



THE XERCES SOCIETY  
FOR INVERTEBRATE CONSERVATION



April 2012

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California Pollinator Plants

# Native Milkweeds

(*Asclepias* spp.)





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The Xerces Society is a nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. Established in 1971, the Society is at the forefront of invertebrate protection worldwide.



Originally established by Congress in 1935 as the Soil Conservation Service, the NRCS has expanded to become a conservation leader for all natural resources, ensuring private lands are conserved, restored, and more resilient to environmental challenges.



The Monarch Joint Venture is a partnership of federal and state agencies, non-governmental organizations, and academic programs that are working together to support and coordinate efforts to protect the monarch migration across the lower 48 United States.

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#### ACKNOWLEDGEMENTS

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Cover: (Top) Tarantula hawk wasp (*Pepsis*) nectaring on narrow-leaved milkweed (*Asclepias fascicularis*), © John Anderson, Hedgerow Farms. (Bottom left) Monarch caterpillar eating milkweed leaves, © William M. Ciesla, Forest Health Management International, Bugwood.org. (Bottom right) Fleshy fruits (“follicles”) and hair-covered seeds of milkweed, © John Anderson, Hedgerow Farms.

Page 3: Milkweed follicles, © John Anderson, Hedgerow Farms.

Page 4: Showy milkweed (*Asclepias speciosa*) and heartleaf milkweed (*Asclepias cordifolia*), © Keir Morse.

Page 5: Narrow-leaved milkweed (*Asclepias fascicularis*), © Aaron Schusteff; showy milkweed (*Asclepias speciosa*), © Rod Gilbert.

Page 6: California milkweed (*Asclepias californica*), © Mark W. Skinner @ USDA-NRCS PLANTS Database; heartleaf milkweed (*Asclepias cordifolia*), © Keir Morse; woolly milkweed (*Asclepias vestita*), © Neal Kramer.

Page 7: Woollypod milkweed (*Asclepias eriocarpa*), © Aaron Schusteff.

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# California Pollinator Plants

## Native Milkweeds (*Asclepias* spp.)

### Overview

Fifteen species of milkweed are native to California. These drought-tolerant plants play a critical role in supporting a tremendous range of pollinators, and occur in nearly all of the state's eco-regions.

The showy flowers of milkweeds offer abundant, high quality nectar to pollinators, making them notable honey bee plants in many parts of the country. However, an enormous range of other pollinators from hummingbirds to butterflies are frequent flower visitors. Milkweeds are named for their milky, latex sap, which contains alkaloids and cardenolides, complex chemicals that make the plants unpalatable to most animals. The plants have fleshy, pod-like fruits ("follicles") that split when mature, releasing the seeds. Fluffy hairs, known as pappus, silk, or floss, are attached to the seeds. These hairs aid in wind dispersal.

Milkweeds have a variety of ethnobotanical uses. Native Americans used stem fibers to make string, rope, and cloth. Also, the sap was used by some tribes to heal sores and cuts and for wart removal. During World War II milkweed floss was used to fill life vests and is currently used as hypo-allergenic filling for pillows and comforters.

In addition to native species, California has three introduced milkweeds, *A. curassavica*, *A. fruticosa*, and *A. tuberosa*. While these species are widely available, there is debate among ecologists about their effects on wildlife and

native plant communities. Given this uncertainty, they should not be introduced to natural areas.

Though a few milkweed species are common in disturbed areas such as roadsides, railways, and fields, most require specific habitat conditions and are not common as cropland weeds.

### Milkweed Pollination

Milkweed flowers have a unique shape and are pollinated in a more specific way than most other insect-visited flowers. Rather than occurring as free grains that are accessible to any visitor, milkweed pollen is contained in pollinia, waxy sacs located inside vertical grooves of the flower. When an insect visits the flower to obtain nectar, one of its legs may slip into a groove ("stigmatic slit"), attaching pollinia to the insect's leg. Fertilization occurs when pollinia are then inadvertently transferred by the insect to another milkweed flower.

### Monarch Butterflies

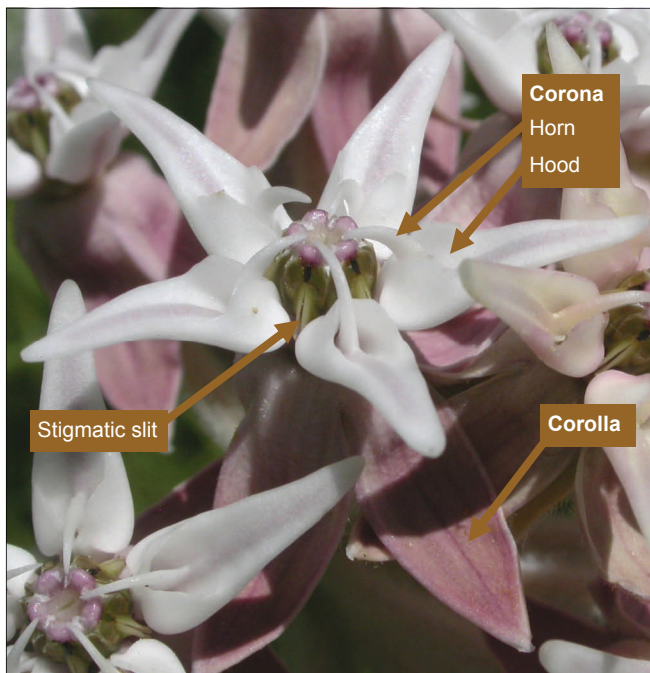
Milkweeds are the required host plants for caterpillars of the monarch butterfly (*Danaus plexippus*). Caterpillars sequester the plants' chemical compounds, giving them protection by making them distasteful to predators.

### Toxicity to Livestock

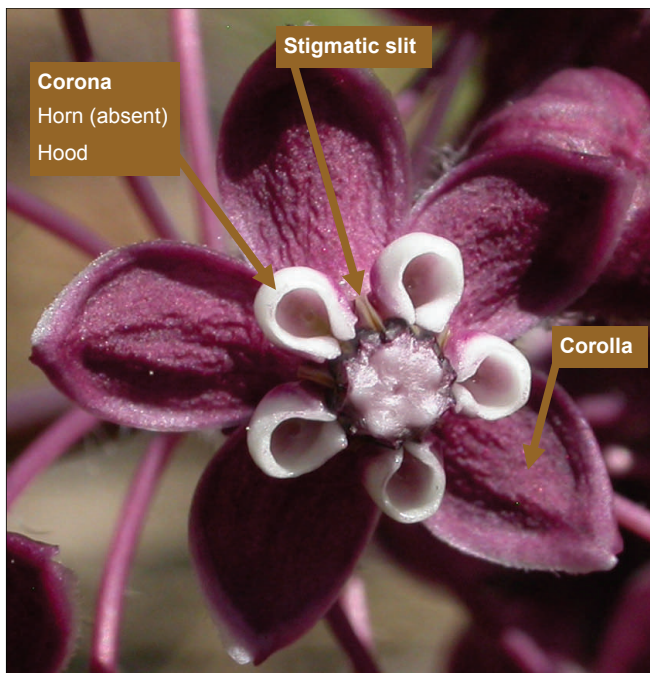
Milkweeds are bitter-flavored and unpalatable and range animals will generally avoid eating them if sufficient forage is available (DiTomaso and Healy, 2007). Forero et al. (2011) note that depression and diarrhea are the main signs of milkweed poisoning. Most milkweed poisoning results from hungry animals being concentrated in areas where milkweed is abundant (USDA ARS, 2006), but milkweed is not in the ten most commonly diagnosed plant poisonings of livestock in California from 1990 to 2007 (Forero et al. 2011). Poisoning may occur if animals are fed hay containing large amounts of milkweed (USDA ARS, 2006); it is important to avoid the inclusion of milkweed in prepared feeds and hay. For more information about toxic dosage and signs of potential poisoning to livestock from consuming milkweeds see Forero et al. 2011.



The fleshy fruits of milkweed contain seeds with fluffy hairs, which aid dispersal by wind. The seeds get darker as they mature.



© Keir Morse



© Keir Morse

The structure of milkweed flowers remains consistent, despite one species appearing quite different from another. At top is showy milkweed (*Asclepias speciosa*); below is heartleaf milkweed (*Asclepias cordifolia*).

Monarchs' annual migration is a widely-known phenomenon, particularly the eastern population that flies to Mexico. West of the Continental Divide, hundreds of thousands of monarchs from an area that stretches from Arizona to British Columbia fly to more than two hundred groves along the California coast. In the spring, these butterflies leave their overwintering sites and spread out across the western states in search of milkweeds on which to lay their eggs.

Annual counts of overwintering monarchs on the California coast have revealed significant population declines. For example, in 1997, Natural Bridges State Beach near Santa Cruz had an estimated 120,000 monarchs. In 2010, only 2,300 butterflies overwintered (Frey et al. 2011). A major factor contributing to these declines is the loss of milkweed plants in the monarch's spring and summer breeding areas across the United States. This loss is due to urban and agricultural development and the application of herbicides in croplands, pastures, and roadsides. The protection and restoration of native milkweeds is critical to reversing this trend.

## Enhancing Pollinator Populations

Extensive research demonstrates that crops with sufficient nearby natural habitat can achieve all of their pollination from wild native bees alone, and that managed honey bees are healthier and more resistant to diseases when they have access to diverse and abundant floral resources. As high-quality nectar producers, milkweeds play an important role in supporting bees.

## Attracting Beneficial Insects

In addition to attracting pollinators, milkweed nectar supports beneficial insects that are natural predators and parasitoids of many crop pests. A recent study conducted in Washington state evaluated 43 species of native flowering perennials for their potential to attract beneficial insects. Showy milkweed (*Asclepias speciosa*) attracted the highest number of beneficial insects, including mite-eating ladybeetles, minute pirate bugs, hover flies, and parasitic wasps, of any plant species studied (David G. James, pers. comm.).

## Insect Pests

Milkweeds are susceptible to infestation by specialist seed bugs (*Lygaeus* and *Oncopeltus* spp.), milkweed longhorn beetles (*Tetraopes* spp.), and oleander aphids (*Aphis nerii*). These insects are generally host specific and are not a threat to agricultural crops.

# Incorporating Milkweeds into NRCS Conservation Practices

Many NRCS conservation practices can be used to create, enhance, or manage habitat for pollinators and other beneficial insects. Including milkweeds in seed mixes and planting plans will provide both an important source of nectar from late spring through early fall (depending on the spe-

cies planted) and a larval food source for the monarch butterfly. Where milkweeds already occur, conservation practices that involve the management of existing habitat will serve to protect these populations.

Conservation Practice	Code	Recommended Species	Notes
Channel Bank Vegetation	322	ASFA, ASSP	Species adapted to moist soils can be included in plantings for both bank stabilization and wildlife value.
Conservation Cover	327	All	Milkweeds may be suitable for remediation and reclamation plantings.
Critical Area Planting	342	ASCA, ASCO, ASVE	Foothill endemic species grow well on slopes and hillsides, and may be useful for soil stabilization.
Early Successional Habitat Development/Management	647	ASFA, ASSP	Several milkweeds have good colonizing ability and are adapted to meadow or grassland conditions.
Field Border	386	ASFA, ASSP	Use caution where spread by underground rhizomes is undesirable.
Hedgerow Planting	422	ASFA, ASSP	Milkweeds can be incorporated into hedgerow edges, adding additional plant structure. Use caution where spread by underground rhizomes is undesirable.
Pest Management	595	ASCA, ASFA, ASSP, ASVE	Milkweed nectar attracts beneficial insects that prey upon pest insects. Providing habitat for those insects has been demonstrated to be valuable for vineyards, orchards, and other crops.
Restoration and Management of Rare and Declining Habitats	643	All	Consider intact milkweed populations when conducting land management activities in remnant natural areas.
Riparian Herbaceous Cover	390	ASFA, ASSP	Some observation indicates that migrating monarchs follow riparian corridors (Dingle et al. 2005).
Upland Wildlife Habitat Management	645	All	Consider managing land in ways that maintain existing patches of milkweed.

**KEY TO SPECIES** ASCA: *Asclepias californica*; ASCO: *A. cordifolia*; ASER: *A. eriocarpa*; ASFA: *A. fascicularis*; ASSP: *A. speciosa*; ASVE: *A. vestita*

## Milkweed Establishment

Milkweeds are most easily established from seed, and germination rates are typically high. Milkweeds prefer full sun and are tolerant of dry soil conditions. California's milkweeds are deciduous perennials. Following seed dispersal, their above-ground growth dies back to the ground. They remain dormant during the winter, and re-emerge in the spring from established root systems. With the exception of prolonged drought, the plants will not require any supplemental watering.

### Seeding

Milkweed seed should ideally be planted in the fall. Exposure to cold temperatures and moist conditions during winter will stimulate germination. Spring planting is also possible but artificial stratification of the seed is recommended, to enhance germination. Seeds should be planted in an area

that has been cleared of all existing vegetation. For planting areas several acres in size, milkweed can be included in native seed mixes and direct seeded using a specialty wildflower seed drill. For planting areas of any size, seed can also be broadcast onto a smooth, weed-free soil surface. To achieve good seed to soil contact, the seed should be compacted into the ground with a cultipacker, lawn roller, or the wheels of an ATV or tractor.

### Seedling Propagation and Transplanting

If establishing transplants from seed, sowing the seeds during early February is recommended. Feedback from restoration specialists suggests that milkweed seedlings are intolerant of root disturbance. Transplant shock can be minimized by propagating seedlings in biodegradable peat pots, which can be planted directly into the ground.

# Seed Sources

California native milkweed seed is becoming more available. In 2010, the Xerces Society for Invertebrate Conservation launched a project to assist the native seed industry in increasing the production of regionally appropriate seed and building new markets for milkweed seed. Initial efforts have been highly successful, with over 70 pounds of narrow-leaved milkweed seed produced in the first year alone. Inventory will grow steadily over the next several years to meet the needs of restoration projects across the state. Several vendors regularly have various milkweed seed in stock. Please contact them for current availability.

Hedgerow Farms, Winters, CA; 530-662 6847; <http://www.hedgerowfarms.com/>

S&S Seeds, Carpinteria, CA; 805-684 0436; <http://www.ssseeds.com/>

Pacific Coast Seed, Livermore, CA; 925-373 4417; <http://www.pcseed.com/>

Sierra Seed Supply, Greenville, CA; 530-284 7926; <http://sierraseedsupply.com/>

# California's Native Milkweeds

## Commercially Available Species

Due to their ability to grow in a wide range of conditions, two species of milkweeds—narrow-leaved and showy—are the most suitable for the majority of restoration efforts.



© Aaron Schusteff

### Narrow-leaved milkweed (*Asclepias fascicularis*)

**Elevation:** 50 – 2,200 m (150 – 7,200 feet)

**Flowering time:** May – October

**Flower color:** corolla pink, corona white

**Maximum height:** 3 feet

**Average seeds per pound:** 107,000

**Description:** This is the most widespread species in California, growing in every region of the state except the Sonoran Desert and the upper montane, subalpine, and alpine zones of the Sierra Nevada.

Suitable locations include dry to moist soil in open, sunny areas. It is typically found in plant communities such as valley grasslands, wetland-riparian areas, foothill woodlands, and chaparral, and clearings within yellow pine, red fir, and lodgepole pine forests.



© Rod Gilbert

### Showy milkweed (*Asclepias speciosa*)

**Elevation:** 0 – 1,900 m (0 – 6,250 feet)

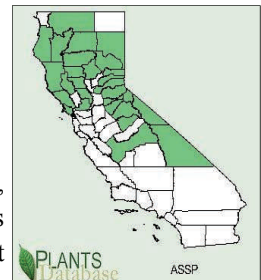
**Flowering time:** May – September

**Flower color:** corolla pink, corona pink or white

**Maximum height:** 5 feet

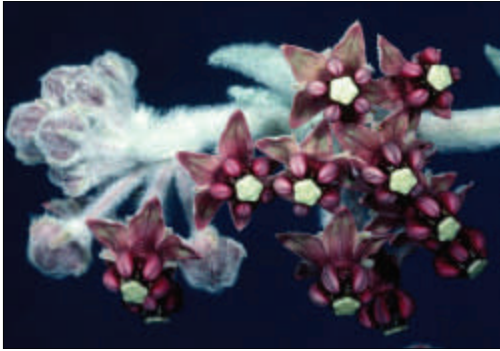
**Average seeds per pound:** 75,000

**Description:** Grows in dry to moist soil in open, sunny areas. Found in many plant communities including wetlands, meadows, savannah, forest clearings, and disturbed sites along roadsides, railways, and waterways. Occurs in forested montane regions of the Sierra Nevada, the North Coast Ranges, and the southern Cascade Ranges, and the arid northern Central Valley and Owens Valley.



## Other Common Milkweeds

Four other native California milkweeds have a fairly wide distribution and occur in a variety of plant communities, but are not yet widely available from commercial sources. These species could be targeted for special conservation efforts where they occur.



© Mark W. Skinner @ USDA-NRCS PLANTS Database

### California milkweed (*Asclepias californica*)

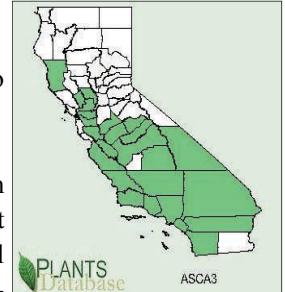
**Elevation:** 200 – 2,100 m (650 – 6,890 feet)

**Flowering time:** April – July

**Flower color:** corolla and corona both pink to purple

**Maximum height:** 3 feet

**Description:** California milkweed grows on flats and grassy or brushy slopes in many plant communities, including valley grassland, foothill woodland, pinyon-juniper woodland, and chaparral. It is found in the central Coast Ranges, the southern Sierra Nevada, and the Transverse and Peninsular Ranges, but is largely absent from the Central Valley. Some authorities recognize two subspecies of this milkweed, with subspecies *greenei* occurring in the central part of the state, and subspecies *californica* occurring in southern California.



© Keir Morse

### Heartleaf milkweed (*Asclepias cordifolia*)

**Elevation:** 50 – 2,000 m (150 – 6,650 feet)

**Flowering time:** May – July

**Flower color:** corolla dark pink to purple, corona pink or white

**Maximum height:** 3 feet

**Description:** Heartleaf milkweed grows in dry, rocky areas in woodlands, chaparral, and evergreen forest in the North Coast Ranges, the Klamath Ranges, the Modoc Plateau, and the foothills and lower montane zone of the Sierra Nevada and Cascade Range. There are a few records from isolated hills within the Sacramento Valley.



© Neal Kramer

### Woolly milkweed (*Asclepias vestita*)

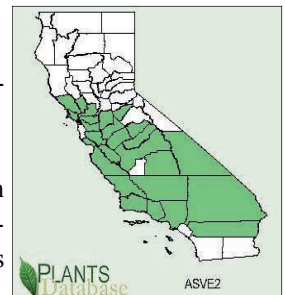
**Elevation:** 50 – 1,350 m (150 – 4,450 feet)

**Flowering time:** April – July

**Flower color:** corolla yellow or pale green, corona yellow or white

**Maximum height:** 2 feet

**Description:** Woolly milkweed grows within valley grassland, chaparral, and foothill woodland on dry plains and hillsides and in canyons in the South Coast Ranges, the Mojave Desert, the Transverse Ranges, the margins of the San Joaquin Valley, and the foothills of the central Sierra Nevada. Two subspecies of woolly milkweed, *parishii* and *vestita*, are sometimes recognized.





© Aaron Schusteff

### Woollypod milkweed (*Asclepias eriocarpa*)

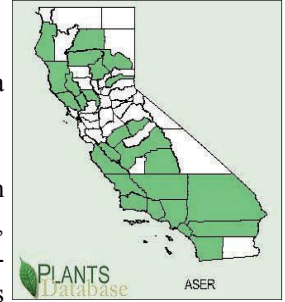
**Elevation:** 200 – 1,900 m (650 – 6,250 feet)

**Flowering time:** May – October

**Flower color:** corolla cream or yellow, corona white or cream, sometimes tinged with purple

**Maximum height:** 3 feet

**Description:** Woollypod milkweed grows in dry, rocky areas in many plant communities, including valley grassland, chaparral, and foothill woodland. It also grows along stream banks and roadsides. The species occurs in the North and South Coast Ranges, the montane zone of the southern Cascades, the foothills and montane zone of the Sierra Nevada, the Transverse Range, the Peninsular Range, and the margins of the Central Valley.



## California's Rare Milkweeds

There are nine other milkweed species native to California. Their potential for habitat restoration efforts is limited because they are either uncommon, have a restricted distribution, or have strict habitat requirements. Several occur only in the Mojave and Sonoran Deserts. Consult the PLANTS Database for more information about these additional California natives.

## Additional Information

For more information about using California native milkweeds for monarch butterfly and pollinator habitat restoration, please contact Brianna Borders, Plant Ecologist, at 503-232 6639 or [brianna@xerces.org](mailto:brianna@xerces.org)

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