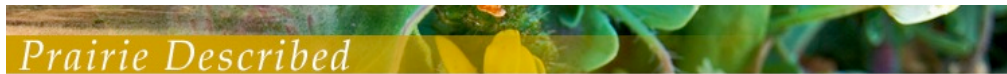




California's Coastal Prairies

A PROJECT OF THE SONOMA-MARIN COASTAL PRAIRIE WORKING GROUP



Prairie Described

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COYOTE THISTLE (*ERYNGIUM ARMATUM*) – NATIVE

Carrot Family (Apiaceae)

Coyote thistle has stiff sharp bluish-green spiny bracts give the flower heads a distinctive star-burst shape. These lovely low-growing perennials will give you a sharp stab if you should happen to touch or sit on one.



COYOTE THISTLE:

- ▶ Is restricted to California.
- ▶ Grows in coastal prairies and bluffs from Humboldt to Santa Barbara County (University of California 2009).
- ▶ Can be dominant in coastal hills and flats (Jepson c1902-1943).
- ▶ Is also found around vernal pools.

The bluish star-burst heads of coyote thistle at Carrington Ranch, Sonoma County. Photo by D. (Immel) Jeffery 2010.

FUN FACTS ABOUT COYOTE THISTLE:

- ▶ Coyote thistle is regarded by cattlemen as an objectionable weed on Point Reyes Peninsula, where it is “extremely abundant” (Jepson c1902-1943).
- ▶ Is also called coastal button-celery and coast eryngo.

INTRODUCTION TO TARWEEDS AND TARPLANTS (*HEMIZONIA*, *DEINANDRA*, *MADIA*)

Sunflower Family (Asteraceae); Tarplants Subtribe (Asteraceae; Madiinae)

- ▶ Tarweed and tarplant are names commonly applied to several genera in the Sunflower family (Asteraceae) including *Hemizonia*, *Deinandra* and *Madia*.
- ▶ They are called “tarweeds” because they have glandular hairs that make them both aromatic and sticky to the touch and they are difficult to tell apart (Keator 2009).
- ▶ The sticky coating is thought to be a strategy for dealing with the long California summer drought by reducing water loss from these late-blooming plants (Saunders 1914:219-220). It could also be a deterrent for potential herbivores, grazers and browsers.
- ▶ Due to relationships uncovered by molecular phylogenetic studies, some species currently in *Hemizonia* are being reassigned to *Deinandra* and *Centromadia* (Flora of North America Editorial Committee eds. 1993+. Accessed 2010 Oct 28).

HAYFIELD TARWEED (*HEMIZONIA CONGESTA*) – NATIVE

Sunflower Family (Asteraceae)

Hayfield tarweed is an annual herb with shaggy or silky hairs on the leaves and stems, which release a pleasant but tar-like aroma when crushed.

HAYFIELD TARWEED:

- ▶ Is endemic to California (Keil, D.J. 1993 in Jepson Manual).
- ▶ Is found in coastal grasslands, sometimes on serpentine (Keil, D.J. 1993 in Jepson Manual).
- ▶ Is found in central and northern California (Keil, D.J. 1993 in Jepson Manual).



A skipper sipping visiting a *Hemizonia congesta* ssp. *lutescens* flower at Jenner Headlands. Photo by D. (Immel) Jeffery, 25 June 2010.

HAYFIELD TARWEED ECOLOGY:

- ▶ Species Interactions: Hayfield tarweed is one of the surviving native species in non-native annual dogtail grasslands (*Cynosurus echinatus* Semi-natural Herbaceous Stands) that are degraded bald hill prairies (Sawyer, et al. 2009:863-864).

FUN FACTS ABOUT HAYFIELD TARWEED

- ▶ There are two subspecies of Hayfield Tarweed found in coastal prairies in Sonoma and Marin Counties (Consortium of California Herbaria 2010):
 - *Hemizonia congesta* ssp. *lutescens* (hayfield tarweed)—has yellow ray flowers with purple veins on the undersides of petals.
 - *Hemizonia congesta* ssp. *congesta* (hayfield white tarplant, pale-yellow hayfield tarplant) has white ray flower with purple veins on the undersides of petals. The California Native Plant Society lists *H. congesta* subsp. *congesta* as “fairly endangered in California” (California Native Plant Society 2011).

Subspecies *congesta* was “misapplied” to *H. congesta* subsp. *leucocephala* in the Jepson

Manual (Hickman 1993) and vice versa according to the second edition (University of California 2009).

COASTAL TARWEED (*DEINANDRA CORYMBOSA*, FORMERLY *HEMIZONIA CORYMBOSA*,) – NATIVE

Sunflower Family (Asteraceae)

Coast Tarweed is an annual forb with bright yellow ray and disk flowers.

COASTAL TARWEED:

- ▶ Is restricted to coastal grasslands (University of California 2009)



Deinandra corymbosa (*Hemizonia corymbosa*) at Point Reyes, Marin County June 18, 1981. Photo © Br. Alfred Brousseau, Saint Mary's

- ▶ Occurs from San Luis Obispo County to Mendocino County (University of California 2009).

COASTAL TARWEED ECOLOGY:

- ▶ Species Interactions: The Ohlone people, Native American residents of the San Francisco Bay to Monterey Bay area, collected coast tarplant seeds and ate them in *pinole* and burned the foliage to drive ground squirrels from their burrows (Bocek 1984).

FUN FACTS ABOUT COASTAL TARWEED:

- ▶ The fresh or dry foliage has a pleasant sweet fragrance (Howell, et al. 2007).
- ▶ *Hemizonia corymbosa* was reassigned to *Deinandra corymbosa* and is under the new name in the Marin Flora (Howell, et al. 2007) and USDA Plants Database and in Jepson Manual (Consortium of California Herbaria 2010).

COAST TARWEED, CHILEAN TARWEED (*MADIA SATIVA*) – NATIVE

Sunflower Family (Asteraceae)

Coast or Chilean tarweed is an annual forb with coarse glandular hairs (trichomes) and smallish yellow flower heads in crowded spike-like clusters (panicles). The basal leaves form a rosette. The ray petals range from greenish yellow to purplish red (Flora of North America Editorial Committee eds. 1993).

COAST TARWEED:

- ▶ Grows in coastal grasslands and colonizes disturbed sites (Parker 2007; University of California 2009).
- ▶ Is native to the Pacific Coast of North America, Argentina and Chile, and occurs sporadically in the coast ranges from



Madia sativa at Point Reyes National Seashore. Photo by D.(Immel) Jeffery, July 2010.

California to British Columbia (Flora of North America Editorial Committee eds. 1993). It is one of several plants that are native to and distributed both in California and Chile.

COAST TARWEED ECOLOGY

► Life History:

- The glandular hairs give the foliage a strong disagreeable odor (Hickman 1993; Zardini 1992), although some persons like the smell!
- Plants grow best in poor, loose, sandy soils (Zardini 1992).
- Usually a foot or two high in coastal prairies, *Madia sativa* reaches 8 feet in the low nutrient soils at the head of Bolinas Lagoon (Howell, et al. 2007).
- Each plant can produce up to 100 flower heads over a 3-7 week flowering period (Celedon-Neghme, et al. 2007).
- *Madia sativa* can partially self-fertilize (Celedon-Neghme, et al. 2007).
- The flowers open at dawn, close at midday, and open again at dusk (Parker 2007).



Madia sativa inflorescence at Point Reyes National Seashore near Kehoe Ranch. Photo by D.(Immel) Jeffery, July 2010.

► Species Interactions:

- In Chile, the flowers are visited by insects, primarily Diptera (true flies) and Hymenoptera (bees) (Celedon-Neghme, et al. 2007).
- Pollinators are more likely to locate and visit taller plants (Celedon-Neghme, et al. 2007).

- The protein content of the seeds after the oil is removed (28.2%) is greater than sunflower seeds (19%) (Zardini 1992).
- The nutritious seeds are an important food for many grassland birds and animals including the Savannah sparrow, western meadowlark, rabbits and ground squirrels (Martin, et al. 1951).
- *M. sativa* seeds (achenes), as well as *Madia elegans* and *M. gracilis* (Moerman 2003), were utilized widely by the native people in both North and South America who resided within its range.
- The Kashaya Pomo gathered the seeds, called “black grain” (*muhca kili*), for *pinole* (Goodrich, et al. 1980).
- The Coast Miwok made “sweet, good *pinole*” from the seeds of *o’wah* (yellow tarweed, *Madia sativa*) (Kelly 1996).
- Since pre-Columbian times, the Araucanians and Mapuches groups in South America cultivated *Madia sativa* (*madi*) for its oily seeds.
- *Madia sativa* is cultivated for seed-oil in South America, Europe, Africa, and Asia Minor (Flora of North America Editorial Committee eds. 1993+: Citing E. Zardini 1992). This practice was largely discontinued in the mid-1700s when olive trees were introduced by the Spanish (Zardini 1992). Olive oil was not considered superior, but the perennial trees apparently reduced the need for annual cultivation for *Madia sativa*. Interestingly, *M. sativa* was introduced into Europe from Chile in the early 1700s and cultivated for its oil use in the local manufacture of soap (Zardini 1992). According to Zardini (1992), *Madi* oil is “transparent, golden yellow, has a pleasant odor, and a mild, sweet, soft, nutty, agreeable taste.”

MORE FUN FACTS ABOUT COAST TARWEED

- ▶ Because the center of diversity for the Genus *Madia* is western North America, it is likely that the species originated there and was later dispersed to Chile (Zardini 1992).
- ▶ The genus name *Madia* comes from the Chilean common name for this plant ***madi***. The full name is *Madia sativa* Molina, indicating it was first described by Molina in 1782 (Zardini 1992).

- ▶ *Madia sativa* (coast tarweed) and *Hemizonia corymbosa* (coastal tarweed) illustrate the confusion that can result from using common names and why we depend upon Latin names when identifying and communicating about plant species.
- ▶ Two other *Madia* species are found in coastal prairie: *M. sativa* seeds (achenes), as well as *Madia elegans* and *M. gracilis* (Moerman 2003), were utilized widely by the native people in both North and South America who resided within its range.
 - Common madia (*Madia elegans*) is “strongly scented,” with showy flowers in open clusters (Hickman 1993). The ray petals are bright yellow, often with maroon at the base. It is found in grassy and disturbed areas and sometimes on serpentine soils (University of California 2009). It is a co-dominates in non-native annual dogtail grassland stands with *Cynosurus echinatus* and *Bromus hordeaceus* (Sawyer, et al. 2009). Is distributed in California, southwestern Oregon, western Nevada and Washington (Flora of North America Editorial Committee eds. 1993+).
 - Slender tarweed (*Madia gracilis*) is a weedy species found in many communities, including coastal prairies. It is “fragrant” and has non-showy flower heads with lemon to green-yellow ray flowers (Hickman 1993). Is widely distributed in western North America (British Columbia to Baja California, Montana, and Utah).

BROWNIE THISTLE (*CIRSIIUM QUERCETORUM*) – NATIVE

Sunflower Family (Asteraceae)

Brownie thistle is a native perennial with long rhizome-like runner roots. Brownie thistle grows in low mounds with flowers on very short stems (Howell, et al. 2007).



Brownie thistle at Sonoma Coast State Beach 2010 May 11. Photo by D.(Immel) Jeffery.

BROWNIE THISTLE:

- ▶ Is endemic to California’s north and south Coast Ranges.
- ▶ Is widespread in grasslands near the coast (Howell, et al. 2007).

BROWNIE THISTLE ECOLOGY

- ▶ **Species Interactions:** The stalks and roots of *Cirsium* spp. are edible and it is likely this thistle, readily found in coastal grasslands, was harvested for food by the Coast Miwok, Pomo, as well as inland tribes making treks to the coast. The stems and roots of many *Cirsium* species were eaten or used medicinally in some manner by many Native Americans including the Ohlone from San Francisco to Carmel (Bocek 1984; Moerman 2003).

HARLEQUIN LOTUS (*HOSACKIA GRACILIS*, FORMERLY *LOTUS FORMOSISSIMUS*) - NATIVE

Pea Family (Fabaceae)

Harlequin lotus is a perennial herb with showy flowers that sometimes form a lovely ring. The banner (top) petals are yellow and the keel and wings (lower petals) are pale rose or lilac, fading to white.

HARLEQUIN LOTUS:

- ▶ Occurs in low wet meadows and moist open areas in coastal grasslands.
- ▶ Is native to the west coast of North America and occurs in from Santa Barbara County through Mendocino County into Oregon and Washington.



HARLEQUIN LOTUS ECOLOGY

- ▶ **Life History:** Harlequin lotus is winter dormant; underground rhizomes send up shoots in spring that form a low, leafy mat before flowering (Keator 1990).

Hosackia gracilis at Point Reyes National Seashore near Kehoe Beach July 22, 2010. Photo by D.(Immel) Jeffery.

MORE FUN FACTS ABOUT HARLEQUIN LOTUS

- ▶ Jepson's early floras use the common name "witch's teeth" for *Lotus formosissimus*, now reassigned as *Hosackia gracilis* (Jepson c1902-1943). This species has many other common names, including Coast Lotus, Bicolor Lotus, Coast Trefoil, and Seaside Bird's Foot Trefoil.
- ▶ Harlequin lotus is on the CNPS Watch List (List 4.2) as uncommon and fairly endangered in California (California Native Plant Society 2011. Accessed 2011 Mar 10).

TRUE CLOVERS (TRIFOLIUM) PEA FAMILY (FABACEAE)

- ▶ California is one of the centers of diversity for *Trifolium*. Most are annuals (only one perennial clover occurs in California coastal prairie) and only a few are mentioned below.
- ▶ Native clovers were an important food source for California's native people who managed clover fields with small-scale, controlled burns conducted seasonally to improve clover production (Peri and Patterson 1979; Peri, et al. 1982; Peri, et al. 1985; Stewart 2002; Timbrook, et al. 1982). Greens were harvested in the spring and eaten fresh or dried for later use. Flowers and leaves were eaten alone or with salt or peppernut cakes (made from California laurel) by the Kashaya Pomo (Goodrich, et al. 1980).
- ▶ Nonnative clovers from the Mediterranean region of Eurasia and North Africa such as rose clover (*Trifolium hirtum*), white clover (*Trifolium repens*), hop clover (*Trifolium campestre*), little hop clover (*Trifolium dubium*) and subterranean clover (*Trifolium subterraneum*) are filling the niche once occupied by native clovers and are now abundant in coastal prairies.

ANNUAL CLOVERS

- ▶ **Rancheria clover** (*Trifolium albopurpureum*) - Native - Distributed from British Columbia to Baja California.

- ▶ **Showy Indian clover** (*Trifolium amoenum*) - Native - Endemic to California and thought to be extinct for many years. There is only one known naturally occurring population.

- ▶ **Bearded clover** (*Trifolium barbigerum*) - Native - Endemic to California.

- ▶ **Pinole clover** (*Trifolium bifidum*) - Native - Distributed from Southern Washington to California. Although widely distributed in California it is “an infrequent species in number of individuals as compared with several other annual species” (Jepson c1902-1943).



Showy Indian clover flower head. Photo by D.(Immel) Jeffery, 2004.

- ▶ **Foothill clover** (*Trifolium ciliolatum*) - Native - Distributed from Washington State to Baja California.

- ▶ **Bull clover** (*Trifolium fucatum*) - Native –

- Occurs in moist open grasslands in Oregon and California.
- The banner petal of the pea family flower inflates in fruit making the flower head fat and succulent looking.
- One of the clovers favored by California’s Native people, the plant was eaten by the Coast Miwok and Kashaya Pomo (Goodrich, et al. 1980; Kelly 1996)



Bull clover (*Trifolium fucatum*) at Bodega Marine Reserve. Photo by D.(Immel) Jeffery, 2010.

- ▶ **Pinpoint clover** (*Trifolium gracilentum*) - Native - Distributed in California, Washington, and Arizona.

- ▶ **Chilean clover**, Macrae's clover (*Trifolium macraei*) – Native
 - Distributed in coastal counties from southern California to Oregon.
 - Among several California native plants that also occur in South America.
 - Can be distinguished from other natives with similar flower color because its flower heads are often paired and the heads have either no or a very short flower stalk (peduncle) extending from the last set of leaves on the stem.

- ▶ **Small-head clover** (*Trifolium microcephalum*) - Native - Fairly widely distributed from British Columbia to Mexico; also in Idaho and Arizona.

- ▶ **Thimble clover** (*Trifolium microdon*) – Native
 - Distributed from British Columbia to Southern California
 - Among several California native plants that also occur in South America.

- ▶ **White-tip clover**, variegated clover (*Trifolium variegatum*) – Native
 - Distributed from British Columbia to Baja California; varieties also present in Arizona, Montana, and Colorado.
 - Jepson (Jepson c1902-1943) considered white-tip clover one of the five most abundant clovers in California and wrote that its edibility and abundance made it an important food source for the Pomo and other native tribes.

- ▶ **Tomcat clover** (*Trifolium willdenovii*) – Native
 - Its main distribution is in California; sporadically distributed in British Columbia, Idaho, New Mexico and Baja California.
 - Among several California native plants that also occur in South America.

PERENNIAL CLOVERS

▶ **Cow clover** (*Trifolium wormskioldii*) – Native

- The only native perennial clover that occurs in coastal prairies.
- Distributed from British Columbia to Mexico; Wyoming and New Mexico.
- Found in moister areas.
- Often spreads by rhizomes.



Cow clover (*Trifolium wormskioldii*) growing with Douglas' iris and wild strawberry in coastal prairie at Point Reyes National Seashore. Photo by D.(Immel) Jeffery, 2009.

CALIFORNIA CHECKERBLOOM (*SIDALCEA MALVIFLORA* SSP. *MALVIFLORA*) – NATIVE

Mallow Family (Malvaceae)

Checkerbloom is a perennial wildflower that spreads through both rhizomes and seeds.

CALIFORNIA CHECKERBLOOM:

- ▶ Is a variety of dwarf checkerbloom restricted to the western California counties and southern Oregon.
- ▶ Is fairly common in Sonoma and Marin county coastal prairies (CPEFS 2010).
- ▶ Is found in coastal prairie, coastal scrub and forest openings (University of California 2009).



California checkerbloom at Salt Point State Park (Sonoma County, California, US). Photo with permission from Gerald and Buff Corsi © California Academy of Sciences.

CALIFORNIA CHECKERBLOOM ECOLOGY

► Species Interactions:

- *Sidalcea malviflora* leaves were baked and eaten by the Coast Miwok in Sonoma and Marin Counties (Kelly 1996).
- The parched seeds were pounded and eaten as *pinole* (seed flour) (Kelly 1996).

MORE FUN FACTS ABOUT CALIFORNIA CHECKERBLOOM

- Maria Copa's grandmother was named Silai, the Coast Miwok name for California checkerbloom (Kelly 1996).
- California checkerbloom no longer occurs in Los Angeles County, where it was once abundant (Hill, S. R. Second Edition of the Jepson Manual [Cited 20 Oct 2010] (University of California 2009).

SUN CUP, GOLDENEGGS (*TARAXIA OVATA*, FORMERLY *CAMISSONIA OVATA*) – NATIVE

Evening Primrose Family (Onagraceae)

Sun cup is a perennial wildflower with four bright yellow petals. The leaves grow in a low ring, called a basal rosette, from a thick fleshy taproot.

SUN CUP:

- Is distributed in grasslands along the western coast from Santa Barbara County to southwestern Oregon.



Taraxia ovata at Point Reyes National Seashore 15 Feb 2011. Photo by D.(Immel) Jeffery.

SUN CUP ECOLOGY

► Grazing:

- The flowers do not have stems but are borne on elongated calyx-tubes resembling stems. The long stem-like calyxes enclose the ovary of the flower below the soil surface and thus the seeds develop in capsules safely nestled underground. Perhaps this is an adaptation to grazing?
- Suncups can withstand some trampling and foot traffic (Parker 2007).

► Species Interactions: Like many coastal prairie plants, sun cups were utilized by local California tribes.

- Sun cup leaves were eaten raw, boiled or steamed by the Ohlone Indians of both the San Francisco Bay and Monterey Bay regions (Bocek 1984).
- The seeds were gathered and eaten by the Coast Miwok who also made a leaf tea (Kelly 1996).

INDIAN PAINTBRUSHES (*CASTILLEJA* SPP., *TRIPHYSARIA* SPP.) – NATIVE

Broomrape Family (Orobanchaceae)

INDIAN PAINTBRUSH ECOLOGY

- ### ► Life History: Both *Castilleja* and *Triphysaria* are partially parasitic (hemiparasitic) in that they secure their water and minerals from the roots of other plants.

► Species Interactions:

- Paintbrushes and owl's clovers (*Castilleja densiflora*, *Castilleja exserta* and *Triphysaria versicolor* subsp. *faucibarbatius*) are still used



Castilleja sp. at Point Reyes Kehoe Beach area. July 22, 2010. Photo by D. (Immel) Jeffery.

by the Kashaya Pomo to decorate dance wreaths for the Strawberry Festival in May (Goodrich, et al. 1980).

- Paintbrushes and owl's clovers were used medicinally by many Native Americans including the Ohlone (Bocek 1984; Moerman 2003).

MORE FUN FACTS ABOUT

- ▶ Some of the species are called “paintbrush” because they have brush-like heads with colorful tips; the color is from the flower and from the leaf-like bracts within the inflorescences. Other species can look like clover heads at first glance. The origin of an alternative common name, owl's clover, is less clear. Some suggest that it may be from the burrowing owls that live in grasslands and others say it is because the flowers look like small owl's faces (Saunders 1914). The Kashaya Pomo call owl's clover “fly eyes” (*samo-huuy*, see Goodrich et al. 1980 for proper diacritical marks).
- ▶ Formerly in the Figwort Family (Scrophulariaceae), *Castilleja* and *Triphysaria* were among the five genera moved to the Broomrape Family (Orobanchaceae).
- ▶ There are only five species of *Triphysaria*, all located in western North America including San Francisco owl's clover, which only occurs in California (Chuang & Heckard 1993, Jepson Manual, First Edition).

JOHNNY NIP (*CASTILLEJA AMBIGUA* SUBSP., *AMBIGUA*) – NATIVE

Broomrape Family (Orobanchaceae)

This native annual wildflower has white-tipped bracts that frame its yellow flowers composed of three pouch-like petals.

JOHNNY NIP:

- ▶ Occurs on coastal grassland and bluffs from the North Coast Ranges to the Central Coast.



Castilleja ambigua subsp. *ambigua* at Point Reyes National Seashore July 22, 2010. Photo by D.(Immel) Jeffery.

- ▶ Is distributed along the coast of North America from California to British Columbia.

JOHNNY NIP ECOLOGY

- ▶ Life History: Johnny nip is partially parasitic (hemiparasitic) and receive much of their nutrition from the roots of other plants.

MORE FUN FACTS ABOUT JOHNNY NIP

- ▶ Is on the California Native Plant Societies “Watch List” as fairly endangered in California (California Native Plant Society 2011).

SAN FRANCISCO OWL’S CLOVER (*TRIPHYSARIA FLORIBUNDA*) – NATIVE

Broomrape Family (Orobanchaceae)

San Francisco owl’s clover is an annual forb that has creamy white flowers petals. The lower lip of *Triphysaria* (Greek for “three bladders”) flowers is divided into three pouches.



San Francisco owl's clover (*Triphysaria floribunda*) at Point Reyes National Seashore. Photo by D (Immel) Jeffery, 22 July 2010.

SAN FRANCISCO OWL’S CLOVER:

- ▶ Is a component of coastal prairie and valley grassland (CalFlora 2011).
- ▶ Is endemic to California.
- ▶ Is narrowly distributed in coastal grasslands, sometimes on serpentine, in San Francisco, Marin, San Mateo, and Santa Cruz Counties. A 2010 collection is listed for Solano County collected from an open grassy flat (Consortium of California Herbaria 2010. Accessed 2011 Mar 4; Hickman 1993).

SAN FRANCISCO OWL’S CLOVER ECOLOGY

- ▶ San Francisco Owl’s clover is a green root-parasite, a green plant that can attach itself to the roots of other plants to harvest stolen nutrients.

MORE FUN FACTS ABOUT SAN FRANCISCO OWL'S CLOVER

- ▶ *Triphysaria floribunda* is listed in the Inventory of Rare and Endangered Plants as List 1B: Fairly endangered in California (California Native Plant Society 2011: Accessed 2011 Mar 4).
- ▶ There are five species, all located in western North America including San Francisco owl's clover, which only occurs in California (Chuang & Heckard 1993, Jepson Manual, First Edition).

JOHNNY-TUCK, PINK BUTTER 'N' EGGS (*TRIPHYSARIA ERIANTHA* SUBSP. *ROSEA*) – NATIVE

Broomrape Family (Orobanchaceae), moved from
Figwort Family (Scrophulariaceae)

Johnny tuck is an annual forb with white flowers that fade to rose-pink. The lower lip of *Triphysaria* (Greek for “three bladders”) flowers is divided into three pouches.

JOHNNY-TUCK:

- ▶ Is native to and occurs only in coastal fields and bluffs at low elevations (< 100m) along the California coast (University of California 2009. Accessed 2011 Mar 4.).

JOHNNY-TUCK ECOLOGY

- ▶ Johnny-tuck is a green root-parasite that can attach to the roots of other plants to rob nutrients.



Triphysaria eriantha subsp. *rosea* at Jenner Headlands. Photo by D.(Immel) Jeffery, June 24, 2010.

Plantain (Plantago)
Plantain Family (Plantaginaceae)

- ▶ The most common plantain in coastal prairies and many other habitats is the introduced English plantain (*Plantago lanceolata*).
- ▶ Three native plantains are found in coastal prairies: tall coastal plantain (*Plantago subnuda*), sea plantain (*Plantago maritima*) and dwarf California plantain (*Plantago erecta*) also known as California plantain or dotseed plantain).

DWARF PLANTAIN (*PLANTAGO ERECTA*) – NATIVE

Plantain Family (Plantaginaceae)

Plantago erecta is a small stature annual herb with narrow leaves.

DWARF PLANTAIN:

- ▶ It is distributed from Oregon to Baja California.
- ▶ It is part of the California goldfields—Dwarf plantain—Six-weeks fescue flower fields Alliance (*Lasthenia californica-Plantago erecta-Vulpia microstachys* Herbaceous Alliance) (Sawyer, et al. 2009). The three species commonly occur together.
- ▶ Can be found in a mosaic with coastal prairie-type associations in the Northern California Coast Ranges, as well as other areas of California.



California plantain (*Plantago erecta*). Photo © Br. Alfred Brousseau, Saint Mary's College.

DWARF PLANTAIN ECOLOGY

- ▶ **Life History:** Can tolerate and is often found on serpentine soils

▶ Species Interactions:

- Is the primary larval host plant for the endangered Bay Area checkerspot butterfly (*Euphydryas editha bayensis*) (National Park Service 2010).
- *Plantago erecta* was used medicinally by some Native Californians (Timbrook 2007: cites Strike 1994:113).

TALL COASTAL PLANTAIN (*PLANTAGO SUBNUDA*) – NATIVE

Plantain Family (Plantaginaceae)

Tall coastal plantain is a perennial forb with large flower spikes extending upward from a stout woody base called a caudex.

TALL COASTAL PLANTAIN:

- ▶ Is distributed from the north coast of California to Mexico, tall coastal plantain is one of the three native plantains that can be found in abundance in Sonoma and Marin coastal prairies (Howell, et al. 2007; University of California 2009).
- ▶ Is found in wet meadows, coastal bluffs and marshes (University of California 2009. Accessed 2011 Mar 4.)



Tall coastal plantain (*Plantago subnuda*) with *Leontodon taraxacoides* at Point Reyes National Seashore 2010 July 29. Photo by D.(Immel) Jeffery.

CALIFORNIA BUTTERCUP (*RANUNCULUS CALIFORNICUS*) – NATIVE

Buttercup family (Ranunculaceae)

California buttercup is a perennial forb with from 7 to 22 petals, 3-lobed leaves and stems that can be prostrate to erect.

CALIFORNIA BUTTERCUP:

- ▶ Is found in the damper areas on coastal bluffs and hills
- ▶ Is a component of California oatgrass prairie, is found in Meadow barley patches, within dense sedge patches, and is one of the few natives remaining in perennial rye grass dominated grasslands (Sawyer, et al. 2009).



California buttercup flower and developing seed head at Ridgecrest in Marin County. Photo by D.(Immel) Jeffery, 2010.

CALIFORNIA BUTTERCUP ECOLOGY

- ▶ Species Interactions:
 - The seeds (achenes) were gathered, parched and eaten by many California tribes (Moerman 2003)
 - Kashaya Pomo children played a game with buttercup flowers; a flower was placed underneath the child’s chin and if the yellow color was reflected on the chin it indicated that the child liked butter (Goodrich, et al. 1980)
 - The Coast Miwok gathered California buttercup seeds for *pinole*. In her notes, Kelly writes Tom Smith’s (Bodega Miwok) description of the seed preparation process: “With seed beater, rake him [sic] into conical basket (tika). Latter is water tight, not pitched. When half full, quit. Leave seeds in sun 2 or 3 days. Parch in big, round basket (ewe)—not fan-shaped. Pound in rock, using basket hopper (tatin).” Kelly interviewed Smith in December 1931.

- Tom Smith, Bodega Miwok said the leaves were used to make tea (Kelly 1996).

MORE FUN FACTS ABOUT CALIFORNIA BUTTERCUP

- ▶ *Ranunculus* is Latin for “little frog.” Pliny named the genus *Ranunculus* because the plant is usually found in wet habitats (Hickman 1993).

WESTERN DOG VIOLET (*VIOLA ADUNCA*) – NATIVE

Viola Family (Violaceae)

Western dog violet is a perennial wildflower with short aboveground stems arising from thin branched rhizomes (underground stems) (Hickman 1993).



Western dog violet (*Viola adunca*). in *Deschampsia cespitosa* prairie at Point Reyes National Seashore, 2011 Feb 3. Photo by D. (Immel) Jeffery.

WESTERN DOG VIOLET:

- ▶ Is a component of red fescue grassland on coastal bluffs and terraces (Keeler-Wolf, et al. 2007) and tufted hairgrass coastal prairie at Point Reyes National Seashore.

WESTERN DOG VIOLET ECOLOGY

- ▶ Life History: Violets produce seeds that can live 100 years in the soil (Massachusetts Division of Fisheries & Wildlife 2008).
- ▶ Species interactions:
 - *Viola adunca* is a poor competitor and relies on periodic disturbance to remove competing plants (Massachusetts Division of Fisheries & Wildlife 2008).
 - *Viola adunca* is the larval host plant of the endangered Myrtle’s silverspot butterfly (*Speyeria zerene myrtleae*). This means that the adult butterflies lay their eggs on this plant, which is the food source for the larvae. The survival of the butterfly species is

linked to the continued persistence of this violet (Adams 2007; Black and Vaughan 2005).

- Violet seeds have appendages that are eaten by ants who carry off the seeds aiding in dispersal (Hickman 1993).
- Viola species were used medicinally by the Ohlone. The plant juices were squeezed from the plants and used as salve on sores; the plants were then boiled and used as a poultice the next day (Bocek 1984).

MORE FUN FACTS ABOUT WESTERN DOG VIOLETS

- ▶ In North America, plant characteristics vary considerably geographically and are therefore sometimes separated into varieties (McPherson and Packer 1974).
- ▶ *Viola adunca* is listed by the State of Massachusetts as a species of special concern. Massachusetts is its southernmost distribution in eastern North America. It is also listed by the state of Iowa vulnerable, at moderate risk of extirpation (local extinction) (Massachusetts Division of Fisheries & Wildlife 2008).
- ▶ Western dog violet can be grown in gardens (see native plant nursery section for sources). A purple dye can be made from the flowers and a dried leaf tea can be drunk for stomach problems (Parker 2007).

**AN INTRODUCTION TO BRODIAEA
BRODIAEA OR TRITELEIA FAMILY (THEMIDEAE)**

- ▶ Brodiaea are perennial monocots whose leaves and stems arise from corms (underground stems that store carbohydrates). The corms are covered with dark brown fibers and the plants propagate by forming daughter corms.
- ▶ The flowers usually include an inner whorl of structures called staminodes that are between the petals and the stamens (see white structures in photo).
- ▶ There are only about 18 species of Brodiaea worldwide and most are endemic to California (University of California 2009).
- ▶ All Brodiaea grow in open grasslands (Keator 1990).

HARVEST BRODIAEA (*BRODIAEA ELEGANS* SUBSP. *ELEGANS*) – NATIVE

Brodiaea or Triteleia family (Themideae), formerly in the Lily family (Liliaeae)

Harvest brodiaea is a geophytic (plants with underground storage organs) perennial herb with funnel-shaped flowers consisting of six shiny deep lavender petals (Parker 2007). The flowers are borne on long, leafless stalks called scapes.

HARVEST BRODIAEA:

- ▶ Is distributed from southern Oregon to Monterey County and then not until San Diego County, California (Flora of North America Editorial Committee eds. 1993+).

HARVEST BRODIAEA ECOLOGY:

- ▶ Species Interactions: Harvest brodiaea corms are about the size of a small onion. The Kashaya Pomo usually cooked them in hot ashes, but they are now more commonly boiled instead (Goodrich, et al. 1980).

DWARF BRODIAEA (*BRODIAEA TERRESTRIS* SSP. *TERRESTRIS*) – NATIVE

Brodiaea or Triteleia family
(Themideae)

Dwarf brodiaea is a perennial herb with bell-shaped flowers consisting of six showy blue-violet petals. Dwarf brodiaea flowers are on a very short stalk (called a scape).



Brodiaea terrestris ssp. *terrestris* growing with *Trifolium* sp. and *Leontodon taraxacoides* at Sonoma Coast State Beach. 2010 May 10. Photo by D. (Immel) Jeffery.

DWARF BRODIAEA:

- ▶ Is endemic to coastal prairies in northwestern California and southwest Oregon.
- ▶ Is distributed from California to southern Oregon.

DWARF BRODIAEA ECOLOGY

- ▶ Species Interactions: dwarf brodiaea corms were eaten raw or cooked by boiling or baking either in hot ashes or in an underground oven (The Olompali People 2009).

WAVYLEAF SOAP PLANT, AMOLE (*CHLOROGALUM POMERIDIANUM*) – NATIVE

Lily Family (Liliaceae)

Soap plant is a geophytic perennial monocot. Panicles of white flowers bloom from May to August (Flora of North America Editorial Committee eds. 1993).



Wavyleaf soap plant flower (at King Mountain, Marin County). The flowers have 3 white petals and 3 white sepals (one petal is hidden within the top sepal in this photo). Photo by D. (Immel) Jeffery, June 12, 2010.

WAVYLEAF SOAP PLANT:

- ▶ Is distributed from southwestern Oregon to southern California.

- ▶ Grows in foothill prairies and grasslands (Keator 1990).
- ▶ *C. pomeridianum* var. *divaricatum* is found only in coastal bluffs and hills of the southern North Coast Ranges and the Central Coast area (Flora of North America Editorial Committee eds. 1993).

WAVYLEAF SOAP PLANT ECOLOGY

- ▶ Soap roots have large underground bulbs that are densely covered with a tunic of coarse brown fibers. The underground bulbs are really modified stems and leaves used to store food (see geophyte). The bulb is made up of fleshy modified leaves called scales. New scales are formed on the inside and as the food is used up, the tough long structural fibers are all that remain of the old outer scales.



Chlorogalum pomeridianum var. *divaricatum*. Marin County, June 2, 2010. Photo by D.(Immel) Jeffery.

▶ Species Interactions:

- Wavyleaf soap plant flowers are pollinated by night-flying insects and moths. The flowers open for only one day and do not open until evening, usually between 5:00 and 7:00 PM until approximately 11:00 PM (Jernstedt 1980).

- The Ohlone gathered and ate the leaves from young plants (Bocek 1984).

- The stalks were pounded and used to wash hair for dandruff (Bocek 1984).

- The bulbs were pounded and placed into pooled water to stun fish causing them to float to the surface (Bocek 1984;



Brush made from wavyleaf soap plant by Yokut basketweaver, Lois Conner. Fibers are from the bulb covering. The handle is covered with a paste made from the baked pulp of the bulb. Photo by D(Immel) Jeffery, 2010.

Goodrich, et al. 1980), and used as soap for washing hair, body, and utensils (Goodrich, et al. 1980).

- The fibrous bulb covers were tied into bundles to make hair brushes and scrub brushes (Bocek 1984).
- The Coast Miwok ate the bulbs of a particular variety growing in rocks on tops of hills (probably *C. pomeridianum* var. *divaricatum*), which were cooked in hot ashes and taste like onion according to Maria Copa (Kelly 1996).

GAIRDNER'S YAMPAH (*PERIDERIDIA GAIRDNERI* SUBSP. *GAIRDNERI*) – NATIVE

Carrot family (Apiaceae)

Gairdner's yampah is a geophytic perennial herb with white carrot-like flowers. It has an enlarged spindle-shaped tuberous root about ½-inch in diameter.



GAIRDNER'S YAMPAH:

- ▶ Is endemic to and distributed only in California.

GAIRDNER'S YAMPAH ECOLOGY

Gairdner's yampah. Photo by D.(Immel) Jeffery, 2009.

- ▶ Species Interactions: The roots were eaten by white settlers in California (Saunders 1976).

MORE FUN FACTS ABOUT GAIRDNER'S YAMPAH

- ▶ This species is threatened by agriculture, grazing, non-native plants, habitat alteration, and urbanization. Gairdner's yampah is considered a species of concern by the California Native Plant Society (California Native Plant Society 2011).

KELLOGG'S YAMPAH (*PERIDERIDIA KELLOGGII*) – NATIVE

Carrot family (Apiaceae)

Yampah is a perennial herb with white umbels of flowers and strong fibrous roots. The thick, strong fibrous roots grow in a cluster.

KELLOGG'S YAMPAH:

- ▶ Is endemic to and grows only in California.

KELLOGG'S YAMPAH ECOLOGY

▶ Species Interactions:

- All parts of yampah were used by Native Americans (Moerman 2003). The seeds were eaten in *pinole* (parched seed meal), leaves were eaten as greens, and roots and flowers were used medicinally. Roots were made into brushes for hair, for sweeping *pinole* and for cleaning baskets (Goodrich, et al. 1980; Kelly 1996:47). The young greens were eaten raw (Goodrich, et al. 1980). Boiled flower tea was taken to stop vomiting (Goodrich, et al. 1980).
- The roots were eaten by white settlers in California who called the plant “white anise” (Saunders 1976).

DOUGLAS' IRIS, COAST IRIS (*IRIS DOUGLASIANA*) – NATIVE

Iris Family (Iridaceae)

Douglas' iris is a geophytic perennial monocot wildflower with blue, purple, white or cream colored flowers.

DOUGLAS' IRIS:

- ▶ Is native to coastal areas from southern Oregon to Santa Barbara County.
- ▶ Grows on coastal bluffs, prairies and at the edges of coastal forests (Keator 1990).

DOUGLAS' IRIS ECOLOGY

▶ Life History:

- Douglas iris has creeping tuberous rhizomes that spread and often forms large clumps.



Iris douglasiana in coastal prairie near Bodega. Photo by J. Coleman 2010.

- According to the Society for Pacific Coast Native Iris (Society for Pacific

Coast Native Iris 2011: Accessed 2011 Mar 23.), clumps of Douglas' iris are often a single clone that can be hundreds of years old.

- ▶ Grazing: Although much valued for its beauty, Douglas' Iris is often considered a noxious weed as the leaves are bitter and not palatable to cattle. Is toxic if ingested and can cause vomiting and diarrhea. The plant juices can cause skin irritation and rash (California Poison Control System 2000). The California State Department of Food and Agriculture lists Douglas' iris as a noxious weeds because it has the ability to form dense, extensive stands and exclude other natives in heavily grazed pastures (California Department of Food and Agriculture 2011).

▶ Species Interactions:

- *Iris douglasiana* leaves contain two fine silk-like fibers valued by Native Americans for their strength and flexibility. The fibers were used to make ropes, cords, nets, and in basketry (Stephens 2000).
- A weak tea of the leaves was taken for stomach problems; the roots were considered a poison (Kelly 1996).
- The flowers are used in wreaths at the Kashaya Pomo Strawberry Festival (Goodrich, et al. 1980).

BLUE-EYED GRASS (*SISYRINCHIUM BELLUM*) – NATIVE

Iris Family (Iridaceae)

Blue-eyed grass is a perennial monocot with starry six-petal deep bluish purple to pale blue flowers with yellow centers.



Sisyrinchium bellum S. Watson. Photo by D.(Immel) Jeffery, 2010.

BLUE-EYED GRASS:

- ▶ Is common in coastal prairie.
- ▶ Is distributed from Oregon to California.

BLUE-EYED GRASS ECOLOGY

- ▶ Grazing: This species is not valued as forage.
- ▶ Life History:
 - Blue-eyed grass spreads through compact rhizomes.
 - Flowers open in the sun and for only one day (Goodrich, et al. 1980)
- ▶ Species Interactions:
 - The roots were made into a medicinal tea used for the stomach and to induce menstruation (Kelly 1996).
 - The Kashaya Pomo made a medium strength tea for upset stomach, heartburn, ulcers and asthma (Goodrich, et al. 1980)
 - Blue-eyed grass was used medicinally by the Ohlone; a decoction was taken for stomachache and chills (Bocek 1984).