



Scotch Broom

Biology and Management in the Pacific Northwest

Cytisus scoparius (L.) Link

A. Hulting, K. Neff, E. Coombs, R. Parker, G. Miller, L.C. Burrill

A bright sign of spring, Scotch broom (*Cytisus scoparius*) reminds us of its invasive presence each year as many acres of forests, pastures, and rights-of-way burst into golden bloom. Scotch broom is a native of Europe and North Africa, from Great Britain to the Ural Mountains, and from Sweden to the Mediterranean. It was introduced as an ornamental plant in California in the 1850s and later used to prevent erosion and stabilize banks and sand dunes.

Since then, Scotch broom has invaded much of the Pacific Northwest; its range stretches from British Columbia

into central California, and from the coast inland to the Cascade and Sierra Nevada mountains. While not as abundant, it also is present in most counties east of the Cascades in Oregon and Washington. Scotch broom is invading northern Idaho and is sparsely distributed throughout southern Idaho.

A woody, leguminous shrub, Scotch broom establishes quickly in disturbed areas, often outcompeting native plants to form dense, monospecific stands (Figure 1). Scotch broom's economic impact can be significant; the state of Oregon loses more than \$40 million annually in timber revenue and control expenses.

Description

Identification and Biology

Scotch broom is a woody shrub that can grow to 10 feet tall, although the average plant is usually 3 to 5 feet. Plants have sharply angled branches and bright yellow flowers. Plants bloom between March and June, before leaves emerge. Young branches have five ridges, are green and hairy, and are responsible for about half of the plant's photosynthetic activity.

Branches become smooth and brown as they age. Leaves are small and oblong, often with three leaflets, and develop later in the growing season. Single or paired flowers, clustered in leaf axils, are bright yellow and typical of plants in the Fabaceae family (Figures 2, 3 and 4, page 2). Occasionally plants bearing maroon flowers or bicolor maroon and yellow flower petals are in Scotch broom populations (Figure 5, page 3).



Figure 1: Scotch broom forming a dense thicket in a clearing disturbed by new home construction.

Andrew Hulting, Extension weed specialist; Karin Neff, faculty research assistant; Larry Burrill, former Extension weed specialist; all of Oregon State University; Eric Coombs, entomologist, and Glenn Miller, integrated weed management specialist, both of Oregon Department of Agriculture; Robert Parker, Extension weed scientist, Washington State University.

Pods contain 3 to 12 seeds and are dark brown or black when mature, with hairs along only the seams of the pod (Figure 6, page 3). These pods twist and pop open as they dry (Figure 7, page 3), ejecting the seed up to several feet. Seeds are greenish black and contain a fatty deposit, called elaiosome, which attracts ants and birds, aiding in seed dispersal.

Scotch broom is evergreen and lives up to 20 years. The species is a host to nitrogen-fixing bacteria, which contribute to its ability to establish in disturbed, nutrient-poor soils. Plants have no inherent dormancy; growth is

limited only by cold temperatures or drought, giving it another advantage over native plants. It is a copious seed producer; a single plant can produce more than 12,000 seeds a year, and seeds can last up to 30 years in soil. Scotch broom can grow from crowns after aboveground growth is removed by clipping, frost, and fire.

Ecology

Scotch broom is primarily a problem in disturbed areas, wherever native vegetation is removed. Tolerant of a wide range of habitats and soil conditions, it readily invades degraded pastures, roadsides (Figure 8, page 4),

utility rights-of-way (Figures 9 and 10, page 5, and Figure 11, page 6), and logged forests.

The establishment of Scotch broom can substantially reduce livestock forage and shade out conifer seedlings, making vegetation management and reforestation expensive. Scotch broom is not readily grazed by animals, which is fortunate as it contains quinolizidine alkaloids that, if eaten, can cause muscle degeneration and birth defects in livestock. Scotch broom also decreases (acidifies) the soil pH and increases soil organic matter content where it grows, altering the soil environment and impacting the ability of native plants to recolonize.

Related Brooms

Other exotic shrubby legumes grow in the Pacific Northwest. All are natives of Europe and potentially invasive in rangelands, disturbed areas, and forests. Pod characteristics are the clearest way to differentiate between these species and Scotch broom.

- French broom (*Genista monspesulana*) has silvery hair covering its stems and many more leaves than Scotch broom, with 85 percent of photosynthesis coming from leaves. Its yellow flowers are clustered in groups of four to 10. Seed pods are green and uniformly hairy. French broom can be found primarily in southwestern and coastal Oregon counties.
- Portuguese broom (*Cytisus striatus*), or striated broom, is similar to Scotch broom, but with paler yellow blossoms and distinctly silver seedpods.



Figure 2: Scotch broom flowers and small, trifoliate leaves.



Figure 3: Scotch broom flower. Flowers are located in leaf axils and begin blooming before leaves emerge.



Figure 4: Scotch broom flower, characteristic of species in the Fabaceae plant family.



Figure 5: Scotch broom flowers with maroon petals.



Figure 6: Immature Scotch broom seed pod with silver hair only along the edges of the pod.

The pods are densely covered with white hairs, larger than those of French broom, and reminiscent of pussy willow. Currently, Portuguese broom has limited distribution in western Lane and Douglas counties in Oregon.

- Spanish broom (*Spartium junceum*) has smooth, waxy cylindrical branches and large, elongated leaves that are present from February to June. Flowers are larger than those of Scotch broom and light yellow. Seedpods are hairless and 2 to 4 inches longer than those of the other brooms. Spanish broom is present in the Puget Sound area of Washington and in southwestern Oregon.

- Gorse (*Ulex europaeus*), often confused with brooms because of its bright yellow flowers, is a spiny, woody shrub also in the Fabaceae family. Gorse appears leafless at maturity, when simple leaves become modified into thick, solid spines (Figure 12, page 7). Seedpods are hairy, small, and slightly flattened.

Gorse grows in clumpy mounds and thickets of densely packed branches primarily along the coast. Stands can be impenetrable, excluding wildlife and human recreation along beaches and in coastal parks. Gorse is distributed throughout western Washington and western Oregon.



Figure 7: Empty mature Scotch broom seed pod. Pods dry and twist, ejecting seed.



Figure 8: Scotch broom thicket along a new road in a housing development.

Management

Prevention

Prevention is the best method to control Scotch broom, especially in areas where the ground and other plants have been disturbed. Overgrazing contributes to its ability to establish. Machinery used in areas with Scotch broom should be thoroughly cleaned before use in noninvaded areas.

Quickly revegetating disturbed sites with fast-growing, competitive native plants is a fundamental tool to limit Scotch broom spread. Native trees (such as Douglas-fir or red alder),

shrubs (such as woods rose, currants, and snowberry), and native grass mixes can help prevent Scotch broom infestations and maintain a native ecosystem that resists Scotch broom invasion. Native-plant guides for Washington, Oregon, and Idaho are included in the “Online Resources” section for additional revegetation ideas and sources of plant material. If Scotch broom colonizes an area, remove it before it produces seed.

Mechanical

Pulling can be an effective removal method on small areas of land, as it removes the entire plant, eliminating

any regrowth. Although labor and cost intensive, pulling has little impact on neighboring desirable plants. Because disturbance resulting from pulling mature plants can create an ideal environment for Scotch broom seedlings, fast and effective revegetation or additional chemical control is essential. Use a shovel or tools like the Weed Wrench to remove deeply rooted plants.

Chemical

Several broad-spectrum herbicides can be effective in controlling Scotch broom infestations. Commonly used herbicides in a variety of habitats include triclopyr, imazapyr, aminopyralid, and glyphosate, applied alone or in combination with 2,4-D.

Any of these herbicide-active ingredients can be mixed into a water-based foliage spray and applied to Scotch broom from spring to late summer. For rates of usage, consult the “Control of Problem Weeds” chapter of the current edition of the *Pacific Northwest Weed Management Handbook*.

<http://pnwpest.org/pnw/weeds>

Use herbicides safely!

- **Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.**
- **Read the herbicide label—even if you’ve used the herbicide before. Follow closely the instructions on the label (and any other directions you have).**
- **Be cautious when you apply herbicides. Know your legal responsibility as an herbicide applicator. You may be liable for injury or damage resulting from herbicide use.**



Figure 9: Rights-of-way are commonly prone to Scotch broom invasion, although plants are less conspicuous when not blooming.



Figure 10: Infestations become much more obvious in the spring when plants are in full bloom.

Complete coverage of all leaves and branches generally results in the best control. The addition of a surfactant can improve spreading and penetration of the herbicide into the plant and further increase performance.

Triclopyr ester formulations also can be mixed into an oil carrier and applied as a basal bark spray to the lower 12-inch portion of the Scotch broom stems. Again, thorough coverage of the stems by the herbicide solution is critical. Always refer to the individual product label for specific application rates and mixing instructions, legal use site selection, and other important application information.

The “Forestry” chapter and the “Control of Problem Weeds” chapter of the current edition of the *Pacific Northwest Weed Management Handbook* are good references on application methods and treatment options for Scotch broom.

Avoid spraying Scotch broom when plants are blooming; the flowers can prevent thorough coverage to plant tissues. Be careful when using herbicides to minimize drift and injury to nontargeted plants. Large stands of dead Scotch broom killed by herbicide applications can be a fire hazard and may warrant removal. Cleared sites should be revegetated to prevent future infestations.

If you are unsure about the use of herbicides, contact your county Extension educator or state department of agriculture for current herbicide product registrations, application rates, and applicator license requirements.



Figure 11: Scotch broom plants growing along railroad tracks.

Biological

Natural enemies can reduce the competitive ability and abundance of a weed species, especially in areas where use of other control methods is too difficult or expensive. Biological control agents have not yet been shown to reduce Scotch broom density in established populations, but do help reduce the spread of Scotch broom, especially when combined with other management methods.

Biological control attempts of Scotch broom in the United States began with the release of the broom twig moth (*Leucoptera spartifoliella*) in 1960 in California and in 1970 in Oregon. The moth is widespread throughout the range of Scotch broom west of the Cascade mountain range. Its larvae damage the epidermis of the twigs, causing a reduced photosynthetic surface, but have only a minor impact.

In 1964, the Scotch broom seed weevil (*Exapion fuscirostre*) was released in California, in Oregon in 1983, and in Washington in the late 1980s. This insect also is widespread and can disperse up to 1.5 miles a year from release sites. The larvae feed on developing seeds in the pods, destroying from 20 to 80 percent of the seeds.

The Scotch broom seed beetle (*Bruchidius villosus*) was accidentally introduced on the eastern seaboard of the United States and, after undergoing host specificity tests, was introduced into Oregon in 1998 and Washington in 1999. Numerous release sites in both states are available for collection and redistribution of the beetle. The larvae of this beetle are seed feeders, and the beetle is becoming more abundant than the

seed weevil at some Scotch-broom-invaded sites. Where it is highly abundant at the sites, 90 percent of the Scotch broom pods are attacked and seed reduction can be from 50 to 90 percent.

Other arthropods feed on Scotch broom, and most are accidentally introduced natural enemies. They have varying impacts, but none are sanctioned for use as classical biological control agents.

For More Information

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Figure 12: Spines of a mature gorse plant.

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Online Resources

Oregon Department of Agriculture, Plant Division, Noxious Weed Control
<http://www.oregon.gov/ODA/PLANT/WEEDS/index.shtml>

Washington State Noxious Weed Control Board.
<http://www.ncb.wa.gov/>

USDA plants database
<http://plants.usda.gov/>

PNW Weed Management Handbook
<http://pnwpest.org/pnw/weeds>

Native Plant Restoration Resources

Washington Native Plant Society
<http://www.wnps.org/landscaping/herbarium/index.html>

Selecting Native Plants for Home Landscapes in Central Oregon.
<http://extension.oregonstate.edu/deschutes/index.php>

GardenSmart Oregon: A Guide to Non-Invasive Plants
<http://extension.oregonstate.edu/catalog/pdf/ec/ec1620.pdf>

Idaho Native Plant Society
 (see Native Plant Guide links)
<http://www.idahonativeplants.org/Default.aspx>

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