
BROOMS

Integrated Pest Management for Home Gardeners and Landscape Professionals

Brooms are a group of shrubs 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*). Brooms initially were introduced as ornamentals, but the United States Department of Agriculture's Natural Resources Conservation Service used them extensively for erosion control along roadsides and in mined areas.

These highly competitive shrubs grow rapidly and form dense stands that most wildlife find impenetrable and unpalatable. Their dense stems make regeneration of most other plant species difficult or impossible, and they create a dangerous fire hazard. In addition, brooms are able to fix atmospheric nitrogen, which increases soil fertility and gives a competitive advantage to other non-native weeds that, unlike the

local natives, thrive on high nitrogen levels. Although some retail nurseries still sell a variety of broom species, homeowners should avoid planting it in their personal landscapes. Depending on your climate, a number of alternate plant species have similar attributes but are not invasive. Contact your county UC Master Gardener for a list of recommendations.

IDENTIFICATION

Brooms are upright shrubs that grow 3 to 10 feet tall (Figs. 1 and 2). They generally produce bright yellow, pea-shaped flowers on green stems from April to June.

Scotch and Portuguese brooms produce their flowers in the leaf axils, while French and Spanish brooms have flowers at the branch tips. In some areas Scotch broom flowers can be multicolored, typically with red or purple petals along with yellow ones.

Another distinguishing characteristic between the species is stem shape. Scotch broom has a five-angled stem (star shaped when viewed from a 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 also identify the species. Spanish broom produces simple leaves while the other three species have mostly trifoliate leaves. For most species, new leaves produced in spring often are lost during hot, dry summer months or periods of stress, giving the plants their characteristic whisk broom appearance. Scotch, Portuguese, and Spanish brooms are deciduous while French broom is an evergreen.

All four brooms produce brownish-black pea pods in mid- to late summer that contain shiny, dark greenish-brown seeds. Table 1 shows identifying features of these four broom species.

Figure 1. Brooms are upright shrubs that produce yellow flowers in spring. Most species also generate new leaves in the spring but often lose them during hot, dry summer months, creating a whisk broom appearance. Shown here is Scotch broom, *Cytisus scoparius*.



Figure 2. Spanish broom, *Spartium junceum*.

PEST NOTES




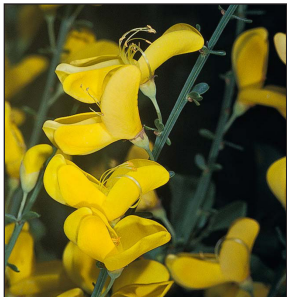







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Table 1.

Distinguishing Features of Four Common Broom Species in California.

<p>Scotch broom (<i>Cytisus scoparius</i>)</p>	<p>French broom (<i>Genista monspessulana</i>)</p>	<p>Spanish broom (<i>Spartium junceum</i>)</p>	<p>Portuguese broom (<i>Cytisus striatus</i>)</p>
 <p>Stems: 5-sided; star-shaped cross section Leaves: compound, 3 leaflets, deciduous, sometimes single on new twigs</p>	 <p>Stems: 8 to 10 ridges; round cross section Leaves: compound, 3 leaflets, evergreen, usually dense</p>	 <p>Stems: smooth or finely ribbed; round cross section Leaves: simple, deciduous, sparse</p>	<p>No photo available.</p> <p>Stems: 8 to 10 ridges; round cross section Leaves: compound, 3 leaflets, deciduous, sometimes single on new twigs</p>
 <p>Flowers: single or paired in leaf axils Petals: yellow or partially red</p>	 <p>Flowers: 4 to 10 in clusters at end of short branches Petals: yellow</p>	 <p>Flowers: several in open racemes at stem ends Petals: yellow</p>	 <p>Flowers: single or paired in leaf axils Petals: yellow</p>
 <p>Seed pods: flattened, only margins hairy</p>	 <p>Seed pods: slightly flattened, entirely covered with long hairs</p>	 <p>Seed pods: slightly flattened with few, if any, long hairs</p>	 <p>Seed pods: slightly inflated, entirely covered with long hairs</p>

BIOLOGY

You'll often find brooms in disturbed places such as riverbanks, road cuts, and forest clear cuts, but they also can colonize undisturbed grassland, shrubland, and open canopy forests. Invasion and spread typically are by seed dispersal. The pods ripen during the dry summer months then explosively eject their seeds a few feet away, mak-

ing a popping noise you can hear for some distance. All of the brooms are prolific seed producers with a single shrub producing as many as 2,000 to 3,500 pods containing up to 20,000 seeds. About 40% of the newly produced seeds germinate immediately after dispersal, and another 25% germinate the second year. The seeds have an impervious seed coat, enabling some seeds to remain dormant in the soil for

up to 50 years and making long-term management difficult.

After germination, stem growth is rapid—as much as 3 to 4 feet the first year. After continuing to grow quickly for another 3 to 4 years, the plant experiences 6 to 8 years of relatively slow growth. Next is a period of senescence with more dead, woody tissue than green. Plants typically live 12 to 17

years but can survive for as long as a quarter century.

Although brooms usually don't reach flowering maturity until the second or third year of growth, under the right conditions—including prevalent moisture—broom species can produce flowers and seeds their first year, making early removal important.

MANAGEMENT

The two primary methods for managing brooms are mechanical removal 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 of broom invasion.

Mechanical Control

You can use hand pulling or mechanical grubbing—using a shovel, pick, or Weed Wrench—to physically remove smaller infestations in wildlands or urban areas. Remove plants in early spring or late fall when the soil is moist and it is easy to dislodge roots. Some tools, however, are difficult to use in soils that are too moist, and hand pulling can create soil disturbance that can lead to rapid reinvasion. Grubbing when the soil is dry and hard usually will break off the stems, leaving rootstalks that will vigorously resprout.

Other forms of mechanical control have not proven successful. Brush rakes and bulldozers often leave pieces of rootstalks that readily can resprout. In some cases, brush removal in late summer, when plants experience 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 you perform it repeatedly throughout the growing season. Within a couple months of germination, young plants usually have produced underground rootstalks large enough to recover from a single mowing. Use extreme caution when mowing during spring and summer because of the

potential for wildfires. Mowing later in the season also can spread seeds.

Lopping mature plants near the base will provide some control; you'll want to do this when plants are moisture stressed in late summer or in late spring following a winter with little rainfall. Lopping at other times can lead to vigorous resprouting.

Cultural Control

Burning alone is not an effective method for controlling brooms. Although burning can remove large amounts of debris, in many cases it can increase the population as it removes competitive vegetation, releases nutrients into the soil, and stimulates the germination of broom seeds left in the soil.

Cutting the above-ground vegetation of French or Scotch broom and allowing it to dry on site, followed by burning, can effectively control resprouting. Burning is more effective if you follow it with an herbicide application, subsequent burnings, and/or revegetation using desirable species. It is important to employ a control strategy following a burn, otherwise the broom population in subsequent years may become worse than before.

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 brooms. You can train goats to selectively feed on brooms or other undesirable species, but overgrazing can lead to nonselective damage to desirable vegetation.

Biological Control

In the 1960s, three insects were introduced as biological control agents on brooms—the Scotch broom seed beetle (*Bruchidius villosus*), the Scotch broom seed weevil (*Apion fuscirostre*), and the Scotch broom twig miner moth (*Leucop-tera spartifoliella*). The latter two species are specific to Scotch broom, while the seed beetle also attacks Portuguese broom, Spanish broom, and French broom. Because brooms are serious problems in many countries, the Inter-

national Broom Initiative is evaluating other insects and pathogens in their native countries to determine their control potential.

Chemical Control

California homeowners can purchase the post-emergent herbicides triclopyr and glyphosate, the most effective chemicals for controlling brooms. You can use these herbicides either alone or as a combination of glyphosate with triclopyr or imazapyr. In areas near rivers or streams, it is important to use the proper formulation of these herbicides. Ester formulations of triclopyr or imazapyr, for example, are not registered for use near water, and some glyphosate formulations cannot be used near water either.

Depending on the compound, you can apply these herbicides as foliar sprays, a cut-stump treatment, or a basal bark application. When using herbicides, be sure to prevent them from getting on desirable plants. Because glyphosate is a nonselective compound, it will damage or kill other vegetation. Triclopyr is a broadleaf herbicide that will not injure grasses but will damage or kill other broadleaf plants. Homeowners and professional applicators should wear appropriate protective equipment as stated on the herbicide label.

Foliar Sprays. The effectiveness of herbicides depends on three factors—timing, achieving good coverage, and using a proper concentration.

Timing. Foliar application of herbicides to brooms is most effective after leaves are fully developed and when the plant is actively growing. This period normally is from April into June or July, when soil moisture remains adequate. The flowering stage is the optimum time to treat. Don't apply herbicides before plants begin their spring growth or in mid-summer when plants are stressed. Although not typically a problem, dust can cover plants growing near roadsides. Herbicides, particularly glyphosate, can readily attach to dust or soil particles, thus reducing their effectiveness.

Coverage and Concentration. You can apply herbicides as a foliar spray using one of two methods. The first is spray-to-wet, where all leaves and stems should glisten following an application. Coverage, however, should not be to the point of runoff.

The other method is a low-volume foliar application called drizzle. This technique uses a higher concentration of herbicide, but you spray it at a lower volume. This method is advantageous in dense shrubbery or where access is limited. To achieve proper coverage, spray the herbicide uniformly over the entire canopy in a “drizzle” pattern, using a spray gun.

For spray-to-wet applications, products containing 41% glyphosate as the active ingredient can provide good to excellent control of brooms when applied at 2.5 ounces of product per gallon of water (2% of the total solution). Some products available for use in the home landscape with this concentration of active ingredient are Clearout 41 Plus, Honcho Herbicide, and Honcho Plus Herbicide. Glyphosate products that have a lower concentration of active ingredient, such as Roundup Concentrate (18% active ingredient), will require about 6 ounces of product per gallon of water (4.7% of the total solution) for effective control.

Triclopyr is available in either amine or ester formulations, with triclopyr ester being more effective on brooms, since absorption of the herbicide into the foliage is not as good with the amine form. One product available for use by licensed applicators—and for homeowners that acquire an operator identification number from their county Department of Agriculture—is Garlon 4. This and other similar products formulated with a minimum of 61% active ingredient can provide good to excellent control when applied at 1 to 1.25 ounces of product per gallon of water (0.75% to 1.5% of the total solution).

Mixing triclopyr ester with commercially available seed oils can offer better penetration. One available product is Hasten Spray Adjuvant; mix this at

1.25 ounces of product per gallon of herbicide solution (1% of the total solution).

The best time to apply either form of the herbicide is late spring. When air temperatures are higher than 80°F, it is better to use the amine formulation, because the ester form is subject to vaporization. More than one ester formulation of triclopyr is available, with differing degrees of volatilization at high temperatures.

You can use glyphosate and triclopyr in combination to achieve better control. Triclopyr is also available in retail stores for use in the home landscape in products formulated at a lower concentration than those available to licensed applicators. Carefully read and follow the label of these products—such as Brush-B-Gon Poison Ivy and Poison Oak & Brush Killer—to apply the correct amount.

The drizzle application method is good in situations of dense planting or when it is difficult to cover an entire area due to topography. Glyphosate formulated into a product with 41% active ingredient can provide good to excellent control of brooms when applied at 19 ounces of product per gallon of water (15% of the total solution). You also can apply triclopyr using a drizzle application. If you are using triclopyr ester formulated into a product with 61% active ingredient, apply it using 13 ounces of product (10% of the total solution) and 25 ounces of seed oil (20% of the total solution) per gallon of water.

Remember that although the drizzle technique uses a higher concentration of herbicide, you are applying it at a lower volume. One gallon of mixed herbicide solution should adequately treat one-half acre of densely populated broom.

Cut Stump Application. Cut stump treatments are most effective in spring during active plant growth or in the fall. Immediately after cutting, apply the herbicide to the cut surface with a paint brush, spray bottle, or plastic squeeze bottle. Delaying application

will result in poor control, because the cut surface quickly will develop an air interface between the water in the vascular tissue and the herbicide solution, preventing movement of the chemical into the plant.

For small stumps, completely cover the cut surface. For large stumps, it is necessary to wet only the cambium, the outer ring of wood next to and including the bark. For small-stemmed shrubs, cut the stems with loppers or clippers and paint or sponge the herbicide solution onto each cut end.

For triclopyr products containing 61% active ingredient, use 1 part product and 4 parts water. The 8% material available to homeowners in nurseries and other stores will work well undiluted. You also can apply glyphosate as a cut-stump application. 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. You can apply concentrated forms of triclopyr ester to basal regions of brooms using a backpack sprayer with a solid cone, flat fan nozzle, straight-stream spray nozzle, or even a wick applicator. Thoroughly cover a 6- to 12-inch high basal section of the stem with spray but not to the point of runoff. You can make basal bark applications almost any time of the year, even after leaves have senesced. For triclopyr ester formulated into a product with 61% active ingredient, the application ratio is 13 ounces of product (10% of the total solution) and 25 ounces of seed oil (20% of the total solution) per gallon of water. Glyphosate and the amine formulation of triclopyr provide poor control using this technique.

One application of an herbicide does not always completely control brooms. Retreat 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 retreat as necessary.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original, labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down the sink or toilet. Either use the pesticide according to the label, or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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