BROOMS

~ Biology and Control ~

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The brooms are a group of shrubs that were introduced into North America from Europe in the mid-1800s. The four most common species are Scotch broom *(Cytisus scoparius)*, French broom *(Genista monspessulana)*, Spanish broom *(Spartium junceum*), and Portuguese broom *(Cytisus striatus)*. Initially introduced as ornamentals, they were also used extensively by the Soil Conservation Service and the United States Department of Agriculture for erosion control along roadsides and for mine tailing stabilization. These highly competitive shrubs have become troublesome in many Mediterranean regions around the world. They grow rapidly and form dense stands that are inaccessible and unpalatable to wildlife. Their dense stems make regeneration of most other species difficult or impossible, and they also create a dangerous fire hazard. In addition, they have the ability to fix atmospheric nitrogen and increase the fertility of the soil, which gives a competitive advantage to other non-native weeds that, unlike the local natives, require high nitrogen to compete.

IDENTIFICATION

The brooms are upright shrubs that grow 3 to 10 feet tall. They generally produce bright yellow pea-shaped flowers on green stems from April to June. Scotch and Portuguese broom produce their flowers in the leaf axils, whereas French and Spanish brooms have flowers at the branch tips. In some areas Scotch broom flowers can be multi-colored, typically with red or purple petals along with the typical yellow petals. Another distinguishing characteristic between the species is stem shape. Scotch broom has a five-angled stem (star-shaped in cross section), French and Portuguese have an eight to ten-angled stem and Spanish broom has a finely ribbed stem making it nearly round. Leaf characteristics can also be used to identify the species. Spanish broom produces simple leaves whereas the other three species have mostly trifoliate leaves. For most species, new leaves produced in the spring are often lost during the hot, dry summer months or during periods of stress, giving the plants their characteristic whisk broom appearance. Scotch, Portuguese, and Spanish broom are all deciduous while French broom is evergreen. All the brooms produce brownish-black pea pods in mid- to late summer which contain 5-12 shiny, dark greenish-brown seeds. The pods ripen during the dry summer months and eject the seeds a few feet when dry.

BIOLOGY

The brooms are often found in disturbed places such as river banks, road cuts, and forest clearcuts, but can also colonize undisturbed grassland, shrubland, and open canopy forests. Invasion and spread is typically by seed dispersal. The seeds have an impervious seed coat which allows some seeds to remain viable for nearly 80 years. All of the brooms are prolific seed producers with a single shrub producing as many as 2,000 to 3,500 pods. About 40% of the newly produced seed germinate immediately after dispersal, and another 25% germinate in the second year. The remaining seed can remain dormant in the soil, making long-term management difficult.

After germination, stem growth is rapid in the first couple of years, as much as 3 to 4 feet in the first year. The rapid growth during the first 4 or 5 years is followed by 6 to 8 years of relatively slow growth. This is followed by a period of senescence in which there is more dead, woody tissue than green tissue. Plants typically live 12 to 17 years, but can survive up to 25 years. Many of the broom species do not reach flowering maturity until the second or third year of growth, making early removal important.

MANAGEMENT

The primary methods of managing brooms are mechanical removal by hand pulling and treatment with herbicides. Broom establishment is mainly through seed dispersal, so maintaining a healthy cover of desirable vegetation and reducing soil disturbance will minimize the potential for broom invasion.

Mechanical Control

Hand-pulling or mechanical grubbing (using a shovel, pick, or weed wrench) can be used to physically remove plants located in a yard or near houses. Remove plants in early spring or late fall when the soil is moist and roots are easily dislodged. Grubbing when the soil is dry and hard will usually break off the stems, leaving the rootstalks to vigorously resprout. Other forms of mechanical control have not proven to be successful. Brushrakes and bulldozers often leave pieces of rootstalks that can readily resprout. In some cases, brush removal in late summer, when plants are experiencing moisture stress, can slow their ability to recover. However, using large equipment to clear land creates a perfect environment for new seedling establishment, making follow up control essential.

Mowing broom plants gives poor control, unless it is performed repeatedly throughout the growing season. Within a couple months of germination, young plants have usually produced underground rootstalks large enough to recover from a single mowing. Extreme caution should be used when mowing during the spring and summer because of the potential for wildfires. Lopping mature plants near the base will provide some control and should be done when plants are moisture stressed in late summer or in late spring after a low rainfall winter. Lopping at other times can lead to vigorous resprouting.

Cultural Control

Burning alone is not an effective method for controlling broom. Burning can be used to remove large amounts of debris; however, in many cases, burning can increase the population as it removes competitive vegetation, releases nutrients into the soil, and promotes germination of seeds. There are reported examples where cutting the above ground vegetation of French or Scotch broom and allowing it to dry on site, followed by burning, can effectively control resprouting. In general, however, burning is best followed by an herbicide application, subsequent burnings, and/or revegetation using desirable species.

Grazing can provide control in small areas if the grazing pressure is high enough to continually suppress growth. Goats have been shown to vigorously feed on resprouting vegetation and shrubs, including broom. Grazing is non-selective so overgrazing can also damage desirable vegetation.

Biological Control

In the 1960s, three insects were introduced as biological control agents on broom: the Scotch broom seed beetle (*Bruchidius villosus*), Scotch broom seed weevil (*Apion fuscirostre*), and Scotch broom twig miner moth (*Leucoptera spartifoliella*). The latter two species are specific to Scotch broom, while the seed beetle also attacks Portuguese broom, Spanish broom, and French broom. Other insects and pathogens are being studied in their native countries to determine their potential for broom control.

Chemical Control

Homeowners in California can purchase the postemergence herbicides triclopyr or glyphosate. These herbicides used alone or combinations of glyphosate with triclopyr or imazapyr can control broom. Depending on the compound, these herbicides can be applied as a cut stump treatment, basal bark application, or as a foliar spray. When using herbicides, care must be taken to keep the material from contacting desirable plants that are susceptible to damage from these compounds. Also, homeowners, like professional applicators, should protect themselves by wearing appropriate protective equipment as stated on the herbicide label.

Glyphosate and triclopyr are the most effective herbicides for the control of broom. However, effective control depends upon proper timing of the application. Apply herbicides in spring when plants are actively growing or in late summer. It is important to note that glyphosate is a non-selective compound and will damage or kill other vegetation it contacts. Triclopyr is a broadleaf herbicide that will not injure grasses but will damage or kill other broadleaf plants.

Foliar Sprays. The effectiveness of herbicides applied to broom foliage depends on three factors: (1) proper growth stage at time of application; (2) good coverage; and (3) proper concentration.

Foliar application of herbicides to broom is most effective after leaves are fully developed and when the plant is actively growing. This period is normally from April into June or July, when soil moisture is still adequate. The flowering stage is the optimum time to treat. Do not apply herbicides before plants begin growth in spring or in mid-summer when plants are stressed.

Herbicides can be applied as a foliar spray using one of two methods. The first is spray-to-wet, where all leaves and stems should be glistening following herbicide application. However, coverage should not be to the point of runoff. The other method is a low-volume broadcast application, called drizzle. This technique uses a higher concentration of herbicide but is sprayed at a lower volume. This method is advantageous in dense shrubbery or where access is limited. To achieve proper coverage, the herbicide is sprayed uniformly over the entire canopy in a "drizzle" pattern, using a spray gun.

For spray-to-wet applications, glyphosate or triclopyr can be applied as a 2% solution of the active ingredient in water. For drizzle applications, glyphosate or triclopyr can be applied as a 15% solution of the active ingredient in water. Products or spray mixtures containing less than this may not effectively control broom. Concentrations of both glyphosate and triclopyr can vary

with the specific formulation purchased. Check the pesticide container to determine the amount of herbicide to add to water in order to achieve the recommended percent solution of the active compound.

Cut Stump Application. Cut stump treatments are most effective in spring during active plant growth or in the fall. Immediately after cutting, herbicide should be applied with a paint brush, spray bottle, or with a plastic squeeze bottle. Delaying application will result in poor control. For small stumps, completely cover the cut surface; for large stumps, it is only necessary to wet the cambium (the outer ring of wood, next to and including the bark). For small stemmed shrubs, stems can be cut with loppers or clippers and herbicide solution painted or sponged onto each cut end. Treatment solutions should contain 8% to 10% triclopyr (the 8% material available to homeowners in nurseries and other stores will work fine, undiluted) or 8% to 10% glyphosate. (If using a brand that has 18% glyphosate listed in the active ingredients, make a 1:1 solution of the product and water. If the product contains 41% glyphosate, use 1 part product and 3 parts water.)

Basal Application. Basal bark applications can be made almost any time of the year. Apply triclopyr (8% to 10%) to the bottom 6 inches of the trunk. This can be done using a spray bottle, sprayer or paint brush. For basal bark applications, use an ester form of triclopyr.

One application of an herbicide does not always completely control broom. Re-treat when new, sprouting leaves are fully expanded, generally when the plants are about 2 feet tall. Watch treated areas closely for at least a year and re-treat as necessary.

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