

Brush Control

Killing unwanted brush and small trees or preventing stumps from sprouting is a problem for many landowners in rural settings. Although every situation is different, there are a number of herbicides and application methods available to control brush or prevent stumps from sprouting. In general, however, the herbicides used for brush control are not labeled for use in the home landscape or domestic settings where desirable plants are present.

The use of brush control herbicides requires careful consideration of the environmental impact of these products and their application methods. Herbicides used for brush control vary in environmental stability, leachability, flashback potential, selectivity, and handling requirements. Herbicides may damage surrounding vegetation, contaminate groundwater, and prevent desirable vegetation from becoming established for several years.

This publication suggests ways to avoid problems, but it does not supersede product label instructions or discuss first aid, storage, and disposal requirements. The specific herbicide label lists hazards that may make the product unsuitable for use in certain situations. Read and follow the requirements on the herbicide label.

Steps in a Brush Control Program

1. Evaluate the target species.

The first step in establishing a brush control program is to identify the dominant target species or group of species on the target site. This is important because each site generally has a mixture of brush, and it is impossible to tailor a single program to fit all possibilities.

2. Evaluate the target site.

The second step is to evaluate the target site itself. Consider potential site and environmental problems such as the following:

- Possible off-site movement of herbicides due to drift or runoff of drainage water
- Potential surface water and groundwater contamination
- Soil type (leachability and clay and organic matter content) and vegetative cover present
- Possible injury to plants whose roots may extend into areas treated with soil-active herbicides

3. Choose the application method and the herbicide.

The third step in establishing a brush control program is choosing a program that does the following:

- Meets the needs of the objective
- Controls the weeds present
- Is compatible with the location, topography, soil type, and nearby nontarget plants

Use Tables 1 through 6 at the end of this publication to match brush species to appropriate herbicides and application methods.

Some brush species cannot be effectively controlled with herbicides. For example, species such as persimmon, sassafras, and sawbrier are difficult to control with herbicides. A few herbicides provide suppression or partial control of these species, but none is very good.

Complete brush control from a single herbicide application rarely occurs due to the diversity of species and the age of brush at most sites. Landowners can compensate for this problem by either tank-mixing two or more herbicides or using a follow-up treatment to control plants that escaped the first application. Follow-up applications are made the next growing season because it is impossible to make an accurate evaluation of control until that time.

Factors to Consider in Choosing a Brush Control Program

Consider the following factors carefully before choosing a control material. Each factor may affect the success of your brush control program.

Suberization. Plants use this natural healing process to prevent insects or diseases from infesting tissues after cuts or wounds occur. Woody plants develop a layer of protective, corky cells over the damaged tissue. Suberization can reduce herbicide effectiveness by preventing absorption. When you use the hack-and-squirt or cut-stump method of application, apply the herbicides immediately to achieve maximum absorption. Delaying application of water-soluble herbicides for as little as 1 hour can reduce absorption and subsequent control.

Root grafts. Sometimes the roots of different plants share vascular tissue through grafting. Root grafting occurs primarily within the same species but may occur between plants of the same genus. A herbicide can move from a treated tree to an untreated desirable tree, killing or injuring it. Damage to desirable trees as a result of root grafting may occur from the use of 2,4-D, Banvel, Roundup, Ally, Escort, Grazon, Garlon, and Remedy.

Flashback. This term describes the passive loss of a herbicide from the roots of treated trees. Once the herbicide is released from one tree, it is available for uptake from another. This means that a treated tree may release herbicide back into the environment, injuring other nearby trees and vegetation. Flashback damage can occur with Grazon, Banvel, and occasionally 2,4-D.

Formulations. The herbicide formulation may affect its performance characteristics. Match the formulation and application method. For example, water-soluble amine formulations of 2,4-D and Garlon are preferred for hack-and-squirt applications. For basal bark applications, use oil-soluble ester formulations such as Pathfinder, Crossbow, or Remedy. Other herbicide formulations include wettable powder; dry-flowable, water-dispersible granules; or flowables. Formulations applied in the dry form include pellets and granules.

Ditch bank brush control. Herbicide use on ditch banks is a problem since most water passing through the ditches will, at some point, be used for irrigation or drinking. Some of the most effective brush herbicides such as Spike, Arsenal, and Velpar have warning statements on the label stating that the product should not be applied to ditches used to transport irrigation or drinking water. Rodeo (5 lb/gal glyphosate) is the best option since it has the fewest restrictions related to water use.

Standing dead brush. Herbicide-killed trees eventually decay, but this may take several years. Options to avoid standing dead brush are to cut the brush with an ax or chain saw and then treat the stumps to prevent sprouting or to treat the brush and then cut when the brush is dead. With most herbicides, the brush can be safely burned as firewood. While mechanical brush control is usually more expensive, time consuming, erosion prone, and less likely to achieve root kill, it does avoid the problems of standing dead brush and handling and applying herbicides.

Application Methods

There are several approaches to applying herbicides for brush control. They range from very simple hand methods to elaborate mechanical means.

Hack and Squirt

Hack and squirt, or **frill treatment**, (Figure 1) is a simple method of killing trees with herbicides. It is best suited to trees at least 4 to 5 inches in diameter. Bark on larger trees is often too thick for most water-soluble sprays to penetrate, so it is necessary to provide a direct pathway for herbicide entry into the plant's vascular system.

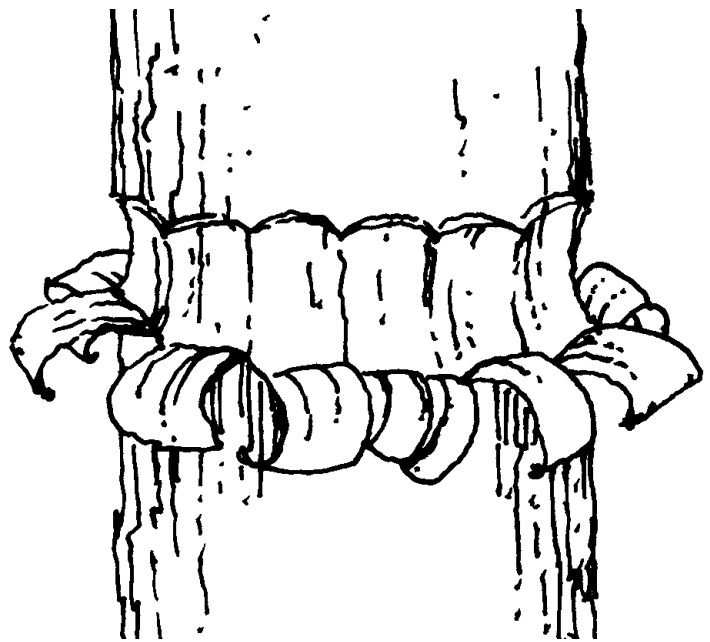


Figure 1. Make a series of downward cuts, leaving the chip, and immediately apply herbicide into the cuts.

Use a hatchet to make a series of downward cuts in the bark around the entire circumference of the tree trunk. For most species, it takes about one cut for every 2 inches of trunk diameter. Frill cuts are overlapping cuts in the tree bark around the stem. Immediately apply the selected herbicide into the cuts. Avoid application during heavy upward sap flow in the spring, when sap flowing out of the wound will prevent good absorption.

Apply herbicides registered for this purpose undiluted or in dilution ratios from one-half to one-quarter strength. Read the product label to determine the appropriate dilution. Amine formulations of Garlon, Grazon, and 2,4-D are generally more effective than esters. Roundup undiluted or half-strength is excellent for hack-and-squirt applications.

Stem injection (Figure 2) is similar to the hack-and-squirt treatment except that specialized equipment is used to inject a specific amount of herbicide into the tree at each injection point. Best results occur when injections are made every 2 to 6 inches around the tree. Trees or brush should be at least 1½ inches in diameter at chest height.

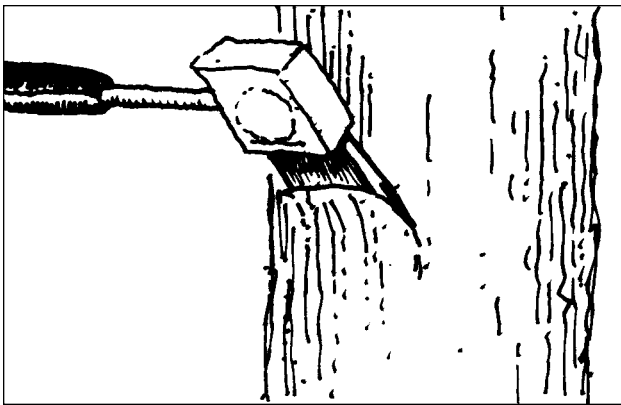


Figure 2. Use special equipment to make injection applications. Injection cuts do not overlap as cut surface treatments do.

Stump Spray Treatment

Stump spray treatment (Figure 3) involves cutting down a tree and treating the freshly cut surface with a herbicide.

Leave a tree stump 8 to 12 inches above the ground, and cut the top of the stump level to allow uniform herbicide coverage. Thoroughly wet the cambium layer next to the bark so the conducting tissue carries the herbicide to the roots.

On larger trees, treat only the outer 2 to 3 inches of the stump. The internal heartwood of the tree is already dead. On trees 3 inches or smaller in diameter, treat the entire cut surface. Apply treatment

immediately after cutting for maximum effectiveness. While there is some reduction in effectiveness after 1 hour, it may take about 4 hours before any serious drop-off in penetration occurs. If application is delayed after cutting, recut the stump and apply the herbicide to the live tissue. Delaying herbicide application to freshly cut trees can result in prolific sprouting from the tree collar and roots.

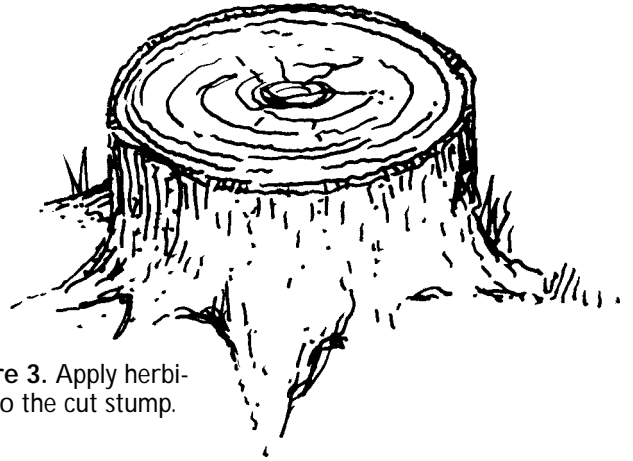


Figure 3. Apply herbicide to the cut stump.

Moisture stress may affect control during the summer and early fall. Applications during the spring upward sap flow are not as successful as late spring and early summer treatments. Pathfinder, Garlon 4, Remedy, and Crossbow are good stump treatment products that mix readily with petroleum-based penetrants.

Basal Bark Treatment

Basal bark treatment (Figure 4) involves the application of a herbicide to the lower 12 to 18 inches of the trunk or stem from early spring to midfall. Some species can be treated during the winter.

The selected herbicide is mixed with diesel fuel, kerosene, or other suitable carrier and applied until the bark is saturated. The low-volatile ester formulations are the only oil-soluble products registered for this use. This method is effective on trees of all sizes but is most commonly used on small brush.

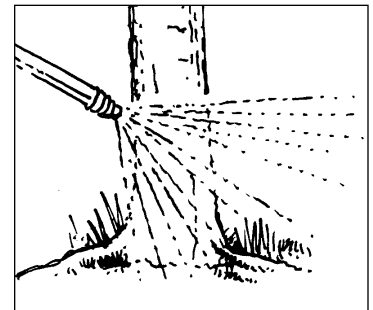


Figure 4. When treating basal bark, apply herbicide to the lower 12 to 18 inches of the tree trunk.

A **thin-line application** (Figure 5) is similar to a basal bark treatment. A thin stream of undiluted herbicide is sprayed horizontally to all sides of a lower plant stem to form a narrow band around each stem or clump. Specialized equipment calibrated to deliver small amounts of herbicide is needed to make such an application.

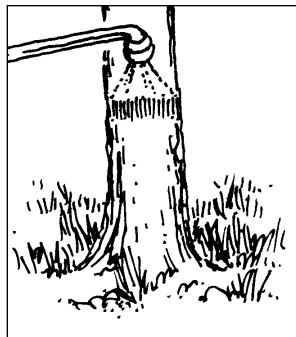


Figure 5. Spray a thin stream of herbicide in a narrow band.

Foliar Treatment

Foliar treatment (Figure 6) is a common method of hand-treating the foliage of brush up to 15 feet tall. Timing varies from early summer to late September, depending on the herbicide used. Foliar treatments are least effective during very hot weather and when trees are under drought stress.



Figure 6. Use foliar treatments for brush up to 15 feet tall. Treatments are least effective during very hot weather or when trees are water-stressed.

Herbicides such as 2,4-D, Banvel, Garlon, and Grazon can be applied in the early summer; Accord provides best results when applied in August or September. Arsenal provides best results when applied from June through September.

Adding a surfactant improves the performance of most foliar-applied herbicides. Drift-control additives are also available to reduce the number of fine droplets produced. **DO NOT** use diesel fuel as an additive when applying herbicides to foliage. Diesel fuel kills the leaves before the herbicide can be translocated by the plant. Spraying until runoff is not necessary. Spray just enough to wet the leaves.

Soil Treatment

Herbicides applied to the soil surface (Figure 7) move into the root zone of the target plants when it rains. Commonly used soil-applied herbicides include Spike and Hyvar. Spike can be applied in narrow bands. Banding, also called braiding or lacing, involves applying a concentrated herbicide solution to the soil in a line or narrow band spaced every 4 to 6 feet. This type of application is used to kill large numbers of trees as in the case of a fence row. Soil-active herbicides can also be applied on a spot or individual tree basis with an exact-delivery handgun applicator known as a spotgun.

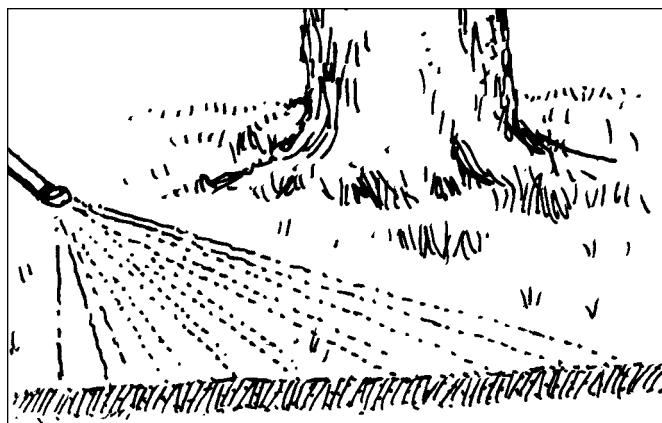


Figure 7. Apply herbicides evenly to the soil above the root zone in soil treatments. Rainfall carries the herbicide into the root zone.

Herbicides

This publication is intended to serve as a reference guide for brush control and should not be used as a substitute for reading the label. Herbicide rates are not shown in this publication. Use rates vary according to the target brush species and the method of application. The appropriate herbicide label is the best source of current application information. Because herbicide labels are constantly updated or changed, you should read the label thoroughly before using any herbicide.

Access (picloram ester + triclopyr ester).

Access is a prepackaged mixture of two herbicides used as a basal bark or thin-line treatment. Access is mixed in diesel fuel, kerosene, or other approved penetrant before application. All treatments are most effective when basal diameters of stems are smaller than 6 inches. As a thin-line treatment, Access has shown activity on hickory, sweetgum, and blackgum. The picloram component is a persistent, highly mobile herbicide that should not be used in areas where runoff water may contaminate surface water or groundwater. This product is a **RESTRICTED USE** material.

Accord (glyphosate). Accord is water-soluble and is used mainly as a foliar spray. It is also very useful in injection and stump sprays. Spray coverage should be uniform and complete (spray to wet). It is subject to washoff and needs a 6-hour, rain-free period after application for maximum performance. An approved nonionic surfactant must be added to the spray mix to achieve best results from foliar spray. Accord is more effective when foliar application is made between August and early October. Accord is effective in controlling brush such as dogwood, sweetgum, blackgum, and some oaks.

Ally (metsulfuron). Ally is a 60 percent dry-flowable herbicide that is applied as a foliar spray treatment. Add a nonionic surfactant (1 quart per 100 gallons) to the spray mix. Apply after full leaf-out in the spring. Results may not be observed for 30 days after treatment. Ally has shown activity on blackberry, dewberry, multiflora rose, ash, cherry, elm, and willow. It does not provide broad-spectrum brush control alone. Hay and grazing restrictions are minimal.

Arsenal (imazapyr). Arsenal can be used as a foliar spray, a hack-and-squirt treatment, or a stump spray. For foliar sprays, a spray adjuvant must be applied to the spray mix before application. Apply from May through September. It is sold under the trade name Chopper for hack-and-squirt applications and under the trade name Stalker for stump and basal bark sprays. Arsenal controls most woody species with the exception of elms and blackberries. Arsenal is especially effective in controlling sassafras, persimmon, sweetgum, oaks, sumac, and red maple. Do not use on food or feed crops, near irrigation water, or in domestic settings. This herbicide may persist for several years, depending on the amount used.

Banvel (dicamba). Banvel is used as a foliar spray to control sensitive brush species after full leaf-out in the spring. It is effective in controlling wild rose and blackberries and suppresses the growth of persimmon. Do not treat areas where downward movement into water or surface water runoff can bring the herbicide into contact with roots of desirable plants. Use of Banvel is compatible with perennial grass forage crops. Remove meat animals 30 days before slaughter. Restrictions for lactating dairy cattle range from 7 to 60 days for grazing and 37 to 90 days for hay harvest, depending on the rate used.

Crossbow (triclopyr ester + 2,4-D ester).

Crossbow is a prepackaged mixture of two herbicides used as a foliar spray to control brush at full leaf-out from the spring through September. Crossbow plus diesel fuel is useful as a stump spray and a basal bark treatment. For best results from the basal bark treatment, apply to brush stems smaller than 6 inches in diameter during winter or early spring. For better control of regrowth from larger trees, cut larger trees and treat the stumps. Crossbow is a good general brush control product that controls or suppresses the growth of some oaks, locust, willow, blackberries, and mulberry. It provides poor foliar control of sassafras and persimmon.

Escort (metsulfuron). Escort is used as a foliar spray to control brush in fencerows and noncrop areas (not pastures and hayfields). See Ally remarks for additional information.

Garlon 3A (triclopyr amine). Garlon 3A is labeled for use as a foliar spray, a stem injection treatment, and a stump spray. Add nonionic surfactant to the spray mixture before making a foliar application. Apply to foliage from May to September. Time the injection for the dormant or growing season. Eye protection is required for applicators. Susceptible species include oak, ash, willow, and blackberry.

Garlon 4 (triclopyr ester). Garlon 4 is labeled for use as a foliar spray, thin-line spray, stump spray, and basal bark treatment. The foliar spray should be made after full leaf-out in the spring. Make thin-line applications from January through October to stems smaller than 6 inches in diameter. It may be mixed with diesel fuel or other approved petroleum-based solvent for stump spray or basal bark treatment. Garlon 4 will control blackberry, sweetgum, osage orange, blackgum, locust, and hickory.

Grazon P+D (picloram amine + 2,4-D amine). Grazon P+D is labeled for use as a foliar spray to control certain brush species in perennial grass pastures and hayfields. Add a nonionic surfactant to the spray mixture before making a foliar application. Apply in the spring after full leaf-out. Do not apply more than 4 quarts of Grazon P+D per acre per year. This product can contaminate water through leaching or runoff, can flash back, and may persist in the soil for several years. Grazon is a RESTRICTED USE pesticide. Do not apply on or near areas to be planted to legumes.

Hyvar (bromacil). Hyvar is available as a wettable powder or water-soluble liquid for use as a soil treatment for brush control. It is effective in controlling brush species such as wild cherry, sweetgum, winged elm, and willow. It is water soluble, readily leachable, and persists for more than a year, depending on the rate. Band application is helpful in reducing possible off-site contamination.

Krenite S (fosamine). Krenite is labeled for use as a foliar spray and is especially effective as a fall application. Apply in the fall before leaves begin to change color. Krenite does not cause rapid brown-out—the brush fails to leaf out the next spring. To improve results, add a nonphytotoxic oil to the spray mixture before making a foliar application. It is very useful in areas adjacent to bodies of water. It is effective on species such as locust, sumac, oaks, and sycamore.

Pathfinder II (triclopyr ester). Pathfinder is a ready-to-use formulation that contains a petroleum-based penetrant. It is labeled for stump spray, basal bark treatment, and thin-line applications. No additional mixing is required before application.

Pathway (2,4-D amine + picloram amine). Pathway is a ready-to-use formulation of two herbicides labeled for hack-and-squirt and stump spray applications. On hard-to-control species, make cuts edge to edge around the entire stem. Freshly cut stumps should be treated with this product. This product is a RESTRICTED USE material.

Remedy (triclopyr ester). Remedy is labeled for use as a foliar spray, basal bark treatment, thin-line spray, and stump spray. It is also sold under the trade name Garlon 4. See remarks for Garlon 4 for additional information concerning its use.

Rodeo (glyphosate). Rodeo is labeled for use as a foliar spray for brush control on or near aquatic sites. A proven program is using 7.5 pints of Rodeo per acre plus nonionic surfactant approved for aquatic use (X-77, Agri-Dex, Induce). Apply in the fall (September to early October) when most crops are mature or have been harvested. For handgun applications, use 1.5 percent Rodeo solution (1.5 gallons per 100 gallons of water) and 2 quarts of nonionic surfactant per 100 gallons of water. Spray to wet the foliage but not to runoff. The maximum allowable rates for Rodeo are 7.5 pints per acre or a 1.5 percent spray solution. The primary precaution is that Rodeo should not be applied within 0.5 mile of a drinking water intake.

Roundup Ultra (glyphosate). Roundup Ultra is labeled for use as a foliar spray, stump spray, and hack-and-squirt treatment. This herbicide is

essentially the same as Accord and Rodeo but with a surfactant already added. See remarks for Accord.

Spike (tebuthiuron). Spike is available as a wettable powder and granule. It is labeled as a lacing or spot soil treatment to control woody brush on noncrop land and fencerows. Spike can be applied at any time. Control symptoms appear slowly and depend on moisture and soil conditions. Spike should not be applied to poorly drained or saturated soils or to soils containing more than 30 percent clay (Control is difficult on clay soils). Application should not be made in domestic situations, near the root systems of desirable plants and trees, and on sites where potential water runoff could cause off-site plant injury. It is effective on oaks, hickories, wild cherry, blackberries, and many other woody species, but it will not control sassafras or persimmon. Spike will persist in the soil for several years.

2,4-D. The herbicide 2,4-D is used primarily as a foliar spray in amine or ester formulations. The ester formulation can be mixed with diesel fuel for stump and basal bark sprays. The amine formulation can be used undiluted for hack-and-squirt and injection applications. This herbicide is effective as a hack-and-squirt treatment, but it is rarely used alone for this purpose. See remarks for Pathway. It is effective as a foliar spray on sumac, some oaks, willow, and poplar.

Velpar (hexazinone). Velpar is available as a dry-flowable and a water-dispersible liquid. Velpar is used as a basal soil spray to control individual or multistemmed brush. Make application just before or during active growth of brush species. Apply to soil within 3 feet of the root collar of target plants, using an exact-delivery handgun applicator (spot-gun). Apply 2 to 4 milliliters of Velpar solution per inch of stem diameter at chest height. For multistemmed brush, apply Velpar solution at the rate of 2 to 4 milliliters per 3 feet of brush canopy width. It is effective in controlling small red cedar, honeylocust, oaks, hickories, and many other woody brush species. Velpar will not control sassafras and persimmon. Do not apply to soil containing more than 30 percent clay. Do not use on sites where runoff water will contact desirable trees or where desirable tree roots may extend.

Weedmaster (2,4-D amine + dicamba). Weedmaster is a prepackaged mixture of two herbicides. It is used undiluted as a hack-and-squirt or stump spray to control brush. A continuous cut or girdle around the tree must be made before spray treatment. Treat stumps within 6 hours of cutting.

Table 1. Susceptibility of Brush Species to Herbicides Applied as a Foliar Spray

Brush Species	Foliar-Applied Herbicides*													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Ash	X**		X	X	X	X	X	X		X	X	S	S	
Blackberry	X	X		S	X	X	X	X			X	X	X	
Blackgum	X		X	S			X	X		X				
Black Locust	X			X	X		X	X		X		S	S	
Cherry	X		X	X	X	X	X	X		S	X	X	X	X
Chinaberry			X											
Dogwood	X		X	S	X		X	X			X	X	X	
Eastern Red Cedar				S										
Elderberry						X		X	X		X	X	X	
Elm	X			X	S	X	X	X		S	X	S	S	
Hackberry	X													
Hawthorn			X	S	X	X	X	X		S	X	X	X	
Hickory	X		X	X				X		S				
Honeylocust				X	S				X					
Maple	X		X	X	X		X	X			X	S	S	
Mulberry			X				X	X						
Oak	X		X	X	X	X	X	X	S	X	X	X	X	X
Osage Orange						X								
Persimmon	X		X	X		X	X			S	X	S	S	
Poplar	X		X	X			X	X			X			X
Privet			X											
Sassafras	X		X	X			X	X		S	X	X	X	
Sawbrier			X											
Sumac	X		X	X	X		X	X	X	X	X	S	S	
Sweetgum	X		X	S	S		X	X		X		X	X	
Sycamore	X			X	X		X	X		X				
Wild Rose	X	X	X	S	X	X		X	X	X	X	X	X	
Willow	X		X	X	X	X	X	X		S	X	X	X	X
Yellow Poplar	X		X			X	X		S		S	S		

*Foliar-applied herbicides: A = Accord, B = Ally, C = Arsenal, D = Banvel, E = Crossbow, F = Escort, G = Garlon 3A, H = Garlon 4, I = Grazon P+D, J = Krenite S, K = Remedy, L = Rodeo, M = Roundup, N = 2,4-D

**X = Control, S = Suppression

Table 2. Labeled Sites for Brush Control Herbicides

Brush Herbicides and Application Methods*	Grazing	Fence- rows	Noncrop Areas	Ditch Banks	Haying
Access (BB, TL)		X**	X		
Accord (FS, HS, SS)			X	X	
Ally (FS)	X				X
Arsenal (FS, HS, SS)		X	X		
Banvel (FS)	X	X	X	X	
Crossbow (FS, SS, BB)		X	X	X	
Escort (FS)		X	X		
Garlon 3A (FS, HS, SS)		X	X	X	
Garlon 4 (FS, TL, SS, BB)	X	X	X	X	X
Grazon P+D (FS)	X				X
Hyvar (ST)			X		
Krenite S (FS)			X	X	
Pathfinder II (SS, BB TL)	X	X	X	X	X
Pathway (HS, SS)		X	X		
Remedy (FS, TL, SS, BB)	X	X	X	X	X
Rodeo (FS)		X	X	X	
Roundup (FS, HS, SS)		X	X	X	
Spike (ST)		X	X		
2,4-D (FS, HS)	X	X	X	X	X
Velpar (ST)			X		
Weedmaster (HS, SS)	X	X	X	X	X

*Application methods: FS = Foliar spray, ST = Soil treatment,
HS = Hack-and-squirt spray, BB = Basal bark spray, SS =
Stump spray, TL = Thin-line spray

**X = Control

Table 3. Susceptibility of Brush Species to Herbicides Applied as a Soil Treatment

Brush Species	Soil-Applied Herbicides		
	Hyvar	Spike	Velpar
Ash		S*	X
Blackberry		X	
Blackgum			X
Black Locust		X	
Cherry	X	X	
Chinaberry			
Dogwood		X	X
Eastern Red Cedar		X	X
Elderberry			
Elm	X	X	X
Hackberry	X	X	X
Hawthorn		X	X
Hickory		X	X
Honeylocust			X
Maple	X	S	
Mulberry		X	
Oak	X	X	X
Osage Orange			X
Persimmon			
Poplar	X		
Privet		X	
Sassafras			
Sawbrier		S	
Sumac	X	X	X
Sweetgum	X	X	X
Sycamore		S	
Wild Rose		X	X
Willow	X	X	X
Yellow Poplar		S	

*X = Control, S = Suppression

Table 4. Susceptibility of Brush Species to Herbicides Applied as a Hack-and-Squirt or Frill Treatment

Brush Species	Hack-and-Squirt or Frill-Applied Herbicides*						
	A	B	C	D	E	F	G
Ash	X**	X			X	S	X
Blackberry							
Blackgum		X			S		X
Black Locust	X						X
Cherry	X	X		X			X
Chinaberry		X					
Dogwood		X		X	S	S	X
Eastern Red Cedar							X
Elderberry							
Elm	X		X	X		X	X
Hackberry	X						
Hawthorn		X		X			X
Hickory	X	X		X	S	X	X
Honeylocust							X
Maple	X	X	X	X	S	S	X
Mulberry	X						
Oak	X	X	X	X	X	X	X
Osage Orange							
Persimmon		X		X			X
Poplar	X	X			X		X
Privet		X					
Sassafras	X	X					X
Sawbrier		X					X
Sumac		X					X
Sweetgum		X			X	X	X
Sycamore					X		X
Wild Rose	X	X					X
Willow		X					X
Yellow Poplar		X					

*Hack-and-squirt or frill-applied herbicides: A = Accord, B = Arsenal, C = Garlon 3A, D = Pathway, E = Roundup, F = 2,4-D, G = Weedmaster

**X = Control, S = Suppression

Table 5. Susceptibility of Brush Species to Herbicides Applied as a Basal Bark (Thin-Line) Spray

Brush Species	Basal Bark Applied Herbicides*				
	A	B	C	D	E
Ash	X**	X	X	X	
Blackberry		X	X	X	X
Blackgum	X		X	X	
Black Locust	X	X	X	S	
Cherry	X	X	X	S	
Chinaberry					
Dogwood			X	X	X
Eastern Red Cedar				X	
Elderberry		X	X		
Elm	X		X	X	
Hackberry	X			X	
Hawthorn			X		
Hickory	X		X	X	
Honeylocust				X	
Maple	X	X	X	X	X
Mulberry			X		
Oak	X	X	X	S	X
Osage Orange					
Persimmon			X	X	
Poplar	X		X		
Privet					
Sassafras	X		X	S	
Sawbrier					
Sumac		X	X	S	
Sweetgum	X	X	X	X	
Sycamore			X	X	
Wild Rose	X	X	X		
Willow	X	X	X	X	
Yellow Poplar			X	X	

*Basal bark applied herbicides: A = Access, B = Crossbow, C = Garlon 4, D = Pathfinder II, E = Remedy

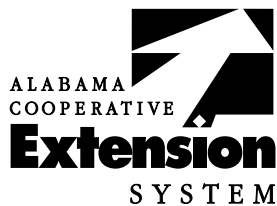
**X = Control, S = Suppression

Table 6. Susceptibility of Brush Species to Herbicides Applied as a Stump Spray

Brush Species	Stump Spray Herbicides*									
	A	B	C	D	E	F	G	H	I	J
Ash	X**	X	X		X	X	X	X		X
Blackberry										
Blackgum		X			X	X				X
Black Locust	X		X		X	S		X		X
Cherry	X	X	X		X	S	X			X
Chinaberry		X								
Dogwood		X			X	X	X	X		X
Eastern Red Cedar						X				X
Elderberry			X		X			X		
Elm	X			X	X	S	X	X		X
Hackberry	X					X				
Hawthorn		X			X		X	X		X
Hickory	X	X			X	X	X			X
Honeylocust						X				X
Maple	X	X	X	X	X	X		X		X
Mulberry		X			X					
Oak	X	X	X	X	X	S	X	X	X	X
Osage Orange										
Persimmon		X			X	X	X	X		X
Poplar	X	X			X			X		X
Privet		X								
Sassafras	X	X			X	S		X		X
Sawbrier		X								X
Sumac		X	X		X	S		X		X
Sweetgum		X	X		X	X			X	X
Sycamore					X	X				X
Wild Rose	X	X	X		X			X		X
Willow		X	X		X	X		X	X	X
Yellow Poplar					X	X				

*Stump spray herbicides: A = Accord, B = Arsenal, C = Crossbow, D = Garlon 3A, E = Garlon 4, F = Pathfinder II, G = Pathway, H = Remedy, I = Roundup, J = Weedmaster

**X = Control, S = Suppression



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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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