

WOODY PLANTS

General recommendations for applying herbicides to forest trees, brush, and woody vines.

CUT-SURFACE TREATMENTS: FOREST TREES

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Trees 1 inch in diameter and larger.	Any season, but growing season treatments are most effective. Avoid sap rise and leaf expansion in spring if possible.	(1) 2,4-D (amine) — 4 lb/gal.	1 part Accord SP: 2 parts water. Apply 1 ml solution in each cut; space cuts 2 inches apart, edge to edge about waist high.
			(2) triclopyr (Garlon 3A) diluted 1 part Garlon 3A: 1 part water.	
			(3) picloram + 2,4-D (Pathway).	Use on all species any time of year. Overlap injector cuts on hard-to-kill species, such as hickory, dogwood, blue beech, and ash. Do not allow picloram to spill into the root zone of desirable and very susceptible species such as yellow poplar and pine.
			(4) imazapyr (Arsenal Applicators Concentrate) dilute solution: mix 4-6 oz Arsenal AC per gallon of water.	Make cuts through the bark completely around the tree with not more than 2 inches between cut edges. Spray or brush Chopper solution into the cuts until thoroughly wet.
			(5) imazapyr (Arsenal Applicators Concentrate) concentrated solution: mix 25 oz Arsenal AC with no more than 103 oz water.	Make one cut for every 3 inches diameter breast height. Spray 1 ml into each cut. Best results obtained from September - March.
			(6) glyphosate (Accord SP) diluted	Apply 1 ml of solution for every 2 inches trunk diameter.
Stump	Sprout control on cut hardwood stumps, particularly on species that sprout profusely: oaks, maple, beech, hickories.	Any season, but most effective as soon as possible after cutting; if possible, treat the same day of cutting.	(1) 2,4-D (amine) — 20 lb/100 gal.	Apply with low volume knapsack sprayer using solid-cone nozzle of medium orifice.
			(2) picloram + 2,4-D (Pathway).	
			(3) triclopyr — 20-25% Garlon 4, + 10% surfactant, + 65-70% diesel fuel.	Triclopyr in diesel fuel can be applied to stumps as late as 3 months after cutting.
			(4) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil.	Spray or brush the Chopper solution onto the cambium area (just inside the bark) of freshly cut stumps until thoroughly wet.
			(5) imazapyr (Arsenal Applicators Concentrate) — mix 4-6 oz Arsenal AC per gallon of water.	Spray or brush the Arsenal solution onto the cambium area (just inside the bark). Ensure that the solution thoroughly wets the entire cambium.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
BARK, FOLIAGE, AND SOIL TREATMENTS: BRUSH AND FOREST TREES				
Basal Bark	Scattered brush or "clumps" of hardwood brush and small trees. Can be used on species remaining after foliar spray. Expect poor control on root-suckering species: black locust, hickories, and sassafras. Best results on trees less than 3 inches diameter.	Any season (Avoid leaf expansion). Late summer, fall, and winter. Reduced control may occur during sap rise or leaf expansion in spring.	(1) 2,4-D + 2,4-DP (LV esters) — 8 to 12 lb each per 100 gal oil.	Drench lower 12 to 15 inches of plant. Density of brush will determine rate per acre.
			(2) triclopyr — 1.5 gal Garlon 4 + 98.50 gal diesel fuel.	Spray the lower 1.5 to 2 feet of brush to runoff, ensuring coverage of root crown.
			(3) 2 gal Garlon 4 + 25 gal diesel + 0.5 gal surfactant + 72.5 gal water.	Follow label directions for mixing. Apply as above.
			(4) triclopyr + picloram — 1-2 gal Access in oil to make 100-gal mix.	Works best on basal diameters up to 6 inches. Drench lower 1.5 to 2 feet of stem.
			(1) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil.	Apply to wet the lower 12-18 inches of hardwood stems less than 4 inches in diameter at breast height. Ensure that the roots of desirable hardwoods do not extend into the treated area.
Stream-Line thinline	Same as above except best on trees less than 3 inches diameter with juvenile bark	Best results obtained in March-June.	(1) triclopyr 20-25% Garlon 4 + 10% v/v surfactant + 60-75% diesel fuel.	With a backpack sprayer and a straight stream nozzle, a 2- to 3-inch-wide band of herbicide is sprayed on each stem. Treat the stem from two sides if it is 1- to 3-inch diameter to ensure that the herbicide completely encircles the stem.
Selective Hardwood Control in Pine Plantations	Hardwood sprouts and large trees in young (1- to 6-year-old) pine stands	July through early October.	(1) imazapyr (Arsenal Applicators Concentrate) apply 16-32 oz Arsenal AC per acre in 10-15 gal water. Add 0.25% v/v nonionic surfactant.	Apply as a broadcast spray to release loblolly and Virginia pine. Use 12-16 oz Arsenal AC to release slash pine or shortleaf pine stands at the end of the third growing season or thereafter.
			(2) imazapyr (8-9 oz Arsenal AC) + metsulfuron (1-1.5 oz Escort XP) per acre.	Apply broadcast in 10-15 gallons of spray per acre.
			(3) imazapyr (Arsenal Applicators Concentrate) mix 1 oz Arsenal AC per gallon of water. Add 0.5% v/v minimum nonionic surfactant.	Apply to individual hardwood crowns. Spray to obtain good coverage of the entire crown, but not to the point of runoff. Effective in controlling hardwood sprouts less than 7 feet in height for forest site preparation and pine release. Use as a directed spray to release any conifer species.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply	
Foliage Spray (low volume, aerial, non-selective)	Large tracts of mixed brush and hardwoods on utility rights-of-way and for range and pasture establishment. All unwanted small trees and shrubs for site preparation in advance of seeding or planting forest trees.	During growing season from late spring to early summer. Effectiveness is decreased during periods of drought.	(1) 8-12 lb 2,4-DP (LV esters) per 30 gal water per acre.	Use aerial application, low-volume sprayer. Use drift control agent in mixture. See Weedone 2,4-DP label for specific instructions. Apply 10 gallons of spray per acre before planting to reduce competition from mixed hardwoods and brush. Apply 10-15 gallons of spray per acre. Apply 10-15 gallons of spray per acre. For exact rate of Velpar L, consult label. Rate dependent on soil texture.	
			(2) 2 lb each of 2,4-D and 2,4-DP (LV esters) and 1.66 lb MSMA per 10 gal water.		
			(3) triclopyr + picloram + 2,4-D — 0.5 gal Garlon 4 + 1.5 gal Tordon 101 mixture.		
			(4) 0.5 gal Garlon 4 + 0.5 gal Tordon K.		
			(5) hexazinone 1-3 gal Velpar L per acre. Rate depends on soil texture.		
		Midsummer to fall.	(1) glyphosate — 6-8 qt Accord SP in 10 gal water. Addition of nonionic surfactant at 2.5% v/v is recommended.	Best results are obtained from late summer or early fall applications; however, Chopper AC can be applied year-round.	
			(2) imazapyr — 48-64 oz of Chopper EC per acre. Addition of nonionic surfactant at 0.5-1% v/v is recommended.		
		Late summer to early fall.		(1) imazapyr (Chopper EC) — apply 48-64 oz per acre in 10-15 gal water. Add 0.5-1% v/v nonionic surfactant.	
				(2) imazapyr + glyphosate — 32-48 oz Chopper EC + 4-5 qt. Add 0.5-1% v/v nonionic surfactant.	
				(3) imazapyr + triclopyr — 32-48 oz Chopper EC + 32-40 oz Garlon 4. Add 0.5-1% v/v nonionic surfactant.	
(4) imazapyr + metsulfuron methyl 40-48 oz Chopper EC + 1-2 oz Escort XP. Add 0.5-1% v/v nonionic surfactant.					
During growing season from leaf out to fall colors.		(1) glyphosate + imazapyr — 1-5 qt Accord SP + 32-64 oz Chopper EC or 1-3 qt Accord SP + 40-64 oz Chopper EC per acre in 10-15 gal of water. Add 0.5% v/v nonionic surfactant.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.		
		(2) glyphosate + triclopyr — 3-6 qt Accord SP + 1-2 qt Garlon 4 + 2.5% v/v nonionic surfactant.	Apply 10-15 gallons solution per acre.		
		(3) fosamine + imazapyr — 4.6 qt Krenite UT + 16-20 oz Chopper + 1.5% v/v nonionic surfactant in 10-15 gal of water.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.		
Heavy hardwood competition and residual pine.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1 qt Garlon 4 + 16-24 oz Chopper EC.	Use nonionic surfactant at 0.5% v/v. Spray to wet.		
		(2) 4-8 qt Krenite UT + 16-24 oz Chopper EC + 1% v/v nonionic surfactant.			
		(3) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant.			

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
	Light hardwood competition and residual pine and grasses.	Full leaf to Aug. 1. June 1 to leaf drop.	(1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal. (2) 8 qt Tordon 101M + 8-10 oz Arsenal. (3) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant.	Use nonionic surfactant at 0.5% v/v. Use higher rates for Virginia and Shortleaf pine. Spray to wet.
	Hardwood, pine, and grass.	Aug. 1 to fall color. June 1 to leaf drop.	(1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal. (2) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant.	Use nonionic surfactant at 0.5% v/v. Use higher rates for Virginia and Shortleaf pine. Spray to wet.
Foliage Spray (high volume, ground)	Scattered brush or "clumps" of hardwood brush. Can be used on species not controlled by prior sprays, such as maple, oak, ash, and persimmon growing along fence rows, highways, rights-of-way, and other non-crop areas.	Late spring and summer from time foliage is fully developed. Dormant season ineffective. Growing season from leaf out to fall colors. Late spring to fall color	(1) 2-3 lb each of 2,4-D and 2,4-DP (LV esters) per 100 gal water. (2) 1-3 qt Garlon 4 per 100 gal water. (1) glyphosate — 2-4 qt of Accord SP per 100 gal of water. Add 1-2 qt nonionic surfactant. (1) 4-8 qt Krenite UT + 2 oz Escort XP per 100 gal water + 1% v/v nonionic surfactant. (2) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant per 100 gal water.	Apply uniformly over top of brush as a coarse spray. With back-pack sprayer, wet all foliage to point of runoff. With hydraulic sprayer, apply 200 to 600 gallons of spray mixture per acre, depending on height and density of brush. Apply 100-400 gallons of spray per acre depending on size and density of woody plants. Spray to wet. Apply 100-200 gallons of spray per acre. Spray to wet. Apply 100 gallons per acre. Spray to wet. Spray to wet.
Soil application with hand-gun applicator	Individual trees or scattered "clumps" of trees or brush. Can be used to treat large tracts with mixed brush and hardwoods.	Mid-March through May. Rain after application is required to activate the herbicide.	2-4 ml of 25% hexazinone (Velpar L) for each inch of stem diameter. For grid pattern to use in site preparation, refer to Velpar L label.	Apply undiluted with exact-delivery hand-gun applicator. Direct treatment to soil within 3 feet of root collar of trees to be controlled. For large trees requiring more than one delivery, make applications on opposite sides of the stem. Rate of herbicide when applied in a grid pattern will depend on soil texture. Refer to the Velpar L label for exact rates.
Soil application (dry materials)	Individual trees. "Clumps" of brush of all species and sizes. Forestry site preparation and rights-of-way.	Early spring applications are most effective. Apply before or during period of active growth of species to be controlled, when rainfall can be expected for soil activation.	(1) 10% hexazinone (Pronone 10G) — 0.5-0.75 oz per inch diameter of tree. (1) Pronone 10G — 5-30 lb/A. Soil texture determines rate. (2) 75% hexazinone (Velpar ULW) — 2.5 to 5.5 lb/A depending on soil texture.	Apply completely around base of tree. Do not apply in root zone of desirable plants. If root grafting occurs, some desirables may be killed outside the treatment area. Increase rates on fine-textured soils (clay, etc.). If slope is greater than 12-15%, damage down the slope from treatment area may occur. Apply with aerial or ground equipment.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Selective herbaceous weed control in pine plantations	Grasses and broadleaf weeds, such as fescue, bahia-grass, goldenrod, dogfennel, broomsedge, etc.	Late winter to early spring before substantial growth occurs in spring.	(1) sulfometuron — 3-6 oz Oust per acre depending on weed complex. (2) sulfometuron plus imazapyr — 2 oz Oust plus 4 oz Arsenal per spray acre. (3) sulfometuron plus hexazinone — 2 oz Oust plus 2 to 3 pt Velpar L per acre.	Apply with ground or aerial sprayers delivering between 5-25 gallons per acre. Addition of Arsenal increases control of johnsongrass, bermudagrass, and other difficult species. Apply with ground or aerial sprayers at 5-25 gallons per acre
		Mid- to late spring after growth of weeds has begun.	(1) sulfometuron plus glyphosate — 2-3 oz Oust plus 12-16 oz Accord SP per acre.	Apply in at least 10 gallons total solution. Addition of Roundup or Accord SP provides broad spectrum control of herbaceous weeds.
		Early spring to midsummer.	imazapyr (Arsenal AC — Apply 4-10 oz per acre in 20-30 gal water. Add 0.25% v/v nonionic surfactant or less.	Best not to add surfactant for slash pine. Apply as a broadcast spray or as a 5- to 6-foot-wide band centered over pine rows. Labeled for loblolly, Virginia, and slash pine plantations.
		Late spring to midsummer.	1 oz Escort XP + 4-6 oz Arsenal in 10-30 gal water. Add .25% v/v non-ionic surfactant or less.	Loblolly pine only.

DIFFICULT-TO-CONTROL WOODY PLANTS

Foliar spray	Easter Red Cedar	Summer.	Tordon K — .25% solution in 1% diesel: water emulsion.	Spray to wet foliage.
			Tordon 101M — 32 oz + 4 oz non-ionic surfactant in 5 gal water.	Spray to wet foliage.
Injection			Pathway — inject 3 to 4 ml for each 3 feet of tree height.	
Foliar spray	Osage Orange	March-June.	metsulfuron methyl (Escort XP) — 1 to 2 oz per 100 gal water with 0.5% nonionic surfactant.	Apply as high volume foliar spray. Treat to runoff.
Basal bark			triclopyr (Garlon 4) — Use 13 oz Garlon 4 + 13 oz Cide-Kick II surfactant + 100 oz diesel fuel.	Apply to smooth bark on stems no larger than 3 inches in diameter.
Foliar spray	Privet	May-Aug.	imazapyr (Arsenal AC) — Use a 1% v/v solution with 0.5% v/v non-ionic surfactant in water.	Spray to wet foliage. May require retreatment if sprouting occurs.
		May-Sept.	metsulfuron methyl (Escort XP) — 4 oz/100 gal water + 1% v/v non-ionic surfactant	Spray to wet. May require retreatment if sprouting occurs. Can be tank mixed with Arsenal.
		March - April	glyphosate (Accord SP) — 2 qt/A	Spray to wet. Provides excellent control (90 + %), but sprouting may occur.
Foliar spray	Yaupon	May-June.	6 qt Accord SP per acre + 2 qt Garlon 4 per acre	Spray to wet.
Foliar spray	Switchcane or Bamboo	May-Sept.	glyphosate (Roundup or Accord SP) — 4 qt/A + 1% volume to volume nonionic surfactant.	Best results are obtained after burning or cutting patches and applying spray to sprouts.
		Early spring	hexazinone — 8-10 qt/A — Velpar L	Sites should be dry at application time.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Chinese tallow	May-Feb.	triclopyr (Garlon 3A) Pathfinder II imazapyr (Arsenal AC)	Apply in dilutions and spacings specified on herbicide label. Nontarget plants may be killed or injured by root uptake of Arsenal.
Stumps	Chinese tallow	May-Feb.	triclopyr	Apply to stump tops immediately after cutting.
Basal Bark	Chinese tallow	Before bud break	20% v/v solution triclopyr (Garlon 4)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedling and Saplings	Chinese tallow	Jul.-Oct.	1% v/v solution imazapyr (Arsenal AC) 30% v/v solution Krenite S 2% v/v solution triclopyr Garlon 4	Spray to wet foliage (add 0.5% nonionic surfactant to all mixtures).
Soil surface	Chinese tallow	Growing season	Velpar L	Apply one squirt with a spot gun per 1 inch stem diameter within 3 feet of the stem or in a grid pattern at spacings specified on the herbicide label. For treatment of extensive infestations in forest situations. Nontarget plants may be killed or injured by root uptake.
Injection and Stumps	Mimosa (silktree)	May-Feb.	triclopyr Garlon 3A imazapyr (Arsenal AC)	Make stem injection using herbicide dilutions as specified on herbicide label. For felled trees, apply these herbicides to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.
Bark or Basal Bark	Mimosa (silktree)	Before bud break	20% v/v solution triclopyr (Garlon 4)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedlings and Resprouts	Mimosa (silktree)	Jul.-Oct.	2% v/v solution triclopyr Garlon 3A or Garlon 4 2% v/v solution glyphosate 0.2-0.4% v/v solution Transline	Spray to wet foliage (add 0.5% nonionic surfactant to Garlon 3A and Garlon 4 mixtures).
Injection and Stump	Tree-of-Heaven (Ailanthus)	Midsummer	triclopyr (Garlon 3A) Pathfinder II picloram + 2,4-D (Pathway) imazapyr (Arsenal AC)	Make stem injections in large trees then apply herbicide. For felled trees, apply herbicide to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Basal Bark	Tree-of-Heaven (Ailanthus)	Midsummer.	20% v/v solution triclopyr (Garlon 4)	Apply to young bark of saplings as basal spray in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor).
Foliage Spray	Tree-of-Heaven (Ailanthus)	July-Oct.	1% v/v solution imazapyr (Arsenal AC) 30% v/v solution (Krenite S) 2% v/v solution triclopyr (Garlon 4)	Spray to wet all foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Baccharis	Midsummer	triclopyr (Garlon 4)	Spray to wet foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Palmetto	spring	16 oz Garlon 4 + 4 g Escort XP	Spray to wet all foliage. Add 0.5% v/v non-ionic surfactant to spray solution. May require sequential applications for complete control.

WOODY VINES

Foliage Spray and Soil Application	Poison Ivy	Late spring application most effective.	(1) picloram + 2,4-D — Use 2-3 gal Tordon 101 or Grazon P+D mixture in 15-50 gal water. (2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Broadcast over root zone. Use picloram only where desirable trees with root zone in the treatment area are expendable. Spray to wet foliage.
		Mid-to late summer.	(1) 4-5 qt Accord SP or Roundup (glyphosate) per acre broadcast or 2% solution with hand sprayer.	Apply as foliar spray while leaves are green. Repeat applications may be necessary. Use the higher rate for plants that have reached woody stage of growth.
Foliar spray	Japanese Honeysuckle	Late spring and summer.	(1) 2,4-D (LV ester) — 4 lb/gal in 100 gal diesel.	Apply as a foliage spray thoroughly wetting all foliage and stems. Density will determine volume of spray per acre. Spot treat regrowth as required. Generally requires a followup or second application.
			(2) glyphosate — wet all foliage with a 2% Roundup or Accord SP solution.	
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
			(4) apply 1-2 oz Escort XP or Cimarron per acre in water solution.	Can damage black cherry or cottonwood.
Foliage spray and soil application	Wisteria	Aug.-Sept.	(1) picloram (Tordon K — 0.5 gal/A) (2) glyphosate (Accord SP — 8 qt/A) (3) dicamba (3% Banvel or Clarity) (4) metsulfuron (Escort XP or Cimarron — 1 oz/A) (5) clopyralid (Transline — 20 oz/A).	All treatments provided 90% brownout in first year — all to be reevaluated. (Add 0.5% nonionic surfactant to all mixtures.)

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Kudzu	Late spring to midsummer.	(1) picloram + 2,4-D — 1-2 gal Tordon 101 or Grazon P+D mixture in 20 gal water.	Apply as foliage spray after full leaf expansion; repeat when regrowth appears. Will damage pines and hardwoods.
			(2) dicamba + 2,4-D — 3 lb dicamba + 5.5 lb of 2,4-D in 20 gal water.	Note: Use for pine vs. hardwood.
			(3) Escort XP or Cimarron — 4 oz/A.	Can apply over/under pine. Apply after full leaf. Use with 1 quart of nonionic surfactant per 100 gallons of water. Will damage black cherry, cottonwood, winged elm, dogwood, and some other hardwoods.
			(4) Transline — 21 oz/A.	Can apply over or under pines. Can apply around hardwoods but may injure leguminous species.
Foliar spray	Multiflora Rose	Spring.	(1) dicamba — Mix 1 gal Clarity or Vanquish in 100 gal water.	Apply as a foliage spray after full leaf expansion; repeat when regrowth occurs.
			(2) 2,4-D (LV ester) — 4 lb in 100 gal water.	Addition of up to 5 gallons of diesel fuel per 100 gallons of spray will improve control.
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal of water.	Spray to wet foliage.
		(4) Escort XP or Cimarron — 0.75-1 oz per 100 gal water.	See Escort XP above.	
		Summer.	(1) Accord SP or glyphosate (3 lb ae/gal) — 1% solution plus 0.5% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Trumpet creeper	Late summer.	(1) Accord SP or glyphosate (3 lb ae/gal) — 4 qt/A + 0.25% nonionic surfactant.	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Redvine	Late summer.	(1) Vanquish or Clarity - 2 qt/A	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Grape Vine	Late spring to midsummer.	(1) 2,4-D (LV ester) — 4 lb in 100 gal water.	Spray all foliage until wet. Addition of crop oil will improve control.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.

DIFFICULT-TO-CONTROL HERBACEOUS PLANTS

Foliar spray	Blue Vervain	Late spring to early summer.	(1) Triclopyr 32 oz Garlon 4 or Remedy 48 oz Garlon 3A (2) Grazon P+D (3) Weedmaster	Add 0.25% v/v nonionic surfactant.
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Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Cogongrass (A combination of herbicide treatment following burning or mowing may be more effective than herbicide treatment alone.)	Mid- to late summer.	(1) imazapyr — 48 oz/A or 1% solution of Arsenal or 24 oz/A or 0.5% solution of Arsenal AC with 1 qt nonionic surfactant per 100 gal spray.	Apply in 20 gallons of spray per acre.
			(2) glyphosate — 72 oz/A or 2% solution of 3 lb ae/gal formulation (with 0.5% v/v nonionic surfactant) if none in formulation.	Often requires treatment in consecutive years. Use 20 gallons of spray per acre. Apply mid-July to 2 weeks before killing frost.
			(3) imazapyr + glyphosate — 24 oz/A or 0.5% solution of Arsenal AC or 48 oz/A or 1% Arsenal plus 32 oz/A or 2% Accord SP or glyphosate (3 lb ae/gal) per acre with 0.25% v/v nonionic surfactant.	Apply in 20 gallons of spray per acre.
Foliar spray	Mistletoe	Winter.	Florel — 2 qt/A in 4 gal water + 0.25% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Johnsongrass	Summer.	(1) Fusilade DX at 8-12 oz/A or 0.5% solution + 0.25% nonionic surfactant or 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(2) Select at 6-8 oz/A or 0.25% solution + 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(3) Outrider at 1.33 oz/A with 1 qt nonionic surfactant per 100 gal spray.	
			(4) glyphosate (3 lb ae/gal) applied as 2% solution in fall. Add 1 qt nonionic surfactant per 100 gal if formulation has none.	
Foliar spray	Horsetail or scouring rush	Summer.	(1) Telar — 1.3 oz/A.	Repeat applications will be required. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray.
			(2) Oust — 6-12 oz/A.	
			(3) Rely — 3% solution.	
			(4) Casoron — 150-200 lb/A of Carson 4G.	
			(5) Hyvar XL — 6-12 gal/A.	
Foliar spray	Itchgrass	Summer-fall.	Glyphosate (Touchdown) 2% solution.	Spray itchgrass to wet all foliage. Be careful not to spray nontarget plants.
		Spring.	Hexazinone (Velpar) 0.5-0.53 lb/A.	Spray itchgrass to wet all seedling itchgrass foliage thoroughly. Add nonionic surfactant or oil concentrate.
		Summer-fall.	MSMA 4 lb/A.	Spray itchgrass to wet all foliage. If surfactant is not present in the formulation, add nonionic surfactant at 0.25%. If the objective is to encourage bermudagrass growth, use MSMA alone.
		Summer-fall.	Sethoxydim 1.5 % + 1% crop oil concentrate.	Spray itchgrass to wet all foliage but not to the point of runoff.