

## Woody plant control

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Woody plants are classed as weeds if they grow where they are unwanted. Remove inferior trees and inferior species from timber stands, pastures, roadsides, and other areas to promote better growth of desirable trees. There are approximately 12,000,000 acres of permanent pasture land in Missouri. Much of it is partially or completely overgrown with unproductive woody species. Removal of such growth is a requisite for pasture improvement and can be done in a number of ways.

**Bulldozing** uproots and removes trees and brush, but a few roots generally remain, and they quickly give rise to new growth. Bulldozing is also objectionable because the soil surface is disturbed and becomes susceptible to erosion. It is also costly.

**Burning**, in addition to posing other hazards, may destroy desirable grass and legume species. Surface mulch is generally lost when fire passes over an area; thus the area is open to erosion.

Mechanical methods such as **cutting, girdling,** or "**brush-hogging**" are neither satisfactory nor effective because sprouts quickly originate from stumps and from extensive root systems. Cutting and girdling particularly are time-consuming and costly.

**Herbicides** for woody plant control have received widespread acceptance during the past several years. Herbicides are effective, relatively economical, and easily applied. This guide provides information on use of herbicides for control of various woody species.

### Description of herbicides

**Amitrole** (Amino-Triazole) is formulated as a water-soluble powder for application in solution form. It is safer to use than 2,4-D, or 2,4-DP where drift would injure nearby plants. Amitrole works on too few species to be used as a general brush killer. It is especially effective on *black locust*, *poison ivy*, *poison oak*, and *sumac*. It moves readily through the plant system so it can be applied to foliage. It is not absorbed through bark, however. Amitrole is not

cleared for use in areas grazed by livestock.

**Ammate** (ammonium sulfamate) is a granular material that is very soluble in water, and that breaks down rapidly in moist soil. It is available in crystalline or liquid form. It is a non-selective contact herbicide applied as a foliage spray and is effective over a wide range of conditions and species. Ammonium sulfamate is especially effective on *poison ivy*, *poison oak*, and *poison sumac*. There are no grazing restrictions where ammate is applied in pasture areas.

**Banvel** (Dicamba) is available in various formulations sold under different trade names: "*Brush-buster*" includes approximately 16 percent dicamba plus 24 percent 2,4-D amine formulated in a 2.9 pound acid equivalent per gallon. Banvel "*CST*" is formulated as a 1 pound per gallon and can be applied directly from the container to cut sulfur. Banvel herbicide contains 4 pounds dicamba per gallon.

**Graslan.** Soil-applied Graslan is effective in eradicating several species of brush and other woody plants. Application just prior to seasonal rainfall will give most rapid response. Brush will continue to die for several months after application. A single application is generally effective for a period of several years.

**Hyvar.** Apply "Hyvar" as a spray just before or during the period of active growth of plants you want to control and when you expect rainfall for soil activation. If dense growth is present, results will be improved if you remove vegetation before treatment. Do not apply when ground is frozen.

**Krenite** applied as a foliar spray will kill or suppress several different woody species (trees or brush) on noncrop land. If you apply it to trees or brush in late summer or early fall, susceptible species won't leaf out during the following spring and subsequently die. Apply at rates of 1½ to 3 gallons of krenite per acre during the two month period before fall leaf coloration. Apply either by air or ground equipment. If it rains within 24 hours of application, effectiveness may be decreased. Use only in accordance with recommendations on the label.

Krenite cannot be used on cultivated land or in pastures.

**Tordon** (Picloram). Picloram is now registered for use on permanent grass pastures and range land in Missouri. Available as a 10 percent granule (Tordon 10K Pellets), picloram is highly effective in eradicating several species of woody plants including brushes and trees.

Picloram can be applied any time when the soil is not frozen. However, best results are obtained from an application in spring before growth begins or during periods of vigorous growth when you expect subsequent rainfall. Moisture is necessary to activate the pellets.

Distribute the pellets uniformly over the problem area. The 10 percent pellets should be applied at a rate of 1 pound per 1,000 square feet. This is equivalent to 40 pounds of formulation per acre for control of such problem species as multiflora rose and juniper.

Picloram is highly water soluble. Do not apply where surface water from treated areas can run off to cropland or to streams, ponds, or wells. Apply picloram only as specified on the label; follow all use directions and precautions. For cut surface treatment see Tordon "RTU."

**Roundup** (Glyphosate). Apply this product when plants are actively growing and at or beyond full flowering. Use the higher rate for larger plants or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage. For best results, apply in late summer or fall after fruit formation. Apply fall treatments before a killing frost. Ensure thorough coverage when using handheld equipment. Symptoms may not appear prior to frost or senescence with fall treatments. If brush has been mowed or trees have been cut, do not treat until regrowth has reached recommended stages.

**Velpar** is an effective general herbicide providing both contact and residual control of many woody plants and, except for johnsongrass, is effective for control of most perennial weeds. It is absorbed through the roots and foliage.

Moisture is required to activate "Velpar" in the soil. For best results, apply when soil is moist and when you expect  $\frac{1}{4}$  to  $\frac{1}{2}$  inch of rainfall within two weeks.

## Methods of herbicide application

Size of the woody plant will in part determine the method of application used. The method is generally selected on the basis of ease of application and cost. When you use phenoxy herbicides, you can apply foliage spray by ground equipment on woody plants shorter than 15 feet. Sprouts or trees that are too tall to spray from the ground but that are fewer than 4 inches in diameter at the base can be treated with basal sprays or stump applications. Use frill treatments on trees that are more than 4 inches at the

base. Aerial application will cover all types of foliage and is effective on trees or brush of any size.

## Foliage applications

Foliage sprays are most practical where thorough coverage of brush or trees can be obtained.

The best time to make foliage application is after the leaves have reached maximum size in late spring or early summer and while rapid growth is in progress. You can spray on a small scale with an ordinary 3-gallon pack (compressed air) sprayer operating at a pressure of 35 to 40 pounds per square inch. For larger areas, a field sprayer you can drive through brush is effective. Spray scattered trees with a hand gun. For low-growing brush, use a broadjet-type nozzle or boom to spray swaths over the brush. Wet leaves thoroughly during the application.

## Mist blower

A mist blower sprays low volumes of herbicide at high pressure to produce a mist. It is generally tractor mounted, capable of applying volumes as low as 2 to 5 gallons per acre, covering trees up to 30 feet tall.

## Aerial applications

Aerial applications are made with specially equipped fixed-wing airplanes or helicopters. Helicopters apparently have no great advantage over a fixed-wing plane, and they may cost considerably more. A helicopter has the advantage of flexibility in landing, and in some cases it may be more practical where landing strips are a greater distance from the spray area. Aerial spraying is designed for large scale operations; spraying areas less than 40 acres is usually impractical. Aerial applications of 2 to 5 gallons per acre are generally made in low-volume carriers.

Applications are made with either oil or oil-water emulsions, which are made with light fuel oils, such as diesel oil or kerosene. The emulsions are made in ratios such as 1 gallon of oil with 4 gallons of water. The phenoxy type compounds like 2,4-D are generally applied at rates of 1 pound per acre for easy-to-kill species, or 2 to 3 pounds per acre for species that are somewhat resistant.

One aerial application will generally result in a 50 to 80 percent kill; a second and sometimes a third application may be necessary to get 90 to 100 percent eradication.

Precautions are needed in aerial spraying to reduce drift and to avoid injury to susceptible plants and crops in the area. Spray in early morning or evening when there is little wind.

Herbicides with the consistency of mayonnaise have been developed. These heavy emulsions are designed to reduce the drift hazard associated with aerial spraying. Devices to apply these materials are still in the experimental stage.

## Species response to woody plant herbicides

Herbicides	Weeds																			
	Oaks	Sweet Gum	Wild Cherry	Persimmon	Sassafras	Pine	Multiflora Rose	Blackberry	Red Cedar	Willow	Sumac	Winged Elm	Greenbrier	Hickory	Honeylocust	Honeysuckle	Red Maple	Poison Ivy	Trumpetreeper	
Ammate	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	P
Ammate (CS)	G	G	G	P	P	P	P	P	P	P	P	P	P	G	G	P	G	P	P	P
Hyvar (ST)	G	G	G	P	P	P	P	P	P	G	G	G	P	P	F	F	F	G	P	P
Krenite (FS)	G	G	P	P	P	P	G	G	P	F	G	G	P	F	P	P	F	P	P	P
Roundup (FS)	G	F	F	P	P	P	F	G	P	P	P	P	P	F	F	G	P	G	G	G
Roundup (CS)	G	G	G	G	P	P	P	P	P	P	P	F	P	F	F	G	P	P	P	P
Graslan (ST)	G	F	G	P	P	G	G	G	P	G	G	G	F	F	G	G	F	G	G	G
2,4-D (FS)	F	P	P	P	P	P	P	P	P	F	P	P	P	P	P	P	P	F	P	P
2,4-D (BS)	F	P	P	P	P	P	P	P	P	F	F	F	P	F	F	P	F	P	P	P
2,4-D (CS)	F	P	P	P	P	P	P	P	P	F	F	F	P	F	F	P	F	P	P	P
2,4-DP (FS)	F	F	F	P	F	P	P	F	P	F	F	P	P	F	F	P	P	F	P	P
2,4-DP (BS)	F	F	F	P	F	P	P	P	P	F	P	F	P	F	P	F	P	F	P	P
2,4-DP (CS)	F	F	F	P	F	F	F	P	P	F	P	F	P	F	F	P	F	F	P	P
Tordon (FS)	F	F	F	P	F	F	F	P	P	F	P	F	P	F	F	P	F	F	P	P
Tordon (ST)	G	F	G	F	F	G	G	G	G	F	G	G	P	G	G	G	F	G	P	P
Tordon (CS)	G	F	G	F	P	P	P	P	G	F	P	G	P	F	G	P	F	P	P	P
Velpar (FS)	G	F	G	F	P	P	P	F	P	G	G	G	P	F	G	F	F	F	P	P
Velpar (ST)	G	F	G	F	P	P	P	F	F	G	G	G	P	F	G	F	F	F	P	P
Velpar (CS)	G	F	G	F	P	P	P	F	P	G	G	G	P	F	G	F	F	F	P	P
Banvel (FS)	F	P	F	G	P	P	P	G	P	F	F	P	P	P	P	P	F	G	P	P
Banvel (ST)	P	P	F	G	F	P	P	P	P	P	F	F	P	F	P	P	P	P	G	G
Banvel (CS)	F	P	F	P	P	P	P	P	P	P	P	F	P	F	F	P	P	P	P	P
Amitrol-T	P	P	F	P	P	P	P	P	P	P	P	P	P	P	F	F	P	F	P	P

Rating scale: G = Good                      FS = Foliar spray  
 F = Fair                                      CS = Cut surface  
 P = Poor                                      ST = Soil treated

### Basal treatments

Basal treatments are usually applied to trees or brush that have basal diameters of less than 4 inches. Bigger trees are not effectively killed with this type of application. Applications are made by spraying an oil-herbicide solution to the base of the tree from ground level to about 12 inches upward. The spray should be applied to the point of run-off. For better kill apply enough material to wet the bud zone im-

mediately beneath the soil surface. Esters of 2,4-D or 2,4-DP are used in solutions of light oil such as kerosene or diesel oil with 16 pounds acid equivalent of herbicide per 100 gallons of oil. A pressure of 15 to 20 pounds per square inch reduces the amount of solution lost. Use nozzles with a narrow angle or cone-pattern. Apply basal treatments any time except when the bark is wet or when the temperature is below freezing.

## Frill treatments

To kill trees larger than 4 inches in diameter, cut a frill around the base and apply herbicide. Make frills by cutting pockets around the trunk to hold the solution. For best results, apply the herbicide immediately after the frill is made. Apply solutions of 2,4-D or 2,4-DP with a sprayer as 16 pounds acid equivalent in 100 gallons of oil. Wet the cut surface with as much spray as it will hold.

Ammate (ammonium sulfate) is also suitable for frill application. Use 4 pounds of chemical per gallon of water. For best results with ammate, treat in early spring or late summer.

## Stump treatments

Stump treatments generally are used when trees can be readily cut down. Trees slightly more than 4 inches in diameter can be cut almost as easily as they can be frilled. Treat fresh stumps with Tordon "RTU," a 5 percent formulation not included on the restricted list of herbicides. The stump should be thoroughly wet to the ground line. You can use ammate solutions

containing 4 pounds per gallon similarly with good results. One teaspoonful of ammate crystals per inch of stump diameter is also effective. For best results, treat in spring or early summer.

## Precautions in herbicide use

Do not inhale herbicides and avoid contact with spray and drift. Avoid repeated or prolonged contact of herbicides with your skin. Avoid spilling the chemical on your body. Wash it off with soap and water if you do and remove contaminated clothing.

To protect fish, wildlife, and livestock, do not clean spraying equipment or dump excess spray material near lakes, streams, or ponds.

Empty herbicide containers may be hazardous. Dispose of them in accordance with label instructions. Put them where they cannot contaminate food, feed, or water.

When handling herbicides wear clean, dry clothing. Launder clothing after each spraying and before wearing again.