

# Scotch Broom

## *Information to use in considering control strategies*

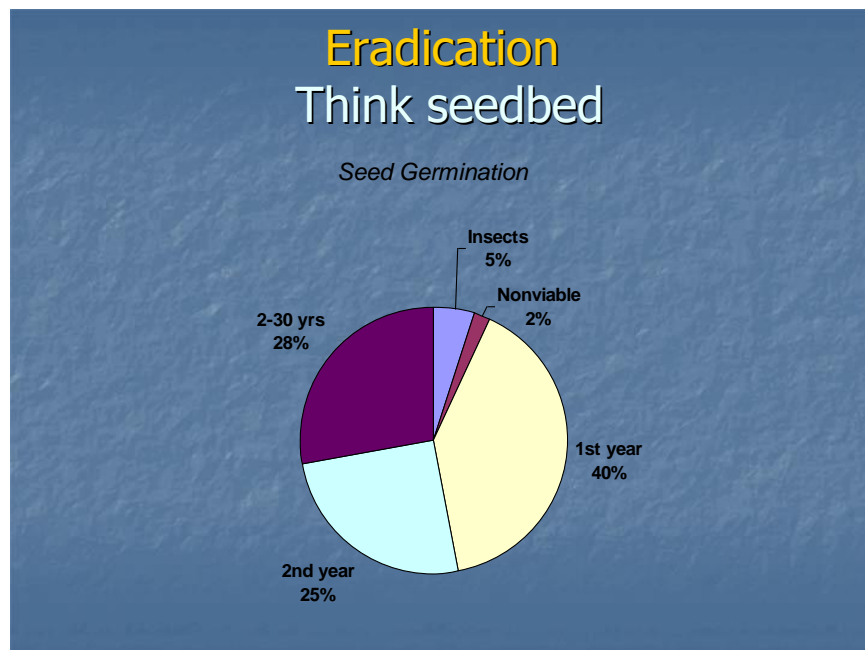
*Adapted from UC IPM Pest notes* <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74147.html>

### *Why brooms are weed invaders?*

Because brooms are legumes, they are capable of essentially manufacturing its own nitrogen fertilizer by "fixing" atmospheric nitrogen through its roots. This allows them to thrive in poor soil sites. 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.

### *Eradication = Seed bank management*

Eradication of any weed requires a focus on the bank of seeds in the ground after the control of the plant. Sixty five percent of broom seeds germinate within the first 2 years, and they have been reported to remain viable for up to 25 years. This means successful eradication will take an extensive effort the first two years, with repeated monitoring of the site for germination over an extended period. The seeds have an impervious seed coat, enabling some seeds to remain dormant in the soil for up to 25 years and making long-term management a challenge.



### *Growth*

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.

## Control Options

### ***Pulling***

You can use hand pulling or mechanical grubbing by using a shovel, pick, or Weed Wrench to physically remove smaller infestations in wildlands or urban areas. Remove plants in winter or early spring 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 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. Weed wrenches are loaned free to members of the Butte Fire Safe Council.



### ***Cutting*** (by hand or mechanical)

Cut near the ground in the late summer or fall before rains occur when the plant is water stressed. Lopping mature plants near the base will provide 30 to 80% control depending on how much the plants are moisture stressed. Lopping at other times of the year when soil moisture is present can lead to vigorous resprouting. Researchers warn against cutting stems off below the soil surface, which can "stir" banked Scotch broom seeds and stimulate their germination.

Mowing broom plants gives poor control, unless you perform it repeatedly throughout the growing season. Use extreme caution when mowing during the summer because of the potential for wildfires. Mowing later in the season also can spread seeds.

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, mechanical 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.

### ***Grazing***

Grazing broom plants generally gives poor control, unless it is performed repeatedly throughout the growing season. 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. Some publications report that brooms contain two alkaloids (cytosine, sparteine) that can create symptoms that appear very soon after ingestion such as nausea, vomiting, staggers.

### ***Burning***

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.

### ***Herbicides***

California homeowners can purchase the two post-emergent herbicides triclopyr (sold as Ortho Max - Poison Ivy and Tough Brush Killer) and glyphosate, (sold as Roundup® and under other trade names), the most effective chemicals for controlling brooms. Depending on the compound, you can apply these herbicides as foliar sprays, on a freshly cut-stump, or a basal bark application. 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 and limit the herbicide effectiveness. Herbicides, particularly glyphosate, can readily attach to dust or soil particles, thus reducing their effectiveness. The best time to apply either form of the herbicide is late spring, when air temperatures are higher than 80°F.

*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.



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. If your water is high in calcium or magnesium use the label instructions for acidification of water before adding the glyphosate.

Triclopyr (sold as Ortho Max - Poison Ivy and Tough Brush Killer or Garlon) 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).

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. 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). 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, gallon sprayer under low pressure, 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 apply 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.

### **Integrated Management**

Integrated management of controlling the brooms includes other actions that reduce germination of seeds stored in the ground. This can be accomplished by planting competitive species (trees, shrubs, forbs, grass), leaving as many trees as possible that produce shade and decreasing soil disturbance in areas where broom plants were removed. All of these actions will decrease the number of germinating broom plants.












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. Seeding non native grasses like annual ryegrass 20 lbs./acre or other plants like Hykon rose clover 4 lbs./acre to compete with the broom will decrease successful germination.

### **Biocontrol**

Two USDA approved insects, a stem boring moth, *Leucopetra spartifoliella*, and a seed beetle, *Apion fusciostre*, were introduced in the 1960s as biocontrol agents, but have had limited success in California. New insect biocontrol agents are being tested in England and France for use on broom in Australia and New Zealand. If proved safe and effective in California, these insects may ultimately become available for use as biocontrol agents in California.



## Distinguishing Features of Four Common Broom Species in California.

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

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