



Scotch Thistle

Onopordum acanthium

Scotch thistle was introduced to the United States in the 1800s as an ornamental plant from the Mediterranean region. It is a noxious weed in Idaho, Oregon, and Washington found in 40 Idaho counties, 19 Oregon counties, and 20 Washington counties. A biennial, Scotch thistle occasionally behaves as a short-lived perennial. Scotch thistle can form dense, virtually impenetrable stands in low- to high-fertility soils.



Mature Scotch thistle.

Identification

Scotch thistle has robust spiny leaves with white woolly hairs that give them a gray cast. There are more hairs on the lower leaf surface than on the upper leaf surface. The stem has spiny “wings” running down the stem.

The leaf outline is egg shaped to narrow spatula shaped, but the general outline is interrupted by irregular spiny teeth along the leaf margin. Leaf length varies between 4 and 20 inches, and the leaves are arranged in an alternate pattern along the stem.



Scotch thistle rosette.



Scotch thistle flower. Note the wings below the flower head. Musk thistle has no wings.

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Flowers are arranged in heads, generally with one head per branch but with as many as seven heads per branch. Heads range from 1 to 2 inches in diameter. Flower color ranges from white to purple. The receptacle (lower, green part of the flower head) is fleshy and deeply pitted but without bristles.

The stems and flower heads can persist through the winter making infestations detectable in the subsequent year. Plants are usually 2 to 5 feet tall but can reach 12 feet tall.

Seeds are spatula-like in shape with four to five angled surfaces and without hairs. Seeds are a mottled brown to nearly black.

Seeds may germinate in the fall after rains have begun. The rosette (clump of leaves at ground level) remains through the entire next year, achieving a diameter up to 4 feet and producing a thick taproot. The plant typically will bolt after a year as a rosette and flower in July through September.

Ecology and biology

Scotch thistle is often found in disturbed areas, favoring sites with frequent moisture that are dominated by annual weeds such as downy brome. Seedlings usually do not compete well with perennial grasses so Scotch thistle is usually found in recently disturbed sites or sites dominated by annual plants. It is common to find this weed in rangelands and along river corridors.

Scotch thistle competes with, and decreases, desirable forage. The sharp spines deter livestock and wildlife from grazing. In fact, if the stand is dense enough it will create a natural barrier that prevents animals from moving between grazing sites.

Seeds are typically dispersed long distances by water, livestock, and human activity. Wind dispersal is limited to several feet.

Seed production in a head appears to be independent of plant density, and each flower can produce between 110 to 140 seeds. Depending on the number of flowers, a plant can produce between 8,400 to 40,000 seeds. Fewer than 20 percent of the seeds produced initially are ready to germinate, and the remainder lies dormant in the soil for 7 to 20 years as a reserve for future population establishments.

Scotch thistle seeds contain a water-soluble germination inhibitor that requires moisture to break dormancy. Light can also inhibit germination; therefore, seeds need to be buried in the soil or covered by plant residue in order to sprout.

Management

Scotch thistle reproduces only by seeds. Therefore, preventing seed production and spread should be the main focus of any management strategy. Practices such as planting certified seed and cleaning equipment help prevent seed movement to new sites. Unless the seeds are

physically moved, natural dispersal does not progress far from the parent plant.

Therefore, controlling small, isolated populations should be the first priority to prevent further spread and establishment.

Mechanical Control

Because Scotch thistle reproduces by seeds only, severing the root below the soil surface will kill the plant. Mowing can be effective if timed to occur before flowering because some seed may develop in severed flower heads. Any regrowth must be mowed again prior to flowering to avoid seed production. As with any mechanical control strategy, enhancing or establishing perennial competitive plants is necessary to reduce future germination and establishment of Scotch thistle.

Grazing

Proper grazing management can maintain perennial grass health and allow grasses to compete with Scotch thistle. However, continuous stocking of animals in an area tends to reduce grass health.

Goats will graze Scotch thistle and have been used successfully as part of a weed management plan. Cattle will not graze Scotch thistle, and sheep may graze only very young rosettes.

In years where grass stand vigor is low, a herbicide may be used to keep Scotch thistle from dominating the site, allowing grasses to recover. Grass stand recovery should include delayed grazing in the next growing season.

Competitive Plants

Perennial grasses that cover the soil surface appear to inhibit successful establishment of Scotch thistle seedlings. Perennial grasses have been more successful than legumes at reducing the number of Scotch thistle seedlings. Grasses that have proved competitive include tall fescue, orchardgrass, and smooth brome grass. Other grasses may also be effective so long as they cover the soil surface.

Chemical Control

Several herbicides used in range, pasture, and noncrop areas control Scotch thistle. Most herbicide applications are made to growing rosettes. Herbicide recommendations can be found in the annually revised *Pacific Northwest Weed Management Handbook*, available in print and online at <http://weeds.ippc.orst.edu/pnw/weeds>.

Summary

A control strategy should include reducing Scotch thistle populations using the tools listed above, altering management to reduce recurrence of the problem, and reseeding if competitive perennials are absent. Since seeds can remain in the soil for up to 20 years, yearly surveys should become part of the management program in order to prevent populations of Scotch thistle from dominating pastures and rangeland. Competitive plants are key to long-term control of Scotch thistle because its seedlings are less competitive against established perennial grasses.

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