



California's Wild Buckwheats *by J. Travis Columbus*

WILD BUCKWHEATS, members of the genus *Eriogonum*, are one of the most diverse, widespread, and recognizable plant groups in California. Native Americans utilized these plants in various ways, including as food. However, wild buckwheats should not be confused with common buckwheat (*Fagopyrum esculentum*) which, though a member of the same family (the buckwheat or knotweed family, Polygonaceae), is a species from Asia. Common buckwheat is cultivated worldwide for its carbohydrate-rich, gluten-free seeds used in foods such as noodles and pancakes. And despite their name and grain-like seeds, buckwheats are not closely related to grasses (Poaceae); their one-seeded fruits are technically achenes, not grains.

California is home to 119 species of wild buckwheats, and, adding scientific varieties, there are 215 species and varieties in the state.

Only sedges (the genus *Carex*) are represented by more species. Although wild buckwheats are widely distributed in North America, including Canada and Mexico, they are by far most diverse in the western United States. In all, there are 252 species of wild buckwheats and an astounding 445 species plus varieties. The wide-ranging sulfur flower buckwheat (*E. umbellatum*) has 41 varieties alone, 25 in California!

Despite their relatively small flowers, usually less than one quarter of an inch across, wild buckwheats can be showy. The flowers have three sepals and three petals. Because the sepals are similar to the petals in color and size, the two are collectively referred to as tepals (outer and inner, respectively). At maturity, the six tepals envelop the fruit and together they fall from the plant.

As in the sunflower family (Asteraceae), the



ABOVE TOP: A flower of short-stemmed bastard sage (*Eriogonum wrightii* var. *subscaposum*) with its six white tepals.

• ABOVE BOTTOM: Naked buckwheat (*Eriogonum nudum*) showing a cluster of three involucres of flowers at different developmental stages. YELLOW ARROW: involucre. RED ARROW: young flower buds. WHITE ARROW: open flowers.



LEFT: Sierra Nevada sulfur flower (*Eriogonum umbellatum* var. *furcosum*), Plumas County.

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Lobb's buckwheat (*Eriogonum lobbii*) near Koip Peak. Photo by Michael Uhler.

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small flowers are aggregated into groups, and beneath (subtending) each group is an involucre. Involucres of wild buckwheats are formed of multiple bracts (reduced leaves) and are cuplike. During a growing season, plants of most species develop many (sometimes hundreds of) involucres of flowers. Depending on the species, the number of flowers per involucre varies from a few to many dozens. Involucres bearing many flowers can resemble pom-poms, as in sulfur flower buckwheat.

How the involucres are arranged on the plant varies greatly across the wild buckwheats. In some species the involucres are closely grouped, resulting in larger clusters of flowers. In other species, for example desert trumpet (*E. inflatum*) and Thurber's buckwheat (*E. thurberi*), the relatively small involucres are not clustered but instead solitary at the ends of lengthy, often threadlike stems (peduncles), which render the flowering portion of the plant open and diffuse. And in yet other species, the involucres, whether grouped or not, are stalkless (sessile) and attached directly to branches, as in wand buckwheat (*E. roseum*).

Flower color varies appreciably in wild buckwheats and is commonly white, pink, cream, yellow, orange, or red. Color usually changes as an individual flower develops from bud to fruit, such as from yellow when flowering to orange in fruit. As well, populations of some species differ in color, which is well known in naked buckwheat (*E. nudum*) and sulfur flower buckwheat. In addition to featuring clusters of flowers with a range of colors, wild buckwheats can flower over long periods. This is because the involucres on a plant are at different developmental stages, and also because the flowers within an involucre do not mature simultaneously but instead develop sequentially, with subsets of flowers open at different times.

Flowers of wild buckwheat species attract an array of insects, including butterflies, moths, bees, flies, wasps, beetles, and ants. Commonly, multiple kinds of insects can be observed visiting flowers of a single plant or population. However, as is true for most plant species, our knowledge is quite deficient as to which insect groups or species visit the flowers of particular species of wild buckwheat. And we know even less about insect larvae that can feed on wild buckwheats. One exception is seaciff buckwheat (*E. parvifolium*), which is the obligate host for the

federally endangered El Segundo blue butterfly. The larvae feed on the foliage and the adults drink nectar from the flowers. Much research is needed to better understand plant-insect interactions in the wild buckwheats.

In addition to differences in flower arrangement and color, wild buckwheats vary in lifespan and growth form. Annuals make up nearly half (54) of the 119 species in California. Many of the annual species germinate in response to winter rains and will flower well into the summer or fall, months after the last rainfall. It is not known what physiological adaptation(s) enable these shallowly rooted plants to survive and flower long into the hot summer in the absence of precipitation. A possible developmental adaptation the annuals share, however, is the production of a basal rosette of short-lived leaves. After formation of the flowering shoots, these leaves usually begin to senesce, well before the plant completes its life cycle. The basal leaves may optimize photosynthesis during plant establishment, when water availability is relatively high. Later, as precipitation diminishes and temperatures rise, these leaves may become a liability due to excessive water loss. As the leaves senesce, photosynthesis shifts to the green, cylindrical stems of the flowering shoots, which have a lower surface-to-volume ratio that can minimize water loss. Many annual wild buckwheat species lack well-developed leaves besides those of the basal rosette, relying on the stems and bracts for photosynthesis after the basal leaves wither.

Of the 65 perennial species of wild buckwheat in California, most (44) are classified as herbs and the remainder (21) are shrubs or subshrubs. One of the most widespread and recognizable shrubs is California buckwheat (*E. fasciculatum*), which has white flowers and can be locally dominant. Many perennial species, whether herbaceous or woody, have a mat-like growth form. In these, the flowers, which are arranged in solitary or clustered involucres, are often projected above the vegetative mat by a leafless stem termed



Thurber's buckwheat (*Eriogonum thurberi*), an annual species with solitary involucres at the ends of lengthy stems (peduncles).



Wand buckwheat (*Eriogonum roseum*) showing three stalkless involucres of flowers attached directly to a branch, the uppermost terminating the branch.



ABOVE: Breedlove's buckwheat (*Eriogonum breedlovei* var. *breedlovei*), endemic to the Piute Mountains, Kern County, with its mat-like, scapose growth form. • RIGHT: Mojave Desert California buckwheat (*Eriogonum fasciculatum* var. *polifolium*), San Gabriel Mountains, Los Angeles County.



a scape. We refer to such plants as scapose.

From seaside to the high Sierra Nevada and the deserts beyond, wild buckwheats are found throughout California at all elevations and in a variety of settings. They prefer open, relatively dry habitats, including gaps in forests. Although California buckwheat, naked buckwheat, sulfur flower buckwheat, and other species are broadly distributed, the ranges of most species are much smaller. Examples of narrowly restricted species are Barron's buckwheat (*E. spectabile*) in the southern Cascade Range, Butterworth's buckwheat (*E. butterworthianum*) in the Santa Lucia Range, and Thorne's buckwheat (*E. thornei*) in the New York Mountains of the Mojave Desert. In fact, these three species are among the 48 species endemic to California, not known from outside the state. Forty-eight species means 40% of all wild buckwheat species in the state are found nowhere else. Adding endemic

varieties, the total jumps to 106, or 49% of all species plus varieties!

One reason many wild buckwheat species have small ranges is that they are restricted to uncommon soil types. Thorne's buckwheat is known from copper-rich soils on a single ridge. A number of species are calciphytes (also calcicoles, calciphiles), plants that grow only on calcareous soils derived from limestone and other carbonate sedimentary rocks. Two such species are Tehachapi buckwheat (*E. callistum*) in the Tehachapi Mountains and jointed buckwheat (*E. intrafractum*) in the mountains surrounding Death Valley, both endemic to California.

Serpentine soils are especially well known to harbor rare plants, including numerous species and varieties of wild buckwheats. Serpentine is

patchily distributed from the western Transverse Ranges northward into Oregon, with its greatest extent in the Klamath Mountains. Because these soils are low in nutrients and high in toxic heavy metals, most plants cannot grow on them. However, around 20 species and varieties of wild buckwheats, three-fourths of which are endemic to California, are entirely or mostly restricted to serpentine. As well, other wild buckwheat species have some populations that are adapted to these soils. Examples of serpentine endemics that are also California endemics are The Cedars buckwheat (*E. cedrorum*) and Snow Mountain buckwheat (*E. nervulosum*) in the North Coast Ranges, and Trinity buckwheat (*E. alpinum*) and Klamath Mountain buckwheat (*E. hirtellum*) in the Klamath Mountains. How various plant lineages and species have adapted to survive and reproduce on serpentine soils is an open question, and much research lies ahead. In California and elsewhere in the western United States, it is interesting that numerous wild buckwheat species are restricted to inhospitable soils of various compositions and textures. These habitats are typically characterized by low plant diversity and cover, with a lot of bare ground. The capacity for wild buckwheats to adapt and speciate on these soils doubtless contributes to the large number of species and varieties in the genus.

Many wild buckwheats are rare, including soil specialists with limited distributions. Currently, an alarming 91 species and varieties are listed in the California Native Plant Society (CNPS) *Rare Plant Inventory* (2022). This represents 42% of all wild buckwheat species and varieties in California. Fortunately, no species or varieties are known to be extinct (CNPS rank 1A). However, 54 are categorized as rare, endangered, or threatened throughout their ranges (rank 1B). Of these, 15 are seriously threatened (rank 1B.1), including the sole species in the state designated as federally endangered, *E. apricum*, and both of its varieties, Ione buckwheat (var. *apricum*) and Irish Hill buckwheat (var. *prostratum*). The species and both varieties occupy a small area in the Sierra Nevada foothills near Sacramento. Cushenbury buckwheat (*E. ovalifolium* var. *vineum*) is a buckwheat variety that is likewise federally endangered. Plants of this variety grow on calcareous soils in the northeastern San Bernardino Mountains.

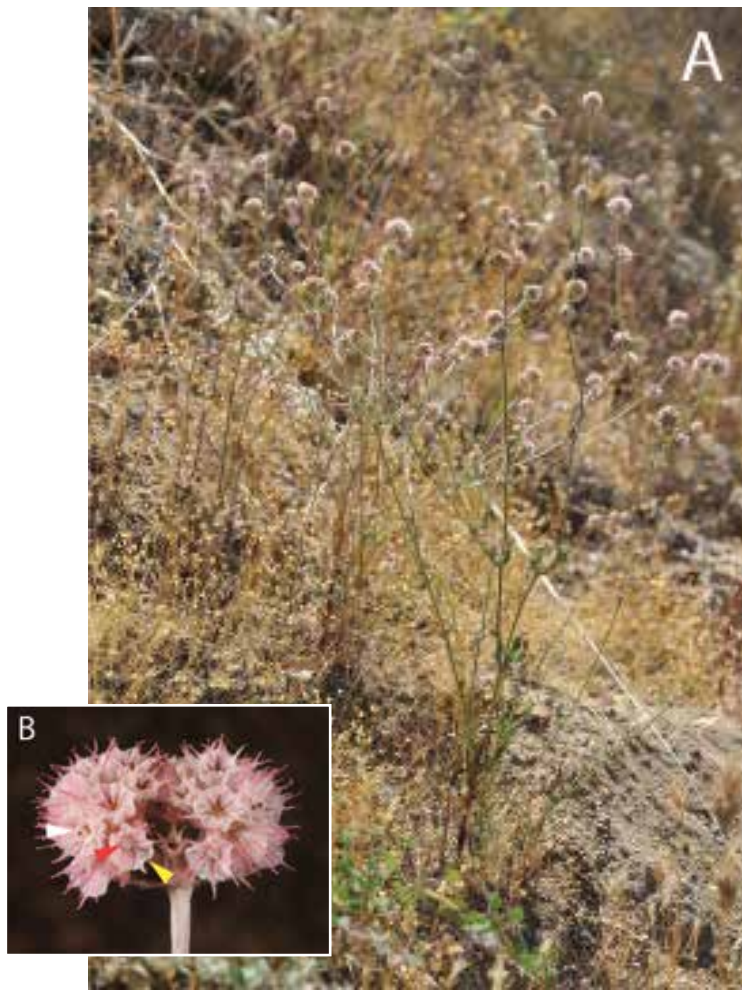
Given the remarkable diversity of wild buckwheats, what do we know about their

evolution, especially how the species are related? The modern approach to revealing relationships among organisms is to sequence and analyze DNA. Thanks to a handful of such studies over the past decade, along with ongoing research, we are gaining a better understanding of the diversification of wild buckwheats. All of the studies, based on different DNA data sets and analytical methods, arrive at the same conclusion: *Eriogonum*, the wild buckwheat genus, is not a single lineage, but several (Sanchez and Kron 2008; Grady 2012; Kempton 2012; Kostikova et al. 2013, 2014a, 2014b; Pearman et al. 2021). Expressed another way, some wild buckwheat lineages and species are more closely related to other genera than to other buckwheats. In order to understand the evolution of wild buckwheats, their close relatives must be taken into account. The following expands on this.

Eriogonum is classified in tribe Eriogoneae (in plant classification, tribe is a category between family and genus). It is by far the largest genus in terms of number of species. In all, 20 genera make up the tribe, although two genera are sometimes placed in a separate tribe (Pterostegieae) and each has but one species, the widespread woodland threadstem (*Pterostegia drymarioides*) and the Baja California endemic rabbit's purse (*Harfordia macroptera*). Eighteen of the 20 genera occur in California, and eight are endemic. In number of species, the wild buckwheats (*Eriogonum*) and spineflowers (*Chorizanthe*) dominate the tribe. The other 18 genera are small, together representing only 25 species, or 7% of the total diversity.

Except for golden carpet (*Gilmania*, with one species, *G. luteola*), all genera and species in the tribe are distinguished in part from other members of the buckwheat family by having involucre bracts below the flowers, these forming a cuplike involucre in wild buckwheats and most relatives. Differences in the involucre bracts have been used, in turn, by taxonomists to establish or delimit the various genera.

Unlike wild buckwheats, nearly all other species in the tribe have projections arising from the involucre bracts. These projections vary considerably in form, though in most species they are needlelike (sometimes hooked) and called awns. This includes all species in the second-largest genus, *Chorizanthe*, the spineflowers. Thirty-five of the 63 spineflower species occur in California, and 26 are endemic. Interestingly,



TOP AND INSET: Pink spineflower (*Chorizanthe membranacea*) showing multiple plants (A) and densely clustered, petal-like involucre bearing hooked awns (B). In this species there is usually only one tiny flower per involucre. YELLOW ARROW: involucre. RED ARROW: flower bud. WHITE ARROW: open flower.

like wild buckwheats, multiple studies reveal that the spineflowers do not represent a single lineage. Rather, it appears that the separate lineages constituting this diverse genus have independently evolved involucre awns.

The other genera possessing involucre projections of various sorts are *Acanthoscyphus** (flowery puncturebract), *Aristocapsa** (Indian Valley spineflower), *Centrostegia* (red triangles), *Dodecahema** (slender-horned spineflower), *Goodmania* (golden goodmania), *Hollisteria** (false spikeflower), *Lastarriaea* (spineflower), *Mucronea** (spineflower), *Oxytheca* (puncturebract), *Sidotheca* (starry puncturebract), and *Systemotheca** (Vortriede's spineflower). The six genera denoted by asterisks are endemic to California. Further, all of these genera have few species. Except for *Lastarriaea* (3 species), *Mucronea* (2 species), *Oxytheca* (3 species), and *Sidotheca* (3 species), each genus is monotypic, with but one species.

Besides the wild buckwheats, only nine other species in the tribe, including five in California, lack involucre projections. Taxonomists have positioned these nine species in seven genera

owing to variation in the involucre bracts (absent, reduced in number or size, spirally arranged, etc.). In addition to *Gilmania*, *Harfordia*, and *Pterostegia*, introduced above, these are *Dedeckera* (July gold), *Johanneshowellia* (Howell's buckwheat), *Nemacaulis* (cottonheads), and *Stenogonum* (two-whorl buckwheat). *Dedeckera* and *Gilmania* are endemic to the Death Valley region of California, whereas *Harfordia* and *Stenogonum* are the only genera in the tribe not present in the state. In addition, each of these genera is monotypic except for *Johanneshowellia* and *Stenogonum*, which each has two species.

Within *Eriogonum*, eight subgenera are currently recognized. The largest—*Eucycla*, *Ganysma*, *Oligogonum*, and *Oregonium*—are well represented in California. However, of these, only subgenus *Oligogonum* (25 of 36 species in California, 13 endemic) in combination with subgenus *Eriogonum* (only two species, both outside California) are a single lineage, based on recent studies (Grady 2012; Kempton 2012). In this lineage, the flowers differ from other wild buckwheats in that the base is narrow (described as stipelike, or a floral stipe) and wingless. Two distantly related species, Conejo buckwheat (*E. crocatum*, endemic and rare in southern California) and hoary wild buckwheat (*E. saxatile*) also have floral stipules, but these are described as narrowly winged (having narrow, raised, longitudinal ridges). The widespread sulfur flower buckwheat is a member of subgenus *Oligogonum*.

It is clear from published and ongoing research on wild buckwheats and their close relatives that taxonomic changes are in order. Named groups, such as genera, should include all, not some, of the descendants from a common ancestor. After additional species and varieties of wild buckwheats and relatives are sampled, more data are gathered and analyzed, and relationships are understood with greater confidence, the delimitation of genera will be updated to reflect current knowledge. Research is also underway to examine species limits. For instance, research in my lab has identified several species that are currently unrecognized in California, and we predict many more await discovery.

Studies of the entire buckwheat or knotweed family, Polygonaceae, tell us that wild buckwheats and close relatives, which constitute a temperate lineage (tribe Eriogoneae), evolved from tropical ancestors (Lamb Frye and Kron 2008; Sanchez and Kron 2008; Sanchez et

al. 2009; Schuster et al. 2013; Kostikova et al. 2014a). The closest extant relatives of the tribe are trees, shrubs, and lianas (woody vines). This means that the herbaceous growth form prevalent in wild buckwheats appears to have evolved from woody ancestors. How wild buckwheats were able to diversify extensively in the western United States is an intriguing and unanswered question. Because they occupy a wide range of elevations and habitats, including a diversity of soils, they appear to have the ability to rapidly adapt and form new species. Physiological adaptations to dry habitats and long flowering times may play a role, as might the ability to attract a breadth of floral visitors and potential pollinators to promote outcrossing and maximize seed production. Outcrossing, or pollen transfer between plants, can introduce novel combinations of genes to the offspring for natural selection to operate on. As well, the relatively small seeds of wild buckwheats may be dispersed long distances, into new habitats.

A short lifespan of wild buckwheats (as in annuals or short-lived perennials) may also be a factor in their success. Short generation times are believed to hasten evolution. Taken as a whole, about half (169) of the 342 species in the tribe are annuals (plus three biennials and short-lived perennials); this includes all of the North American species of *Chorizanthe* (there is a lineage of perennials in South America) and all but two species in the 18 small genera. Remarkably, as we learn more about the evolutionary history of wild buckwheats and close relatives, it is becoming clear that perennials have often evolved from annual ancestors (Grady 2012; Kostikova et al. 2013). This is remarkable for two reasons. First, for plants in general, annuals usually evolve from perennials. Second, as mentioned above, wild buckwheats and close relatives appear to have evolved from woody ancestors, which means that the evolution of perennials from annuals in the tribe represents a reversal, a *return* to a perennial lifespan.

California's wild buckwheats stand out by their great diversity in number and form, statewide distribution, and ecological breadth. They are resilient in extreme environments such as hot deserts, cold mountaintops, and harsh soils, and they are vital sources of food for a large but incompletely known array of insects. Many species and varieties are rare, however, and need to be monitored and protected to the best of our abilities. And despite the known diversity of

the group, much remains to be learned about California's iconic wild buckwheats.

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All photos are by the author.

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Parish's oxytheca (*Acanthoscyphus parishii* var. *parishii*) showing two involucre bearing many awns.



ABOVE AND BELOW: Red-flowered buckwheat growing on Santa Rosa Island. I did a little deadheading on the plant in the foreground to dress it up for the photo, but you can see the old flowering stalks cluttering the photo in the background. Unlike some of the other buckwheats, the *Eriogonum grande* varieties do benefit from deadheading in the garden setting. BELOW: Bright red flowers of red-flowered buckwheat.

Buckwheats of the Channel Islands *by Liz Bittner*

BUCKWHEATS ARE AMONG my favorite plants. During flowering, the inflorescences are full of small flowers that open over a series of days, resulting in daily offerings of nectar and pollen for pollinators. When not in flower, many species have lovely silvery-gray or bicolored leaves, soft with small hairs. Buckwheats are great garden plants, generally subshrubs that can fit in a smallish garden, and buckwheat species originating from the Channel Islands are among the best suited to our Bay Area gardens. Being island plants found in coastal sage-scrub habitat, these plants do very well near the Bay but need supplemental water and perhaps some dappled shade or late-afternoon shade inland.

The three California Channel Island

buckwheats that are most commonly used in gardens in our area are Santa Cruz Island buckwheat (*Eriogonum arborescens*), Santa Catalina Island buckwheat (*Eriogonum giganteum* var. *giganteum*), and red-flowered buckwheat (*Eriogonum grande* var. *rubescens*).

Examples of these, as well as Santa Barbara Island buckwheat (*Eriogonum giganteum* var. *compactum*), bliss buckwheat (*Eriogonum* × *blissianum*), and San Nicolas Island buckwheat (*Eriogonum grande* var. *timorum*), can



be found growing in the Channel Islands Section of the Regional Parks Botanic Garden. I invite you to visit the section throughout the seasons to learn how these plants perform.

The Santa Cruz Island buckwheat is a medium-sized shrub with narrow leaves. The flowers open up whitish pink and fade to a rusty brown. As with most buckwheats, it's this change in flower color over a period of time that provides so much interest and what is so charming and attractive about the plant. After the succession of flower colors, there is no need to deadhead. The dark inflorescences from the previous season provide a nice contrast with the light silvery-gray foliage of the plant. Sometimes only the scape (flower stalk) persists and can provide color interest itself, turning yellow, orange, red, and finally an ashy brown. Plants can grow up to six feet tall, and the twisted trunks of older specimens are a nice feature. This plant will self-sow in the garden. Santa Cruz Island buckwheat is native to Santa Cruz Island, but it can also be found in smaller numbers on Santa Rosa and Anacapa Islands.

Santa Catalina Island buckwheat is a somewhat larger and definitely bolder-textured shrub. The leaves are broad and might even be almost tropical looking, were it not for the fact that we associate the gray, felty, almost succulent leaves with a drier Mediterranean climate. The inflorescences are also bold, borne on long stalks at the ends of the branches. The plants we have growing at the Garden are rangier than where I've seen them elsewhere, and the long inflorescences do tend to weigh down the branches. The ranginess may be a function of exposure, soils, or watering. Sometimes a gardener gets impatient during the winter and, seeing these weighed-



down branches, will go ahead and deadhead and prune, before garden visitors have finished enjoying the color transitions that the flowers go through. In wintertime one must find tasks that one can do to stay ahead of the game before the inundation of spring tasks arrives. Santa Catalina buckwheat grows naturally only on its namesake island, but it has also been planted on Santa Cruz Island.

Both of these taxa are examples of island gigantism, having become much larger than mainland buckwheats. Island gigantism, a common phenomenon among island animals and birds, as well as plants, may with these buckwheats be due to a combination of the absence of grazers, less competition from other plants than on the mainland, and a milder climate.

Red-flowered buckwheat (*Eriogonum grande* var. *rubescens*) can also be found in the Botanic Garden. The flowers of this plant, in small inflorescences in spite of its name, can range from a striking deep red to a light pink, and we do have the variety of colors here. Red-flowered buckwheat is found on San Miguel, Santa Rosa, and Santa Cruz Islands. And a real treasure at

Saint Catherine's lace (*Eriogonum giganteum* var. *giganteum*) with developing inflorescence growing in the Botanic Garden.

Santa Cruz Island buckwheat (*Eriogonum arborescens*) on Santa Rosa Island. Notice the various stages of flowering.



the Garden is San Nicolas Island buckwheat (*Eriogonum grande* var. *timorum*). Found only on San Nicolas Island and listed as endangered by the State of California, this plant is not to be found in the nursery trade. It is striking as the brightest white of all the buckwheats growing in the Channel Islands section, both in foliage and in flower. Both of these taxa appear to be short lived here at the Garden but self-sow regularly. Colleagues and others have reported having individuals in their gardens for up to 10 years. I expect we'll see hybrids between these two taxa come up in the Garden beds in the future.

Lastly, and least in number, is the Santa Barbara Island buckwheat (*Eriogonum giganteum* var. *compactum*). As the scientific name implies, this is a compact version of Santa Catalina Island buckwheat that grows only on Santa Barbara Island. We have one single specimen here in the Garden that is hanging in there! It flowers each year, and each year I am grateful that it has not succumbed to a furry friend or some other demise.

Two California Channel Island taxa are absent from the Garden's collection. Island buckwheat (*Eriogonum grande* var. *grande*) grows on both northern and southern California Channel Islands and is another example of island gigantism, reportedly growing up to six

feet tall! San Clemente Island buckwheat (*Eriogonum giganteum* var. *formosum*) grows naturally only on its namesake island but has also been found in the garden trade in southern California. It would be a treat to include these in the Garden's collection as well, so that our visitors could view all seven California Channel Island buckwheats in one location.

Santa Catalina Island buckwheat (*Eriogonum giganteum* var. *giganteum*) and Santa Cruz Island buckwheat (*Eriogonum arborescens*) can hybridize to create what has been called Bliss buckwheat (*Eriogonum* × *blissianum*). This name is from a 1935 garden hybrid at the Santa Barbara Botanic Garden that first came to our garden in 1965. Apparently some of our staff at that time were not particularly impressed. The accession record reads "1965.064: A natural garden hybrid; [ed. found] in Santa Barbara Botanic Garden. One human quality; no great improvement on either of its parents." The hybrids do occasionally show



ABOVE AND BELOW: San Nicolas Island buckwheat (*Eriogonum grande* var. *timorum*) blooming profusely at the Botanic Garden. Photos by Bart O'Brien.

up in the Garden as volunteers and have shown up on Santa Cruz Island as well, where Santa Catalina Island buckwheat (*Eriogonum giganteum* var. *giganteum*) has been planted as a landscape plant.

Liz Bittner is Botanic Garden Supervisor. Along with her management duties, she provides day-to-day care for the Channel Islands section of the Garden.

All photos are by author unless otherwise noted.



Buckwheats of the High Sierra *by Michael Uhler*



Sierran cushion buckwheat (*Eriogonum ovalifolium* var. *nivale*). As is often the case, there are more flowers than foliage at this taxon's floral peak. This photo was taken east of Lamarck Col on September 5, 2020, the first day of the massive Creek Fire. The smoke lent a soft and diffused backlighting that evening.

AS I SIT AT MY DESK typing this article, I can visualize all the beautiful California plants from the Sierra Nevada that I have the pleasure of growing at the Regional Parks Botanic Garden. These thoughts warm me and give me hope. Our Garden has the most diverse collection of Sierra Nevada plants of any public garden, and it is challenging to choose a favorite species or even a favorite genus from among all the wonderful plants I am privileged to steward. However, the wild buckwheats (genus *Eriogonum*) rank close to the top of my favorites list. *Eriogonum* is one of the largest genera in California, and growing them brings me immense satisfaction. Here are some of my favorite high-elevation, wild buckwheats from the Sierra Nevada.

One of my beloved Sierra haunts is the upper Convict Creek drainage on the east side of the mountains, just to the south of Mammoth Lakes. It was here almost 12 years ago that I

first collected seed of the Inyo wild buckwheat (*Eriogonum latens*). It readily germinated and grew for me, and I continue to admire it as one of the most enduring and attractive of the Sierran buckwheats I've collected thus far. The cream-to-pale-yellow flowers are borne on a ridged stalk that rises eight to twelve inches above the leaf rosettes in a single, relatively large, spherical inflorescence. Aptly, the Inyo wild buckwheat is largely confined to Inyo County, and I often encounter it in "The Inyo," which is my absolute favorite national forest. *Eriogonum latens* ranges from 8,500 feet to over 11,100 feet in elevation and favors well drained substrates to sink its roots into. I know I'm in a great place when I am with this "eastside local."

Lobb's wild buckwheat (*Eriogonum lobbii*), is another choice species, and it is currently planted in our new crevice garden. In its second growing season it is still in its winter dormancy,



The spherical heads of Inyo buckwheat (*Eriogonum latens*). This species has bloomed for a decade in the Garden's Sierran section.



with most plants showing only a small, protected central bud encircled by a rosette of dried leaves. It seems they are maintaining a state of dormancy adapted to an alpine winter despite the rather balmy Berkeley Hills weather we've been having. The plants' seasonal senescence appears to be non-negotiable, at least in its above-ground parts. I am anticipating the onset of their spring growth and hope they will bloom this year. The population from which I collected the seed is particularly charming to me, with a ring of prostrate inflorescences encircling the tidy basal rosette of tomentose (slightly woolly) foliage. The flowers start cream or white and mature to a beautiful deep rose. The species grows at elevations up to 12,500 feet in the Sierra Nevada. While at the Denver Botanic Garden last October I bonded with other North American Rock Garden Society members who are also attempting to bloom this desirable wild buckwheat in Colorado.

Despite 16 years of collecting for the Regional Parks Botanic Garden, it has been only during the last two years that I have attempted to collect and grow one of the most reproductively distinctive wild buckwheats from the Sierra Nevada, not to mention from our state. This is the frosted buckwheat (*Eriogonum incanum*), which has piqued my interest ever since my first enlightened botanical encounter with it 15 years ago. The frosted buckwheat stands out as one of only three of over 100 California buckwheat species to be dioecious. That means male flowers (staminate) and female flowers (pistillate) are found on separate plants! This condition is exceptional in the genus *Eriogonum*, and I am looking forward to celebrating the Garden's first blooming of this species. I have many specimens growing in the crevice garden, currently awaiting their gender-reveal parties. The untrained observer might mistake the two sexes as actually being separate species, as they do look quite different in advanced stages of flowering. The male plants retain their head-like, yellow inflorescence, while the pistillate inflorescences of the female plants often mature to red and becomes branched. Most impressively, this charming species grows to an elevation of more than 13,000 feet!

I would be remiss if I did not mention one wild buckwheat from the subgenus *Eucycla* (every other taxon discussed in this essay is in the subgenus *Oligogonum*). Species in the *Eucycla* subgenus are differentiated from those in the *Oligogonum* subgenus by their lack of the floral structure termed a stipe. The stipe is the supporting stalk attaching the ovary to the receptacle, and *Eucycla* species do not have it. My stipeless choice is the Sierran cushion buckwheat (*Eriogonum ovalifolium* var. *nivale*).

Nivale means snow white or growing near snow, and this gorgeous cushion buckwheat is found mostly in the alpine Sierra Nevada and the adjacent White and Inyo Mountains. *Eriogonum*



TOP LEFT: A beautiful color form of Lobb's buckwheat (*Eriogonum lobbii*). I returned a couple of weekends later to collect seed from this plant. The inset photo is a seedling from the collection growing in the new crevice garden.

• UPPER RIGHT: A wild and naturally exposed root system of the frosted buckwheat (*Eriogonum incanum*). This unbranched, woody root system is perfectly adapted to grow deep in rock crevices like those of the Garden's new crevice garden. • RIGHT: Of all California's 11 alpine buckwheat species, the Sierran cushion buckwheat (*Eriogonum ovalifolium* var. *nivale*) grows at the highest elevation. It can be found as high as 13,800 feet above sea level. Here it is close to Lamarck Col at approximately 12,500 feet.



ovalifolium var. *nivale* bloomed for us last year for the first time on record. I am particularly enamored with its extremely tight foliage that is comprised of vertically oriented leaves that are often overlapping such that large droplets of water are repelled. Of all the wild buckweats discussed here, this taxon reaches the highest elevation. Growing at 13,800 feet above sea level, it is a true alpinist. I cannot stop photographing this charismatic plant in the wild; honestly, I cannot stop photographing any and all wild buckweats I encounter!

I am particularly excited to grow two special, prostrate, wild buckweats of which I obtained seed last summer on my tours in “foxtail pine country.” I was collecting in the Southern Sierra Nevada in the vicinity of Mount Langley, the southernmost peak over 14,000 feet in California. The first taxon, Coville’s sulphur flower (*Eriogonum umbellatum* var. *covillei*), is a low-growing mat comprised of clusters of leaf rosettes, with yellow flowers that usually age to red. I collected this plant at the uppermost foxtail pine groves (*Pinus balfouriana* subsp. *austrina*) east of Old Army Pass amongst shed five-needled clusters of my favorite pine of all! Also on this trip I was focusing on collecting the aptly named foxtail wild buckwheat (*Eriogonum polypodum*), a Southern Sierra endemic with limited distribution and a California Native Plant Society Rare Plant



A juvenile grey-crowned rosy finch high in the southern Sierra Nevada at Sawmill Pass eating seed of the Sierran cushion buckwheat (*Eriogonum ovalifolium* var. *nivale*).



The type specimen of the Inyo buckwheat (*Eriogonum latens*). This significant herbarium sheet was made by the eminent Willis Linn Jepson of UC Berkeley. Incidentally, this might be my favorite wild buckwheat of the Sierra Nevada.



Another charming alpine, the Mt. Rose wild buckwheat (*Eriogonum rosense* var. *rosense*) at 12,851 feet on Parker Peak. Interestingly, Parker Peak was the first ascent of the famous mountaineer, Norman Clyde. Clyde had achieved more than 130 first ascents in his lifetime. This choice alpine will soon be here for you to visit at our botanic garden.



Ranking (CRPR) of 4.3. It has chalky white flowers that are borne on prostrate or decumbent stalks and also ripen to red. Both of these species grow mainly in the subalpine zone, but they do appear in the veritable alpine zone also. Our seeds are being processed as of this writing and will have germinated by the time this article is printed.

The wild buckwheats will always hold a special place in my life, and I enjoy most visiting them, and admiring their beauty, in their wild habitats. I hope you all get a chance to visit the ones I've mentioned here, either in the wild or in our Garden.

ABOVE AND INSET: The Foxtail buckwheat (*Eriogonum polypodum*) is the rarest buckwheat I've collected from the alpine zone in California's Sierra Nevada. The common name refers to its affinity for growing close to the southern foxtail pine (*Pinus balfouriana* ssp. *austrina*). The foxtail buckwheat is endemic to California, found only in Inyo, Tulare, and Fresno counties.

Michael Uhler is the gardener responsible for the Sierran and Seabluff sections at the Regional Parks Botanic Garden.

All photos are by author.

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The Garden is open from 8:30 a.m. to 5:00 p.m (5:30 from June 1 to September 30) every day except
New Year's Day, Thanksgiving, and Christmas.

Good News from the Garden!

Congratulations to Bart O'Brien, Director of the Regional Parks Botanic Garden!

Bart is the 2022 recipient of the Liberty Hyde Bailey Award, the highest honor given by the American Horticulture Society.

The Garden is offering docent led tours again!

Saturdays at 2 p.m., Sundays at 11 a.m. and 2 p.m., Holidays at 2 p.m.
Tours are free; meet at the Visitor Center.

Fall Plant Sale October 1

We are happy to host our first Fall Plant Sale since October 2019 (Monday, Wednesday, Saturday sales have been suspended in preparation). Look for information about the plants on offer in the special mid-September issue of *The Botanic Garden Monthly*.

A complete inventory will be posted on our Friends of the Regional Parks Botanic Garden website prior to sale day.

As always, you will find treasures and surprises. See you there!

— Thank You to these Nurseries for Providing a Discount to Members —

Annie's Annuals and Perennials (510-215-3301), 740 Market Avenue, Richmond, www.anniesannuals.com

Bay Natives Nursery (415-287-6755), 10 Cargo Way, San Francisco, www.baynatives.com

California Flora Nursery (707-528-8813), 2990 Somers Street at D Street, Fulton (north of Santa Rosa), www.calfloranursery.com

Central Coast Wilds (831-459-0655), 336 Golf Club Drive, Santa Cruz, www.centralcoastwilds.com (please call before visiting)

East Bay Wilds Native Plant Nursery (510-409-5858), 2777 Foothill Boulevard, Oakland, www.eastbaywilds.com

East Bay Nursery (510-845-6490), 2332 San Pablo Avenue, Berkeley, www.eastbaynursery.com

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Larner Seeds (415-868-9407), 235 Grove Road, Bolinas, www.larnerseeds.com

Mostly Natives Nursery (415-663-8835), 54 B Street, Unit D, Point Reyes Station, www.mostlynatives.com

Oaktown Native Plant Nursery (510-387-9744), 702 Channing Way, Berkeley, www.oaktown@oaktownnursery.com