

NONCROPLAND

NONCROPLAND INSECT CONTROL

David Buntin, Research/Extension Entomologist

PESTS	INSECTICIDE	FORMULATION AMOUNT PER ACRE	LB ACTIVE INGREDIENT PER ACRE	REMARKS AND PRECAUTIONS
NONCROPLAND includes field margins, fence rows, roadsides, ditch bands, fallow fields, and unmanaged areas adjacent to cultivated or cropped fields in agricultural areas, unless specifically prohibited by the label. Does not include areas with open water. Does not include premise sprays for buildings and other structures such as grain bins. Does not include unmanaged land in urban and residential areas.				
Grasshoppers	<i>acephate</i> Acephate 97 Orthene 97, other 97% brands	Non-crop areas: 4 oz Wastelands: 1.5–2 oz (see label)	0.243	For use on field borders, fence rows, roadsides, ditch banks, and borrow pits; also wastelands (lower rate). For early to mid-season application. Do not graze or feed vegetation cut from treated area.
Grasshoppers Armyworms Chinch bugs	<i>esfenvalerate</i> Asana XL (0.66EC) Adjourn, other brands	Grasshoppers 2.9–5.8 fl oz Armyworms 5.8–9.6 fl oz Chinch bugs 5.8–9.6 fl oz	0.015–0.03 0.03–0.05 0.03–0.05	Excluding public land such as parks, forests, or recreational. Spray non-cropland adjacent to tilled areas to control migrating insects which are a threat to crops. Do not apply more than 0.5 lb ai/A/year. Do not feed or graze livestock on treated area. Do not spray ditch banks or areas adjacent to water.
Grasshoppers Foliage feeding caterpillars such as fall armyworm, striped grass looper	<i>diflubenzuron</i> Dimilin 2L	2 fl oz	0.032	Long lasting growth regulator. Apply to small immature insects to prevent molting. Not effective on adult insects. Do not exceed 6 fl oz/year. Only apply when potential for drift is minimal. For ground applications add 1 pt–2 qt of emulsified vegetable or paraffinic crop oil if conditions are favorable for evaporation. See label for additional instructions.
Ticks Grasshoppers	<i>carbaryl</i> Sevin 4F, XLR Plus, Carbaryl 4L, other brands	0.5–1.5 qt	0.5–1.5	1–2 application/year but do not apply more than 3 lb ai/A/year. Do not graze or harvest for hay within 14 days after application. BEE CAUTION: Do not apply to target crops or weeds in bloom.
Target pests listed on label for adjacent crops Includes grasshoppers, armyworms, chinch bugs, stink bugs, others	<i>gamma cyhalothrin</i> Declare (1.25) Proaxis (0.5), other brands	Apply at rates listed on label for adjacent crop and target pests. For most crops and target pests: Declare: 1.02–1.54 fl oz Proaxis: 2.56–3.84 fl oz	0.01–0.015	For non-cropland adjacent to cropped areas. Do not apply to public lands. Apply at rates listed on label for adjacent crop and target pest (see label). Do not apply more than 0.1 lb ai/A/season. Do not graze livestock in treated areas.
Target pests listed on label for adjacent crops Includes grasshoppers, armyworms, chinch bugs, stink bugs, others	<i>lambda cyhalothrin</i> Warrior II Zeon, Lambda 2.08 Silencer 1, Tiaga Z Mystic Z, other brands	Apply at rates listed on label for adjacent crop and target pests. For most crops and target pests: Warrior II Zeon, others 2.08: 1.28–1.92 fl oz Silencer, others 1: 2.56–3.84 fl oz	0.02–0.03	For non-cropland adjacent to cropped areas. Do not apply to public lands. Apply at rates listed on label for adjacent crop and target pest (see label). Do not apply more than 0.1 lb ai/A/season. Do not graze livestock in treated areas.
Various caterpillars, beetles, leafhoppers and other pest. See label for complete list.	<i>azadirachtin</i> Ecozin Plus, Aza-Direct (1.2%), other brands	Ecozin: 15–30 fl oz Aza-Direct: 1–2 pt Varies with other brands		Do not exceed 56.4 oz/A of Ecozin Plus. For use on uncultivated agricultural areas such as farm yards, fence rows, grasslands, fallow land, right-of-way, and other non-cropland areas listed on the label.
Grasshoppers	<i>malathion</i> Malathion 57 EC	1.5–3.0 pt	0.94–1.875	NOTE: Check label. Most formulations of <i>malathion</i> are not labeled for non-cropland use.

GRASS ROADSIDE VEGETATION MANAGEMENT

Mark Czarnota, Extension Horticulturist—Weed Science
Taylor Singleton, Extension Sustainability Specialist

SITE	HERBICIDE FORMULATION	MOA	BROADCAST RATE/ACRE			REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	ACTIVE INGREDIENT	REI (Hours)	
<p>In portions of the United States, numerous weed species have developed resistance to members of the sulfonylurea herbicide family (e.g. Telar, Oust, Escort). Sulfonylurea resistant biotypes are able to survive use rates several times higher than needed to control susceptible biotypes. Roadside managers are encouraged to adhere to the following weed control practices to prevent the occurrence of sulfonylurea resistant weeds.</p> <ol style="list-style-type: none"> 1) Tank mix sulfonylurea herbicides with herbicides that have a different mode-of-action (e.g. <i>glyphosate</i>, 2,4-D, etc.). 2) Do not let weed escapes go to seed in areas that were treated with sulfonylurea herbicide. 3) Respray problem areas with an herbicide that has a different mode-of-action than a sulfonylurea. 4) Rotate the use of sulfonylurea herbicides with herbicides that have a different mode-of-action. 						
THESE DORMANT TREATMENTS ARE DESIGNED FOR ROADSIDES HAVING PREDOMINANTLY BERMUDAGRASS.						
Annual Grass and Broadleaf Weed Suppression in Dormant Bermudagrass	<i>sulfometuron</i> Oust 75DG	2	1 oz	0.75 oz	4 H	Oust may be applied once in November–early-February while the bermudagrass is dormant for the control of winter annual grass and broadleaf weeds. This treatment may delay greenup of the bermudagrass.
	<i>glyphosate</i> (numerous brands)	9		0.38–0.5 lb	4 H	<i>Glyphosate</i> may be applied in December–mid-March while the bermudagrass is dormant for the control of winter annual grass and broadleaf weeds. This treatment does not provide residual control.
	<i>glyphosate</i> + Oust 75 DG	9 + 2	— + 0.25 oz	0.25 lb + 0.19 oz	4 H	Apply in December–mid-March while the bermudagrass is dormant for the control of winter annual grass and broadleaf weeds. Bermudagrass greenup is not delayed extensively with this treatment.
	<i>glyphosate</i> + Oust 75DG + Telar 75DG	9 + 2 + 2	— + 0.25 oz + 0.25 oz	0.25 lb + 0.19 oz + 0.19 oz	4 H	<i>Glyphosate</i> + Oust + Telar may be applied in December–mid-March while the bermudagrass is dormant for the control of winter annual grasses and broadleaf weeds. Bermudagrass greenup is not extensively delayed by this treatment.
	<i>imazapic</i> + <i>glyphosate</i> Journey 0.75 + 1.5 lb/gal	2 + 9		16 fl oz + 0.25	12 H	Apply to dormant bermudagrass for the control of annual broadleaf weeds. Add a non-ionic surfactant at 0.25% v/v to the spray mix. DO NOT apply immediately before or during spring green-up of bermudagrass or significant delays in greenup will occur.
	<i>glyphosate</i> + 2,4-D amine Campaign 3.1 lb/gal others	9 + 4	1–2 qt	0.3 + 0.48 to 0.6 + 0.95 lb	48 H	Campaign may be applied once for the control of winter annual grass and broadleaf weeds before bermuda greenup. It may also suppress or control broadleaf weeds tolerant of these other treatments. Refer to the label for rates for particular species. It is not necessary to add a surfactant to Campaign. Since Campaign is a formulation containing 2,4-D, use special precautions when applying in the vicinity of 2,4-D sensitive crops such as vegetables, tobacco, fruit trees, ornamental, and cotton.
	<i>diflufenzopyr</i> + <i>dicamba</i> Overdrive 76.4% DF 0.2 lb ai + 0.5 lb ai/lb	19 + 4	4–8 oz	0.05 + 0.125 to 0.1 + 0.25	24 H	Controls annual and perennial broadleaf weeds. Add a non-ionic surfactant at 0.25% v/v or methylated seed oil at 2 pt/A to the spray mix. <i>Diflufenzopyr</i> has been shown to improve the activity of “auxin-like” herbicides such as <i>triclopyr</i> , <i>clopyralid</i> , and <i>picloram</i> . May be tank-mixed with Garlon 4 and 3A, 2,4-D, Plateau, <i>glyphosate</i> , Escort, Oust, Telar, and MSMA to increase spectrum of weed species controlled. Overdrive is rainfast within 4 hours after application.

SITE	HERBICIDE FORMULATION	MOA	BROADCAST RATE/ACRE			REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	ACTIVE INGREDIENT	REI (Hours)	
Maintenance of Actively Growing Bermudagrass (Weed Control or Suppression)	MSMA (Several trade names) 6 lb/gal or DSMA (Several trade names) 3.6 lbs/gal	17	½ gal	2 lb	12 H	May be applied during summer months every 4–6 weeks for suppression or control of emerged weeds. This treatment will release actively growing bermudagrass and suppress bahiagrass, dallisgrass, johnsongrass, and several broadleaf weeds.
		17	1 gal	3.6 lb		
	diflufenzopyr + dicamba Overdrive 76.4% DF 0.2 lb + 0.5 lb/lb	19 + 4	4–8 oz	0.05 + 0.125 to 0.1 + 0.25	24 H	Controls annual and perennial broadleaf weeds. Add a non-ionic surfactant at 0.25% v/v or methylated seed oil at 2 pt/A to the spray mix. <i>Diflufenzopyr</i> has been shown to improve the activity of “auxin-like” herbicides such as <i>triclopyr</i> , <i>clopyralid</i> , and <i>picloram</i> . May be tank-mixed with Garlon 4 and 3A, 2,4-D, Plateau, <i>glyphosate</i> , Escort, Oust, Telar, and <i>MSMA</i> to increase spectrum of weed species controlled. Overdrive is rainfast within 4 hours after application.
	<i>glyphosate</i> (numerous brands)	9	—	0.19–0.3125 lb	4 H	May be applied during summer months to suppress or control emerged weeds and to release well-established and actively growing bermudagrass. For bahiagrass growth and seedhead suppression apply a second application at 0.125 lb ai/A 6–8 weeks after the initial application.
	<i>imazapic</i> Plateau Impose 2.0 lb/gal	2	3–4 fl oz	0.047–0.0625	12 H	Apply after full spring green-up of bermudagrass or during the summer months to suppress bahiagrass growth and seedhead development. Add a non-ionic surfactant at 0.25% v/v or methylated seed oil at 1.5–2 pt/A to the spray mix. Do not apply immediately before or during bermudagrass green-up. A second treatment may be applied in 6–10 weeks for continued growth suppression.
	<i>sulfometuron</i> Oust 75DG	2	0.5 oz	0.375 oz	4 H	Oust may be applied after full spring green-up of bermudagrass to suppress bahiagrass growth and seedhead development and for the control of certain broadleaf weeds. A second treatment may be applied 6–10 weeks later for continued suppression. Be certain that no bermudagrass injury is present before making the second application. A non-ionic surfactant at 0.25% v/v should be added to the spray mix.
	<i>glyphosate</i> + Oust 75DG	9 + 2	— + 0.25 oz	0.19 lb + 0.19 oz	4 H	<i>Glyphosate</i> + Oust may be applied to bermudagrass to provide bahiagrass seedhead inhibition and vegetative suppression. Apply 1–2 weeks after full greenup of bermudagrass and bahiagrass or after the bahiagrass has been mowed. Application should be made prior to seedhead emergence.
	<i>nicosulfuron</i> + <i>metsulfuron</i> Pastora 56% + 15%	2 + 2	1–2 oz	0.025–0.05 + 0.0067–0.013	4 H	Use for control of grassy and broadleaf weeds in bermudagrass on uncultivated nonagricultural areas (such as airports, highway, railroad, and utility rights-of-way, sewage disposal areas, etc.); uncultivated agricultural areas (such as farmyards, fuel storage areas, fence rows, soil bank land, barrier strips, etc.); and, industrial sites (such as lumberyards, pipelines, tank farms, etc.) including grazed areas on all these sites. Apply with a non-ionic surfactant, crop oil concentrate, or ammonium nitrogen fertilizer.

GRASS ROADSIDE VEGETATION MANAGEMENT

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			AMOUNT OF FORMULATION	ACTIVE INGREDIENT	REI (Hours)	
Maintenance of Actively Growing Bermudagrass (Weed Control or Suppression) <i>(continued)</i>	<i>aminopyralid</i> Milestone VM 2 lb/gal	4	4–7 fl oz	0.06–0.11	48 H	Controls numerous broadleaf weed species such as horseweed, dogfennel, horsenettle, and tropical soda apple. Milestone is non-volatile, but use care when applying in the vicinity of broadleaf crops, fruit trees, and ornamentals. Milestone can be tank-mixed with Plateau, <i>glyphosate</i> , <i>MSMA</i> , <i>2,4-D</i> , and numerous other herbicides labeled for use on grass roadsides. Add a non-ionic surfactant at 0.25% v/v to the spray mix.
	<i>aminocyclopyrachlor</i> + <i>metsulfuron</i> Streamline 52DF 39.5% + 12.6%	4 + 2	1.75–10 oz	0.06–0.04 + 0.01		Apply for weed and brush control on non-crop areas, rights of ways industrial sites and natural areas such as campgrounds. Apply early post-emergence treatments when broadleaf weeds are actively germinating or growing. The length of control is dependent on the application rate, condition, and growth stage of target weeds, environmental conditions at and following application, and the density and vigor of competing desirable vegetation. Applications to bermudagrass, Kentucky bluegrass and tall fescue industrial, and roadside turfgrasses can cause transient stunting, yellowing and/or seedhead suppression. To reduce these transient symptoms, make application later in the spring after new growth is 4–6" tall or make application in the fall. Do not apply more than 11.5 oz broadcast/A/year.
	<i>aminocyclopyrachlor</i> + <i>chlorsulfuron</i> Perspective 55DF 39.5 + 15.8%	4 + 2	1.75–11 oz	0.06–0.38 (0.04 + 0.02 to 0.27 + 0.11)		Controls broadleaf and grassy weeds in non-crop areas, rights of ways at industrial sites and natural areas such as campgrounds. Applications to bermudagrass, Kentucky bluegrass and tall fescue industrial, and roadside turfgrasses can cause transient stunting, yellowing and/or seedhead suppression. To reduce these transient symptoms, make application later in the spring after new growth is 4–6" tall or make application in the fall. Do not apply more than 11.5 oz broadcast/A/year. Do not apply more than 11 oz/broadcast/A/year as a result of broadcast, spot, or repeat applications. Do not apply more than 3 times per year.
	<i>glyphosate</i> + <i>2,4-D</i> Campaign 3.1 lb/gal others	9 + 4	1–1.5 qt	0.3 + 0.48 to 0.45 + 0.72 lb	48 H	Campaign may be applied to actively growing well-established bermudagrass and bahiagrass to suppress or control emerged weeds and to allow the release of the bermudagrass. Use the low rate on bahiagrass. This treatment will control many broadleaf weeds tolerant of <i>MSMA</i> , <i>DSMA</i> , Roundup Pro, or Roundup Pro + Oust due to the <i>2,4-D</i> which is one of the ingredients. Rate of application should be based on the weed species most common on the roadside (Refer to label). It is not necessary to add a surfactant to Campaign. Since Campaign is a formulation containing <i>2,4-D</i> , use care when applying in the vicinity of <i>2,4-D</i> sensitive crops such as vegetables, cotton, tobacco, fruit trees, and ornamentals.
	<i>sulfosulfuron</i> OutRider 75DF	2	1.33 oz	0.062	12 H	Recommended for the control of emerged johnsongrass and sedges in bermudagrass and bahiagrass. DO NOT use OutRider on other grass species such as tall fescue. OutRider does not control annual grasses such as crabgrass and sandbur, or perennial grasses such as dallisgrass and vaseygrass. Apply to johnsongrass at a minimum of 18" tall up to the heading stage. Apply to sedges 6–10" tall. Add a non-ionic surfactant at 0.25% v/v. OutRider may be tank-mixed with other herbicides; however, <i>amine</i> formulations may reduce johnsongrass control. For best results, do not mow for two weeks before or after application.

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Maintenance of Actively Growing Bermudagrass (Weed Control or Suppression) <i>(continued)</i>	<i>penoxsulam</i> + <i>oxyfluorfen</i> Cleantraxx 0.83 + 3.93 lb/gal	2 + 14	3–4.5 pt	0.3–0.5 + 1.5–2.2	24 H	Cleantraxx provides pre- and post-emergence control of susceptible weeds in roadsides, railroads, industrial sites, and other non-crop areas. The best weed control is obtained by applications to weeds either pre-emergence or at early post-emergence timings. For the best control of emerged grass and broadleaf weeds, apply a tank mix of Cleantraxx with a post-emergence herbicide registered for use on the specific site. For post-emergence applications, Cleantraxx must be applied with an approved adjuvant. Do not apply more than 4.5 pt/A/year. Do not apply Cleantraxx when weather conditions favor drift. Do not treat inside banks or bottoms of irrigation ditches, either dry or containing water, or other channels that carry water that may be used for irrigation or domestic purposes. A single rainfall of 0.5" or more, within 21 days after application, is necessary to activate treatments for pre-control.
	<i>foramsulfuron</i> + <i>iodosulfuron-methyl</i> + <i>thiencarbazonemethyl</i> Derigo WDG 24 + 2.4 + 10%	2 + 2	3–6 oz	0.045 + 0.005 + 0.019 to 0.09 + 0.10 + 0.038 lb		Apply 3–6 oz/A for grassy and broadleaf weed control. Do not exceed the maximum amount of 6 oz/A/year as a broadcast spray of this product. For broadcast applications, use a minimum of 10 gal water/A. For weed control in dense weed populations, control of weeds under adverse growing conditions, or control of mature weeds, spray volume should be increased to obtain adequate spray coverage of targeted weeds. Do not use this product on cool-season grass types, including tall fescue, fine fescue, Kentucky bluegrass, or perennial ryegrass unless control of these species is desired. Rainfall within 2 hours of spray drying may result in reduced weed control and may necessitate retreatment. Do not mow immediately after application or before spray has dried or weed control may be reduced. After treatment, do not transfer clippings to non-target areas. For johnsongrass, dallisgrass, and vaseygrass control, apply in combination with MSO at 0.5-1% v/v and apply as a broadcast, spot application, or directed spray. Make a second application if regrowth is observed 30-60 days later. Application should be made in the fall for optimum control of dallisgrass.
Tall Fescue Seedhead Suppression and/or Weed Control	<i>MSMA</i> (Several trade names) or <i>DSMA</i> (Several trade names)		1/3 gal 1 gal	2 lb 3.6 lb	12 H	Mow roadsides, if needed, when bahiagrass or dallisgrass seedheads begin to appear (usually in early June). Begin treatment when grasses begin to send up new seedheads. Air temperature in afternoons should be 80° F or above. Apply as needed when new seedheads or other weeds emerge usually at 4–6 week intervals. During the summer, 2–3 applications will be needed. This treatment suppresses bahiagrass, dallisgrass, johnsongrass, and broadleaf weeds and allows fescue to remain with little injury.
	<i>glyphosate</i> (numerous brands) + <i>sulfometuron</i> Oust 75DG	9 + 2	— + 0.25 oz	0.19–0.25 lb 0.19 oz	4 H	<i>Glyphosate</i> + Oust may be applied to tall fescue roadsides to suppress tall fescue seedhead production, broadleaf weeds, and grasses. Apply to established, actively growing tall fescue in the spring prior to seedhead emergence (usually between March 1–April 1). Slight discoloration of the fescue may occur.
	<i>sethoxydim</i> Sethoxydim G-Pro 1 lb/gal	1	1 lb/gal	0.19 lb	12 H	May be applied to tall fescue roadsides to suppress tall fescue seedhead production. Apply to established tall fescue that is actively growing in the spring prior to seedhead emergence (usually between March 1–April 1). Do not apply to fescue less than 1 year old. Apply in 30–40 gal of water/A. <i>Sethoxydim</i> will not suppress or control broadleaf plants which may be released due to the suppression of tall fescue. Discoloration of the fescue will often occur and may sometimes be severe.

GRASS ROADSIDE VEGETATION MANAGEMENT

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			AMOUNT OF FORMULATION	ACTIVE INGREDIENT	REI (Hours)	
Tall Fescue Seedhead Suppression and/or Weed Control (continued)	<i>chlorsulfuron</i> Telar 75DG	2	0.25 oz	0.19 oz	4 H	Telar may be applied to suppress tall fescue seedhead production. Apply to established tall fescue that is actively growing in the spring prior to seedhead emergence (usually between March 1 and April 1). Some suppression of the grass growth may occur. This treatment will also help to suppress or control many broadleaf weeds.
	<i>glyphosate</i> (numerous brands) + <i>chlorsulfuron</i> Telar 75DG	9 + 2	— +	0.19–0.25 +	4 H	<i>Glyphosate</i> + Telar may be applied to tall fescue to suppress seedhead production and control some annual weeds. Apply to established tall fescue in the spring prior to seedhead emergence (usually between March 1 and April 1). Make only one application per season. Telar provides better control of thistles and mustards than Oust.
	<i>glyphosate</i> (numerous brands) + <i>metsulfuron</i> Escort, Patriot 60 DG	9 + 2	— +	0.19–0.25 0.15 oz	4 H	<i>Glyphosate</i> + <i>metsulfuron</i> may be applied to tall fescue to suppress seedhead production and control some annual weeds. Apply to established tall fescue in the spring prior to seedhead emergence (usually between March 1 and April 1).
	<i>diflufenzopyr</i> + <i>dicamba</i> Overdrive 76.4% DF 0.2 lb + 0.5 lb/lb	19 + 4	4–8 oz	0.05+0.125 to 0.1+0.25	24 H	Controls annual and perennial broadleaf weeds. Add a non-ionic surfactant at 0.25% v/v or methylated seed oil at 2 pt/A to the spray mix. <i>Diflufenzopyr</i> has been shown to improve the activity of “auxin-like” herbicides such as <i>triclopyr</i> , <i>clopyralid</i> , and <i>pictoram</i> . May be tank-mixed with Garlon 4 and 3A, 2,4-D, Plateau, <i>glyphosate</i> , Escort, Oust, Telar, and MSMA to increase spectrum of weed species controlled. Overdrive is rainfast within 4 hours of application.
	<i>aminopyralid</i> Milestone VM 2 lb/gal	4	4–7 fl oz	0.06–0.11	48 H	Controls numerous broadleaf weed species including horseweed, dogfennel, horsenettle and tropical soda apple. Milestone is non-volatile, but use care when applying in the vicinity of broadleaf crops, fruit trees, and ornamentals. Milestone can be tank-mixed with Plateau, <i>glyphosate</i> , MSMA, 2,4-D, and numerous other herbicides labeled for use on grass roadsides. Add a non-ionic surfactant at 0.25% v/v to the spray mix.
	<i>imazapic</i> Plateau Impose 2 lb/gal	2	2–3 fl oz	0.031–0.047	12 H	Apply in early spring to suppress tall fescue foliar growth and seedhead emergence.

WEED CONTROL IN NONCROPLAND

Mark Czarnota, Extension Horticulturist—Weed Science
Taylor Singleton, Extension Sustainability Specialist

NONCROPLAND

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
	Herbicides used for soil applications on noncropland areas provide residual control of susceptible plants in treated areas and may result in bare ground for several months or years. Refer to the specific herbicide label for additional information.				
Soil	<i>prometon</i> Pramitol 25E Sonora 4SC	5	4–10 gal 2–5 gal		Controls numerous annual and perennial weeds. This product will inhibit plant growth for 1 or more years. Controls weeds through foliar and root contact; however, the primary activity is through root uptake. Apply before or shortly after weeds emerge. Dry soil conditions and lack of rainfall may result in poor weed control. DO NOT use near adjacent desirable trees or shrubs. Pramitol 5PS is a ready-to-use pelleted product. Areas of application: industrial sites, railroad and highway rights of way, guard rails, around buildings, storage areas, and fence rows.
	<i>prometon</i> + <i>simazine</i> + <i>sodium chlorate</i> + <i>sodium metaborate</i> Pramitol 5PS	5 + 5	152–400 lb		
	<i>diuron</i> Karmex 80DF	7	5–15 lb	12 H	Controls annual grass and herbaceous broadleaf weeds. Apply prior to or shortly after weeds emerge. For post-emergence applications, add a non-ionic surfactant at 0.25–0.5% v/v. DO NOT use on walks, driveways, tennis courts, or similar areas. Areas of application: utility, railroad and roadside rights of way, lumberyards, industrial storage areas and around farm buildings.
	<i>bromacil</i> (40%) + <i>diuron</i> (40%) Krovar 1 DF DiBro 2+2	5 + 7	4–30 lb 200–400 lb	12 H	Controls annual and perennial weeds. Apply prior to or shortly after weeds emerge. Use the high rate for nutsedge and bermudagrass control. Krovar I plus surfactant may be tank mixed with <i>2,4-D amine</i> , <i>MSMA</i> or <i>paraquat</i> . DO NOT use near desirable plants or in areas where their roots may extend. DO NOT use on walks, driveways, tennis courts, or other similar areas. Areas of application-railroad and roadside rights-of-way, industrial storage areas and industrial sites.
	<i>bromacil</i> Hyvar X 80 WP Hyvar X-L 2 lb/gal	5	3–15 gal 1.5–12 gal	12 H	Controls a wide range of annual and perennial weeds, brush and trees. Use the high rates for brush and tree control. Refer to label for the use of lower rates for annual and perennial weed control. DO NOT apply over the root zone of desirable plants, or in locations where <i>bromacil</i> may be washed or moved into contact with their roots. DO NOT use on lawns, walkways, tennis courts, or other similar areas. Areas of application: railroad and roadside rights of way, lumberyards, storage areas, and industrial plant sites.
	<i>imazapyr</i> (0.5%) + <i>diuron</i> (2.0%) Topsite 2.5G	2 + 7	200–300 lb		Controls a wide range of annual and perennial grass and broadleaf weeds. Apply as a pre- or very early post-emergence application. DO NOT use on lawns, walks, driveways, tennis courts, or other similar areas. DO NOT apply over the rootzone of desirable plants. Areas of application: railroad, utility, pipeline and highway rights of way, petroleum tank farms, storage areas, and other similar areas.
	<i>imazapyr</i> Arsenal 0.5G others	2	200 lb	48 H	Controls a wide range of grass and broadleaf weeds. Apply before weeds emerge. DO NOT use on lawns, walks, driveways, tennis courts, or other similar areas. DO NOT apply over the rootzone of desirable plants. Areas of application: railroad, utility, pipeline and highway rights of way, petroleum tank farms, fence rows, storage areas, and other similar areas.
	<i>flumioxazin</i> Payload 51WDG	14	8–12 oz		Controls a wide range of grass and broadleaf weeds. Apply before weed emergence or to weeds less than 2" tall. Add a non-ionic surfactant at 0.25% v/v for post-emergence applications. DO NOT apply more than 24 oz/A/year of Payload. Areas of application: guard rails, railroad, substations, industrial plant sites, around farm buildings and fence rows, and storage areas.

WEED CONTROL IN NONCROPLAND

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Soil (continued)	<i>flumioxazin</i> + <i>pyroxasulfone</i> Piper 76WDG	14 + 15	6–10 oz		Piper is a preemergence and early postemergence herbicide for control of selected grass and broadleaf weeds to maintain bareground and certain perennial grasses in non-crop areas. The most effective postemergence weed control occurs when applied in combination with a surfactant to weeds less than 2 inches in height. Do not apply more than 10 oz per acre per application by ground. Use a tank mix partner in combination with Piper for postemergence control of weeds larger than 2 inches.
	<i>indaziflam</i> Esplanade 200SC 1.67 lb ai/gal	29	3.5–7 fl oz	12 H	Provides pre-control of annual grasses and broadleaf weeds in railroad, roadside, industrial areas, utilities, airports, government and military installations, and managed areas. Do not apply to soil with standing water or areas where runoff water flows. Do not exceed 7 fl oz/A in a single application or 10 fl oz/A/year.
	<i>indaziflam</i> (24.3%) + <i>rimsulfuron</i> (16.7%) Esplanade Sure WG	29 + 2	3–6 oz		Esplanade Sure is a pre- and postemergence herbicide for residual control of annual grasses and broadleaf weeds in non-crop areas including railroads, roadsides, hardscapes, and industrial areas. Esplanade Sure may be used to release or re-establish desirable perennial grasses, forbs, shrubs and trees in non-crop areas. Do not apply more than a total of 6 ounces of Esplanade Sure per acre (0.91 lb indaziflam and 0.062 lb rimsulfuron) within a twelve-month period. Do not apply more than two applications of Esplanade Sure in a 12-month period. Do not use on residential or commercial lawns, golf courses, sod farms, or production and landscape ornamentals.
	<i>indaziflam</i> + <i>aminocyclopyrachlor</i> + <i>imazapyr</i> Plainview 2.19 lb ai/gal	29 + 4 + 2	32–64 oz		Plainview SC is a non-selective herbicide that controls undesirable vegetation in areas where bareground is desired. Do not apply more than a total of 64 ounces/acre of Plainview SC per acre within a twelve-month period. Do not exceed a total of 0.09 lb indaziflam, 0.28 lb aminocyclopyrachlor acid, and 1.5 lb imazapyr acid per acre on sites receiving applications of Plainview SC or other herbicides containing these active ingredients. Do not apply more than 64 oz per acre in a single application. Do not make more than two applications per year of Plainview SC when using reduced applications rates. Allow at least 60 days between applications. Applications to hardscapes (e.g. cracks in parking lots, walkways, and other hard surfaces) may be made by spot application only.
	<i>hexazinone</i> Velpar 75DF Velpar L 2 lb/gal Pronone MG Pronone 10G	5	3–10 lb 1–6 gal 30–120 lb 30–120 lb	48 H	Controls a wide range of annual and perennial weeds, and various brush and tree species. Apply just before or soon after weed emergence. For tree and brush control apply from the late winter-early summer. Velpar L can be soil applied with an exact delivery handgun or applied as a lace and streak treatment for woody plant control. Pronone MG and 10G are ready-to-use granular formulations that are spread over the area to be treated. DO NOT use over the root zone of desirable trees. DO NOT use on lawns, walks driveways, tennis courts, or similar areas. Areas of application—railroad, utility, and roadside rights of way, industrial storage areas, and other similar sites.
	<i>tebuthiuron</i> Spike 80W Spike 20P Sprakil S-5	7	1.5–7.5 lb 3.75–30 lb 40–120 lb		Controls a wide range of woody vines, brush and trees. Apply year round, except when soil is saturated with water or frozen. Wettable powder formulations are mixed with water and applied to the site. Pellet and granule formulations are applied directly to the soil as a broadcast or spot application. DO NOT apply in any area where the roots of desirable plants are located. Spike 80W can be tank-mixed with Surflan 4AS for improved annual grass control. <i>Tebuthiuron</i> is not labeled for use on walks, driveways, streets, tennis courts, or under swimming pools, asphalt, or concrete. Areas of application—utility, roadside and railroad rights of way, fence rows, and industrial storage areas.
	<i>dichlobenil</i> Casoron 4G	20	250–300 lb	12 H	Controls a wide range of annual grass and broadleaf weeds. Woody vines, brush and trees are usually tolerant to <i>dichlobenil</i> . Apply granules during the cool months (December–mid-February) of the year. If applications are made at temperatures greater than 70° F, <i>dichlobenil</i> should be incorporated into the soil by irrigation water (¼ inch) or shallow tillage. DO NOT apply to slopes located above crops or lawns as run-off from treated areas could cause injury. Areas of application: utility, roadside and railroad rights of way, industrial, and recreational areas, and fence rows.

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Soil (continued)	tebuthiuron + diuron Sprakil 13 1.0 + 3.0G	7 + 7	150–400 lb		Controls a wide range of annual and perennial grass and broadleaf weeds. May be applied year-round; however, for best results apply in spring-early summer. DO NOT apply near desirable trees in areas where roots may extend into the treated area. DO NOT use on cropland or on land to be used for subsequent cropping. DO NOT contaminate irrigation ditches or water used for domestic purposes.
	Sprakil 26 2 + 6G		150–400 lb		
Foliage	chlorsulfuron Telar 75DG	2	0.25–3 oz	4 H	Primarily effective for the control of annual and perennial broadleaf weeds. A surfactant at 0.25% v/v should be included in the spray mix for post-emergence applications. DO NOT allow spray to drift to desirable plants. Sprayers that have contained <i>chlorsulfuron</i> should be used only on noncropland areas. Areas of application—utility, roadside and railroad rights-of-way, fence rows, and industrial storage areas.
	metsulfuron Escort 60DF Patriot 60DF	2	0.3–4 oz	4 H	Effective for control of annual and perennial weeds, kudzu, certain woody species, and <i>Pensacola bahiagrass</i> . A surfactant at 0.25% v/v should be included in the spray mix. DO NOT allow sprays to drift to desirable plants. Sprayers that have contained <i>metsulfuron</i> should be used only on noncropland areas. Areas of application—utility, roadside and railroad rights of way, fence rows, and industrial storage areas.
	sulfometuron Oust 75DG Spyder 75DG	2	2–8 oz	4 H	Controls a wide range of annual and perennial broadleaf weeds, certain annual grasses and woody vines. Apply as pre- or post-emergence treatment. A surfactant at 0.25% v/v should be included in the spray mix for post-emergence applications. DO NOT allow sprays to drift to desirable plants or apply to soils saturated with water. Sprayers that have contained <i>sulfometuron</i> should be used only on noncropland areas. Areas of applications: utility, roadside and railroad rights of way, fence rows and industrial storage areas.
	aminocyclopyrachlor + imazapyr + metsulfuron Viewpoint 61.7DF 22.8% + 31.6% + 7.3%	4 + 2 + 2	13–20 oz		Apply Viewpoint for controlling brush, weeds in bareground areas, or vines and briars. Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not apply or otherwise permit this product or sprays containing this product to come into contact with any non-target crop or desirable broadleaf plants. Do not use on lawns, walks, driveways, tennis courts, or similar areas. Do not apply more than 20 oz broadcast/A/year.
	diuron (62%) + imazapyr (8%) Sahara DG	7 + 2	13–19 lb		Provides post-emergence and pre-control on numerous grass, broadleaf weed, brush, and vine species. Post-emergence applications are recommended for perennial plants. Use where bare ground (no plant growth) is desired. Add a non-ionic surfactant at 0.25% v/v, or methylated seed oil at 1.5–2 pt/A. DO NOT use on lawns, walks, driveways, tennis courts, or other similar areas. DO NOT apply over the rootzone of desirable plants. Areas of application: railroad, utility, pipeline and highway rights of way (including pavement edges, guard rails, sign posts, and delineators), petroleum tank farms, fence rows, storage areas, non-irrigation ditch banks, and other similar areas.
	2,4-D (Numerous trade names and formulations)	4	1–4 lb ai	48 H	Controls certain annual and perennial broadleaf weeds. Apply to actively growing weeds. Ester formulations volatilize at temperatures > than 70° F and can injure sensitive plants. <i>Amine</i> formulations are recommended during the warm months. DO NOT allow sprays to drift to desirable plants. Areas of application: utility, railroad and roadside rights-of-way, fence rows, and industrial storage areas.

WEED CONTROL IN NONCROPLAND

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Foliage (continued)	2,4-D + 2,4-DP	4 + 4			Controls a broader range of vines, brush, and trees than 2,4-D. Apply during the spring and summer months. Patron 170 may also be applied as a basal bark, cut stump, or frill treatment. These herbicides are ester formulations. Use with caution during the warm months of the year. DO NOT allow sprays to drift to desirable plants. Areas of application: utility, railroad and roadside rights-of-way, fence rows, and industrial storage areas.
	Patron 170 1.83 + 1.87 lb/gal others		1–1.5 gal	48 H	
	2,4-D + dicamba Weedmaster 2.87 + 1 lb/gal	4 + 4	0.5–4 pt	48 H	Controls most broadleaf weeds and certain vine, brush, and trees. Apply to foliage of actively growing plants. DO NOT apply over the root zone of desirable trees or allow sprays to drift to desirable plants. Areas of application: utility, roadside and railroad rights of way, fence rows, industrial storage areas, and other similar noncropland areas.
	Veteran 720 1.9 + 1 lb/gal				
	MCPA + dicamba Veteran 2010 2.5 + 1.25 lb/gal	4 + 4	2–8 qt		Controls various herbaceous broadleaf weeds, and woody brush and trees. Use the low rate on herbaceous plants; the high rate on woody plants. DO NOT allow sprays to drift to desirable plants. Areas of application: rights of way, fence rows, roadsides, and other similar areas.
	2,4-D + triclopyr Crossbow 2 + 1 lb/gal	4 + 4	0.5–4 gal		Controls a wide range of broadleaf weeds, vines and woody plants. Apply to the foliage of actively growing plants. May also be applied as a dormant stem, basal bark, and cut stump treatment. Use the low rate for broad leaf weeds. Refer to label for rates for woody species. DO NOT allow sprays to drift to desirable plants. Crossbow is a low-volatile ester formulation. Use with caution during the summer months. Areas of application: roadside rights of way, fence rows, and industrial storage areas.
	dicamba Vanquish 4 lb/gal	4	0.25–2 gal	24 H	Controls a wide range of broadleaf weeds, vines, and woody plants. Apply to the foliage of actively growing plants. Vanquish may also be used as cut stump treatment (1 part Vanquish to 1-3 parts water). DO NOT apply over the root zone of desirable trees or allow sprays to drift to desirable plants. Areas of application: utility, roadside and railroad rights-of-way, fence rows, and industrial storage areas.
	diquat Reward 2 lb/gal	22	1–2 qt	24 H	Controls most annual grasses and annual broadleaf weeds. Control of perennial weeds is poor. Apply to the foliage of actively growing weeds. A non-ionic surfactant at 0.125% v/v should be included in the spray mix. DO NOT allow sprays to drift to desirable plants. DO NOT apply over the root zone of desirable trees. Areas of application: utility, roadside and railroad rights of way, fence rows, and industrial storage areas.
	paraquat Gramoxone Max 3 lb/gal	22	1.7–2.7 pt	48 H	Controls most annual grasses and annual broadleaf weeds. Control of perennial weeds is poor. Apply to the foliage of actively growing weeds. A non-ionic surfactant at 0.125% v/v should be included in the spray mix. DO NOT enter treated areas for 48 hours after application unless protective clothing and equipment is worn. Areas of application: utility, railroad and roadside rights of way, commercial buildings, industrial storage areas, walkways, patios, along driveways, and fences.
	glyphosate (numerous brands and formulations)	9	1–5 lb ai/A	4 H	Controls a wide range of grass and broadleaf weeds, vines, brush, and trees. Apply to the foliage of actively growing plants. A non-ionic surfactant at 0.5% v/v should be included in Accord spray mixes. DO NOT allow sprays to drift to desirable plants. Areas of application: roadside and railroad rights of way, fence rows, irrigation ditchbanks, and industrial storage areas.

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Foliage (continued)	<i>MSMA</i> <i>DSMA</i> (Several trade names and formulations)	17 17	2 lb ai/A 3.6 lb ai/A	12 H	Controls most annual grasses, johnsongrass, dallisgrass, bahiagrass, nutsedge, and certain broadleaf weeds. Apply to actively growing weeds. DO NOT allow sprays to drift to desirable plants. Areas of application: utility, roadside and railroad rights of way, fence rows, industrial sites, and drainage ditchbanks.
	<i>clopyralid</i> Transline 3 lb/gal	4	0.25–1.33 pt	12 H	Controls a wide range of annual and perennial broadleaf weeds. Grasses and members of the mustard family are tolerant to <i>clopyralid</i> . DO NOT allow sprays to drift to desirable plants. Areas of application: Transline- utility, roadside and railroad rights of way, and industrial storage areas, stinger-fence rows, around farm buildings, and equipment pathways.
	Stinger 3 lb/gal		0.25–1.33 pt	12 H	
	<i>fosamine</i> Krenite S 4 lb/gal	27	1.5–3 gal	12 H	Used for the control and growth suppression of a wide range of woody plants. Apply from July until fall leaf coloration. <i>Fosamine</i> affects only the portion of the foliage contacted by the spray and can be used for trimming or partial growth suppression. DO NOT allow sprays to drift. Areas of application: utility, roadside and railroad rights of way, areas adjacent to domestic water supplies, lakes, and ponds, industrial storage areas, and drainage ditchbanks.
	<i>imazapyr</i> Arsenal 2 lb/gal	2	2–6 pt	48 H	Arsenal formulations control a wide range of grass and broadleaf weeds, vines, brush, and trees. Arsenal may be applied as a pre- or post-emergence treatment. For Arsenal liquid, post-emergence applications are preferred for perennial weeds. Chopper is used as a cut stump, frill or low-volume basal bark treatment. DO NOT allow sprays to drift or apply over the root zone of desirable plants. DO NOT use on lawns, walks, driveways, tennis courts or similar areas, or any area where landscape plantings are anticipated. Areas of application: utility and railroad rights of way, fence rows, and industrial storage areas. Arsenal liquid may also be used under asphalt and concrete pavement.
	Chopper 2 lb/gal		See label	12 H	
	<i>picloram</i> Tordon K 2 lb/gal	4	0.25–4 qt	12 H	Controls a wide range of broadleaf weeds and woody plants. Most grasses are tolerant to <i>picloram</i> . Apply to the foliage of actively growing plants. Most crop plants and ornamentals can be severely injured by <i>picloram</i> . DO NOT allow sprays to drift or apply over the root zone of desirable plants. Tordon K is a Restricted Use Herbicide. Areas of application: utility, roadside and railroad rights of way, and industrial storage areas.
	<i>picloram</i> + 2,4-D Pathway Tordon 101M 0.54 + 2 lb/gal	4 + 4	Undiluted 0.5–4 gal	48 H	Pathway and Tordon 101R are ready-to-use products labeled for the control of woody plants. These herbicides are used as a cut stump, tree injection, or frill treatment. Tordon 101M controls broadleaf weeds, vines, brush, and trees. Tordon 101M may be used as a foliage, tree injection, frill, or cut stump treatment. Most crop plants are sensitive to <i>picloram</i> . DO NOT allow sprays to drift or apply over the root zone of desirable plants. Tordon 101M is a Restricted Use Herbicide. Areas of application: Pathway—utility, roadside and railroad rights-of-way, and fence rows; Tordon 101M: utility, roadside and railroad rights of way, and industrial storage areas.
	<i>picloram</i> + <i>triclopyr</i> Access 1 + 2 lb/gal	4 + 4		See label	Controls woody plants. Applied as a basal bark and thinline basal bark treatment. Access is mixed either with oil (diesel fuel, kerosene, No. 1 or 2 fuel oil, or Arborchem Basal Oil) or oil-water solutions. Refer to label for mixing instructions. Most crop plants and ornamentals can be severely injured by Access. DO NOT allow sprays to drift or apply over the root zone of desirable plants. Access is a Restricted Use Herbicide. Areas of application: utility, roadside and railroad rights of way, fence rows, and industrial storage areas.

WEED CONTROL IN NONCROPLAND

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Foliage (continued)	<i>triclopyr</i> Garlon 3A Tahoe 3A 3 lb/gal Garlon 4 Tahoe 4E 4 lb/gal Vastlan 4 Pathfinder	4	0.5–1 gal 1–3 qt Undiluted	48 H 48H 12 H 12 H 24 H 12 H	Controls a wide range of broadleaf weeds, vines brush, and trees. Most grasses are tolerant to <i>triclopyr</i> . <i>Triclopyr</i> formulations are used as a foliage treatment, basal bark (Garlon 4, Tahoe 4E), cut surface (Garlon 3, Tahoe 3A), and cut stump treatment. Pathfinder is a ready-to-use product labeled for basal bark and cut stump treatments. DO NOT allow sprays to drift to desirable plants. Areas of application: utility, roadside and railroad rights of way, fence rows, industrial storage areas, and around farm buildings.
Dormant Stem Treatments	2,4-D + 2,4-DP Weedone 170 3.7 lb/gal others	4 + 4	3–4 gal + 100 gal diesel oil	48 H	Spray in winter when plants are dormant. Drench all branches and stems.
	2,4-D + 2,4-D Weedone CB ready to use 1.33 lb/gal others	4 + 4	Undiluted	48 H	Apply undiluted to brush (up to 4" trunk diameter at breast height) to the lower 18–36 inches of the plant stem. Treat all around the stem including the root collar area and any exposed roots.
	2,4-D + <i>triclopyr</i> Crossbow 3 lb/gal	4 + 4	1.5–4 gal + 96–99 gal of diesel fuel, or No. 2 fuel oil.		Thoroughly wet upper and lower stems of brush including the root collar and any ground sprouts. Apply when bark is dry and brush is dormant. Best results are obtained with late winter-early spring applications.
	<i>triclopyr</i> Garlon 4 Tahoe 4E 4 lb/gal	4	4–8 qt in 100 gal of spray mix	12 H	Controls most woody plants with stems less than 2" in diameter. Crop oil concentrate at 3.0% v/v should be added to the spray mix. Alternatively, mix 3–6 qt of <i>triclopyr</i> in enough diesel fuel to make 100 gal of spray mix. Apply mixture by spraying at 20–40 psi any time when brush is dormant, foliage has dropped and from within 10 weeks before and up to bud break. Thoroughly wet the entire plant to the point of runoff. Also spray the ground under the plants for control of root-suckering species such as sumac, persimmon, sassafras, and locust. Apply up to 150 gal/A of spray mixture.
Basal Treatment	<i>picloram</i> + <i>triclopyr</i> Access 1 lb/gal + 2 lb/gal	4 + 4	1–2 gal + 98–99 gal of diesel oil, or No. 1 or No. 2 fuel oil		Add the herbicide to the oil and mix thoroughly. Use the higher rate of herbicide for hard to control species or trees with diameters 4–6". Apply using low pressure (20–40 psi) to the basal parts of brush and tree trunks to a height of 12–15" from the ground. Spray until run-off at the ground line. Also, spray the ground under the plants for control of root suckering species. Best control will be obtained when applications are made during the late dormant or active growing season.
	<i>triclopyr</i> Garlon 4 Tahoe 4E 4 lb/gal	4	1–5 gallons in 99–95 gal of diesel fuel, or No. 2 fuel oil	12 H	Controls most woody plants with stems less than 6" in diameter. Apply any time except when snow or water prevents spraying to the ground line. Spray the basal part of the tree and brush to a height of 12–15" above the ground. Spray completely around the tree or brush stem until runoff at the ground line is visible. <i>Triclopyr</i> may also be applied as a low volume basal bark, streamline basal bark, and thinline basal bark treatment. Refer to the label for information on these application techniques.

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Cut Stump	2,4-D + 2,4-DP Weedone 170 3.7 lb/gal	4 + 4	3–4 gal in 100 gal of oil	48 H	Apply with low volume knapsack sprayer using solid cone nozzle of medium orifice. Spray the entire freshly cut stump particularly bark and exposed roots. A thorough drenching is essential for complete control. Spray is effective and economical on stumps 3–4" and larger.
	<i>aminocyclopyrachlor</i> + <i>imazapyr</i> + <i>metsulfuron</i> Viewpoint 61.7DF 22.8% + 31.6% + 7.3%	0 + 2 + 2	13–20 oz		Apply Viewpoint for controlling brush and weeds in bare ground areas or vines and briars. Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not apply or otherwise permit this product or sprays containing this product to come into contact with any non-target crop or desirable broadleaf plants. Do not use on lawns, walks, driveways, tennis courts, or similar areas. Do not apply more than 20 ounces broadcast/A/year.
	2,4-DP + 2,4-D Weedone 170 Patron 170	4 + 4	Undiluted	48 H	Apply undiluted to fresh cut stumps up to 3" in diameter. Cut the stems as close to the ground as possible before treating.
	<i>picloram</i> + 2,4-D Tordon 101M	4 + 4		48 H	Spray or paint within 1 hour of cutting the cut surfaces of freshly cut stumps or stubs with either herbicide. The cambium area adjacent to the bark should be thoroughly wet. Tordon 101M may be applied undiluted or diluted 1:1 with water.
	<i>picloram</i> + 2,4-D Pathway	4 + 4	Undiluted	48 H	Spray or paint within one hour of cutting the cut surfaces of freshly cut stumps and shrubs with undiluted herbicide. The cambium area adjacent to the bark should be thoroughly wet.
	<i>dicamba</i> Banvel CST Veteran CST 1 lb/gal	4	Undiluted	24 H	Spray or paint within 1 hour of cutting, freshly cut stump surfaces. The area adjacent to the bark should be thoroughly wet.
	<i>dicamba</i> Vanquish 4 lb/gal	4	Diluted	24 H	Mix 1 part of <i>dicamba</i> with 1-3 parts water and spray or paint freshly cut stump surface. The area adjacent to the bark should be thoroughly wet.
	<i>triclopyr</i> Garlon 3A Tahoe 3A 3 lb/gal	4	Undiluted	48 H	Spray or paint the cut surfaces of freshly cut stumps and stubs with undiluted <i>triclopyr</i> 3A. The cambium area next to the bark is the most vital area to wet.
	Garlon 4 Tahoe 4E 4 lb/gal Vastlan 4 lb/gal		2–3 gal + 8–7 gal of diesel oil	12 H	Apply mixture with a backpack sprayer. Spray the root collar area, sides of the stump, and the cambium area. Apply within 1 hour of cutting at any time of the year, except when snow or water prevents spraying to the ground line. Use only <i>triclopyr</i> 4 or 4E (ester).
	Pathfinder		Undiluted	12 H	Apply to the sides of the stump and the cambium area. Apply at any time of the year, except when snow or water prevents spraying the ground line.

WEED CONTROL IN NONCROPLAND

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Kudzu	<i>dicamba</i> Vanquish 4 lb/gal	4	1–2 gal	24 H	Apply in 50 gal of water/A to kudzu after full leaf development. Repeat treatment one year later if kudzu appears. Refer to drift comments in foliage section.
	<i>picloram</i> + 2,4-D Tordon 101M	4 + 4	2–3 gal	48 H	Apply in 40–50 gallons of water per acre for complete coverage. Apply after the foliage is well developed. Repeat treatment one year later if kudzu appears. Refer to drift comments in foliage section.
	<i>tebuthiuron</i> Spike 20P	7	20 lb		Spike may be used as a soil treatment for control of kudzu. Apply in the spring. Repeat treatments may be needed. DO NOT use where marketable timber or desirable trees or shrubs are adjacent to the area. Rates exceeding 20 lb/A may cause severe injury to perennial grasses. Apply before bermudagrass or other summer perennial grasses break dormancy.
	<i>triclopyr</i> Garlon 4 Tahoe 4E 4 lb/gal Vastlan 4 lb/gal	4	1–2 qt	12 H	Apply to kudzu after full leaf development in the summer months. Repeat treatments may be needed. Many plants are susceptible to injury from this herbicide. DO NOT spray when wind speed is greater than 5 mph or otherwise favors drift to plants such as cotton, vegetables, ornamentals, etc.
	<i>clopyralid</i> Transline 3 lb/gal	4	21 oz	12 H	Apply to kudzu after full leaf development in the summer months. Repeat treatments may be needed. Many broadleaf plants are susceptible to Transline. Avoid applications during windy conditions when spray drift to desirable plants may occur.
	<i>glyphosate</i> Roundup Pro 4 lb/gal	9	4.0 qt	4 H	Apply to kudzu at the full bloom growth stage or up to 1 month after bloom. Repeat applications will be needed to control regrowth.
	<i>metsulfuron</i> Escort 60DF Patriot 60DF	2	3–4 oz/A	4 H	Apply to kudzu after full leaf development in the summer months. Add a surfactant at 0.25–0.5% v/v. Repeat treatments may be needed. DO NOT use over the root zone of desirable plants or allow sprays to drift.
Asphalt Surfaces (Herbicides applied before laying asphalt)	<i>dichlobenil</i> Casoron 4G	20	250–300 lb	48 H	Apply after the final grade is achieved to control weeds under asphalt in roadway, parking lots, and residential areas. Treated areas should be covered with asphalt as soon as possible. For resurfacing work, existing weeds should be sprayed with a contact herbicide prior to the <i>dichlobenil</i> application.
Asphalt Surfaces	<i>trifluralin</i> Treflan 5G	3	240–300 lb	12 H	Treflan 5G may be applied after the final grade is established or after base rock has been added. Asphalt paving should follow Treflan application as soon as possible. DO NOT apply Treflan to areas where asphalt is laid directly on top of soil. May be used in residential and recreation areas.
	<i>prometon</i> Pramitol 25E Sonora 4SC	5	7.5–10 gal 2–5 gal		Apply to soil just before laying asphalt in parking lots, highway shoulders, median strips, roadways, and other industrial sites. Apply in a minimum of 100 gal of water/A. DO NOT use on land near adjacent trees or other desirable plants.
	<i>bromacil</i> Hyvar X Hyvar X-L	5	10–30 lb 4–12 gal	12 H	Use <i>bromacil</i> under asphalt only in industrial sites or where the pavement has a suitable barrier along the perimeter that prevents encroachment of roots of desirable plants. Apply to subgrade and after final grading. Apply in a minimum of 100 gal of water/A. If soil is not moist, incorporate <i>bromacil</i> 4–6" deep with a disk or rototiller. Rainfall or irrigation of 2" will also provide uniform incorporation. DO NOT use in residential areas such as driveways, parking lots, walkways, tennis courts, golf cart paths, or any area where landscape planting could be anticipated.

APPLICATION METHOD	HERBICIDE FORMULATION	MOA	AMOUNT OF FORMULATION PER ACRE	REI (Hours)	REMARKS AND PRECAUTIONS
Asphalt Surfaces (continued)	<i>diuron</i> (62%) + <i>imazapyr</i> (8%) Sahara DG	7 + 2	13–19 lb		Apply to the soil surface after the final grade is established prior to laying asphalt in noncropland areas. If moisture is not present, Sahara should be disked or rototilled into the soil to a depth of 4-6". DO NOT move soil after application or apply where Sahara may contact the roots of desirable plants. Sahara is NOT recommended for use under pavement in residential properties such as driveways or parking lots, or in recreational areas such as golf cart paths or tennis courts.
	<i>imazapyr</i> Arsenal 2 lb/gal	2	6 pt	48 H	Apply to the soil surface after the final grade is established prior to laying asphalt in noncropland areas. If moisture is not present, Arsenal should be disked or rototilled into the soil to a depth of 4-6". DO NOT move soil after application or apply where Arsenal may contact the roots of desirable plants. Arsenal is NOT recommended for use under pavement in residential properties such as driveways or parking lots, or in recreational areas such as golf cart paths or tennis courts.
	<i>indaziflam</i> + <i>aminocyclopyrachlor</i> + <i>imazapyr</i> Plainview 2.19 lb ai/gal	29 + 4 + 2	32–64 oz		Plainview SC is a non-selective herbicide that controls undesirable vegetation in areas where bareground is desired. Do not apply more than a total of 64 ounces/acre of Plainview SC per acre within a twelve-month period. Do not exceed a total of 0.09 lb indaziflam, 0.28 lb aminocyclopyrachlor acid, and 1.5 lb imazapyr acid per acre on sites receiving applications of Plainview SC or other herbicides containing these active ingredients. Do not apply more than 64 oz per acre in a single application. Do not make more than two applications per year of Plainview SC when using reduced applications rates. Allow at least 60 days between applications. Applications to hardscapes (e.g. cracks in parking lots, walkways, and other hard surfaces) may be made by spot application only.
	<i>sodium metaborate</i> (48%) + <i>sodium chlorate</i> (30%) Bare-Spot Monobor Chlorate		870–1,740 lb		Apply to the soil surface after the final grade has been established prior to laying asphalt. DO NOT apply over the root zone of desirable trees and shrubs.
Asphalt Surfaces (emerged weeds)	<i>2,4-D</i> (Numerous trade names) 2 lb/gal	4	1–2 qt	48 H	Controls broadleaf weeds. DO NOT allow sprays to drift to desirable plants. May be tank mixed with <i>MSMA</i> .
	<i>MSMA</i> 6 lb/gal	17	0.5 gal	12 H	Controls annual grasses, certain perennial grasses and some annual weeds. May be tank mixed with <i>2,4-D</i> . DO NOT allow sprays to drift to desirable plants.
	<i>glyphosate</i> (numerous brands and formulations)	9	1–5 lb ai	4 H	Controls a wide range of grass and broadleaf weeds. DO NOT allow sprays to drift to desirable plants.

NONCROPLAND WOODY PLANT RESPONSE TO HERBICIDES Patrick E. McCullough, Former Extension Agronomist—Weed Science

Refer to the recommendations shown for a specific herbicide or refer to the herbicide label. This data was last updated by McCullough et al. in 2022 and will be revised beginning in 2025.

	HYVAR	SPIKE	VELPAR	TRICLOPYR 4	TRICLOPYR 3A	PATHFINDER	ROUNDUP / ACCORD	BANVEL / VANQUISH
WOODY PLANT	SOIL APPLICATIONS			BASAL	CUT STUMP APPLICATION			
Ash	F	F	F	F	P	F	F	F
Bamboo	P	P	F	P	P	P	P	P
Birch	F	F	F	F		P	F	F
Blackberry	F	F	F	G	F	G	G	G
Cedar, Red	F	P	F	F	F	P	P	P
Cherry, Wild				G	G	G		G
Chinaberry		G		G	G			
Dogwood	F	G	F	G	F	F	F	F
Elm	F	G	F	F	F	F	F	F
Greenbrier (Smilax)	P	F	P	P	P	P	P	P
Hawthorn	F	P	P	F	F	P	F	F
Hickory	F	F	P	G	P	P	F	F
Honeysuckle	P	G	P	P	F	G	P	P
Kudzu	P	P	P	P	F	G	F	F
Locust, Black	F	G	G	F	P	P	F	F
Locust, Honey	F	G	G	F	P	P	F	F
Maple spp.	F	F	F	G	P	F	F	F
Mulberry	F	F	F	F		P	F	F
Oak spp.	F	G	G	G	F	F	G	G
Orange, Osage	F	P	F	P	P	P	P	P
Persimmon	P	P	P	F	G	P	F	F
Pine spp.	F	F	P	G	G	P	G	G
Poison ivy/oak	F	P	F	P	F	P	G	G
Poplar	F	F	F	F		P	F	F
Privet, Chinese		E	G	E	E	E		F
Rose, multiflora	F	G	G	F	F	F	F	F
Sassafras	P	P	P	F	F	P	F	F
Sumac	F	G	F	G	F	P	G	G
Sweetgum	F	F	F	G	F	P	G	G
Sycamore	F	F	F	F		P	F	F
Trumpet creeper	P	F	P	P	F	P	P	P
Willow	F	F	F	G	F	P	F	F

Key to Response Symbols: E—Excellent Control; G—Good Control; F—Fair Control; P—Poor Control. If no symbol is given, weed response is unknown.

	HYVAR	KRENITE	ROUNDUP/ ACCORD	TRANSLINE	2,4-D	ARSENAL	BANVEL/ VANQUISH	ESCORT	TRICLOPYR 4	TRICLOPYR 3A
WOODY PLANT	FOLIAGE APPLICATIONS									
Ash	F	F	F	P	P	G	P	F	F	F
Bamboo	P		P-F	P	P	G	P	P	P	P
Birch	F	F	F	P	F	P		P	F	F
Blackberry	F	F	F	P	P	P	F	G	E	E
Cedar, Red	F	P	P	P	P	P	F	P	P	P
Cherry, Wild		F	F	P	P		P	G	G	G
Chinaberry				P	P		F		G	G
Dogwood	F	F	P	P	P	G	F	F	F	F
Elm	F	F	F	P	F	P	F	F	F	F
Greenbrier (Smilax)	P	P	P	P	P	G	P	P	P	P
Hawthorn	F	P	F	P	F	G	F	P	F	F
Hickory	F	P	G	P	F	G	P	P	G	G
Honeysuckle	F	F	F	P	P	G	F	G	P	P
Kudzu	P	F	F	G	P	P-F	F	G	G	G
Locust, Black	F	G	G	G	P	P	P	G	G	G
Locust, Honey	F	F	P	G	P	P	P	P-F	F	F
Maple spp.	F	F	P	P	P	G	P	F	F	F
Mulberry	F	F	P	P	P	G		P	F	F
Oak spp.	F	F	G	P	F	G	F	F	G	G
Orange, Osage	F	F	P	P	P	P	P	P	P	P
Persimmon	P	F	F	P	P	F	G	P	F	F
Pine spp.	F	G	P	P	P	P	G	P	G	G
Poison ivy/oak	F	P	F	P	P	G	F	P	E	E
Poplar	F	F	F	P	F	F		P	F	F
Privet, Chinese			G	P	P	G	P	P	P	G
Rose, multiflora	F	F	F	P	P	G	F	E	F	F
Sassafras	P	P	P	P	P	G	F	P	G	G
Sparkleberry						G				
Sumac	F	F	F	P	F	G	F	P	G	G
Sweetgum	F	F	G	P	P	G	F	P	G	G
Sycamore	F	F	P	P	F	F		P	F	F
Trumpetcreeper	P	F	F	P	P	G	F	P	P	P
Willow	F	F	F	P	P	G	F	P	F	F

Key to Response Symbols: E—Excellent Control; G—Good Control; F—Fair Control; P—Poor Control. If no symbol is given, weed response is unknown.