

# Purple Star-thistle Control

## Introduction

Purple star-thistle (*Centaurea calcitrapa* L.) is a noxious, invasive weed that severely degrades rangelands. Purple star-thistle typically grows as a biennial, completing its life cycle in two years. Mature plants are covered with stout, sharp spines.

Purple star-thistle poses a dual risk for livestock ranchers; it degrades forage quality by displacing palatable plants and by hindering access to grazing land. Its sharp spines can also injure the eyes, noses, and mouths of grazing animals.

Although purple star-thistle is not as widespread throughout California as its close relative, yellow star-thistle (*Centaurea solstichialis* L.), it is well established in parts of Marin County and spreads rapidly where uncontrolled.

## Plant Characteristics

Purple star-thistle is native to the Mediterranean region of southern Europe and is a member of the sunflower family. It generally grows as a biennial, germinating and growing a stout taproot the first year, then bolting into a densely branched, extremely spiny 1 to 4 foot plant. Mature plants often have the appearance of a rounded mound. The first year after germination, purple star-thistle is recognized by its flat, radiating rosette that develops spines in the center. Rosette leaves are deeply lobed, gray-green, with light colored midribs.

Lower leaves on plants that have bolted are deeply divided and resemble the rosette leaves while the upper leaves are narrow and linear at the base and divided at the tips. Plants are covered with flower heads which carry stout, very sharp spines up to 1 inch long. Each spine has 1 to 3 pairs of small prickles near its base. It is these stout spines that make this plant so unpalatable to livestock.

Unlike yellow star-thistle, which is palatable in its early growth stages, purple star-thistles develops its spines early in the growth cycle and is completely unpalatable.

## Life Cycle

Purple star-thistle reproduces by prolific seed production. Seed is widely dispersed by wind, water, animals, vehicles and contaminated feed. Purple star-thistle prefers deep, fertile soils and often grows in bottomlands.

Though technically classified as a biennial, in some situations purple star-thistle may behave as an annual or as a short-lived perennial. Plants can germinate from fall through spring; therefore plant maturity can be staggered within a stand. This makes control particularly difficult as different growth stages respond differently to control techniques.



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Although most purple star-thistle seeds germinate readily the first year after they are produced, deeply buried seeds can remain viable in the soil for many years. When soil is disturbed by road grading, cultivation or livestock concentration, buried seed can surface and germinate.

## Control

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The two control methods for purple star-thistle are chemical and mechanical; there is not yet a biological control.

Successful control or eradication of purple star-thistle requires following a strategy that integrates appropriate control methods with the life cycle and ecology of this plant. In developing a weed management strategy, consider the level of control that is reasonable to expect. Attempting complete eradication will require a more extensive effort than confinement of a stand. Control results should be carefully observed to increase success in future years.

General weed control principles that should be followed include:

- Control all isolated plants and small outlying populations to prevent establishment of new stands. Although these may not seem like high priority areas, the small amount of time required to control them will pay off in the future by preventing large populations from establishing in relatively weed free areas.
- Implement yearly control measures before flower maturity and seed set or remove and dispose of seed heads or mature flowering heads. Control methods may have to be repeated several times during a season for plants with staggered maturities.
- Maximize vegetative cover in affected areas. Reseeding bare areas and maintaining recommended residual dry matter (RDM) levels will help prevent establishment of new purple star-thistle seedlings.

## Mechanical Controls

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### *Hoeing*

Hoeing can be effective in controlling small infestations of purple star-thistle. This technique should be used when plants are in the rosette stage or after they have bolted but before flowers have started to show color. If hoeing is done after flowers start showing color, plants should be removed from the site and disposed of. Flower heads that show color but have not yet set seed can mature and seed can ripen after plants are cut. Hoeing may need to be repeated two or three times each year to remove plants with staggered maturities. Plant crowns should be dug up, removing at least 1.5" of taproot below ground to prevent resprouting.

### *Mowing*

Mowing is not an effective control method because plants in the rosette stage generally grow below the height of the mower bar and because purple star-thistle's robust taproot resprouts when top growth is cut. Mature plants that are mowed are likely to become bushier and produce more seed and flowers. Mowing can also cause seed to be disbursed more widely.

## Chemical Control

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If herbicides are used, spraying should be done in late winter or early spring, ideally in January or February. Most plants will be small rosettes at this time and can be difficult to locate. However, dead standing plants from the previous year can be used to locate existing infestations.



Photo: © 2008 Neal Kramer

Early spraying of rosettes requires less herbicide and is more effective than spraying mature plants later in the season. It causes less damage to desirable pasture plants and reduces chemical application costs. Broadleaf selective herbicides are the best choice for this time of year because they will not kill actively growing grasses. In late spring or early summer, once annual grasses have dried up, non-selective herbicides can be used for control of late season purple star-thistle rosettes or immature plants that have not yet bloomed.

A January or February spraying can be followed by manual removal, mowing, or spot spraying on non-selective herbicides to kill later maturing plants. Infested areas should be monitored to assess the need for follow-up control. Control practices may need to be repeated throughout the spring and summer.

Consult the Marin County Department of Agriculture for thistle identification and information on pesticide permits (415) 473-6700.