Some these are cultivated but they're not usually available

Heerman's buckwheat forms low rounded mounds several feet across in age, growing in rocky places in the White Mountains and covered in white flowers



Special to Heerman's buckwheat are the widely diverging, often dichotomous branches seen here



The plumed buckwheat, *E. plumatella*, has dramatic, narrow branched plumes of flowers



E. microthecum from the dry slopes of the eastern Sierra, splays flat-topped cymes above the branched stems. Some forms have snowy white flowers while



Others feature golden yellow flowers



Wright's buckwheat resembles the mat formers shown earlier. The dense silvery mats form large crowns on steep slopes, mostly in the high mountains, but the ones pictured here grow along the Mines Road.



Wright's buckwheat is not very showy in flower because the flowers are borne in narrow spikes and are often white or very pale pink.



Our third group of wild buckwheats are the shrubby kinds, some growing to 8 feet tall.

- While two of the shrubs grow on the mainland, two are restricted to the Channel islands off the Southern California coast
- *E. parvifolium*, the little-leaf buckwheat is common in the central coast
- *E. fasciculatum*, with clusters of narrow leaves, the so-called California buckwheat, is widespread in dry mountains from central California south
- *E. arborescens*, is confined to Santa Cruz Island, and...
- *E. giganteum*, St. Catherine's lace, is endemic to Catalina Island

California or flat-top buckwheat features numerous branches with clusters of narrow, almost needlelike leaves and open cymes of white or pale pink flowers



California buckwheat is widely distributed in dry areas of the foothills and desert mountains. Here you see the flowers rising above competing shrubs in my garden



California buckwheat is another species with beautiful rust-colored dried flowers so that even in winter it adds drama to a garden



Little-leaf buckwheat from the central coast forms billowy mounds with pale pink flowers and small leaves borne all along the stems



Here is a closer view of the leaves and flowers of little-leaf buckwheat



Endemic to Santa Cruz Island, *E. arborescens* forms a mounded shrub to 3 or 4 feet tall with broad clusters of white flowers that fade russet. Note the narrow leaves



Here are two color forms of Santa Cruz Island buckwheat, the norm being white.



In flower or fruit, St. Catherine's lace (*E. giganteum*) is dramatic, growing up to 8 feet tall and with a broad spread



Here is a close view of the flowers of St Catherine's lace and



Here are the beautiful, broad, gray leaves



Although this ends our slide show, there are many other beautiful and garden-worthy buckwheats awaiting trial

- Some are doubtless difficult to grow, particularly the mat formers from high mountains,
- While others such as the annuals need to be reseeded each year and feature tiny flowers
- Hopefully, as you continue with this awesome group, you'll discover other species that deserve a place in your garden.