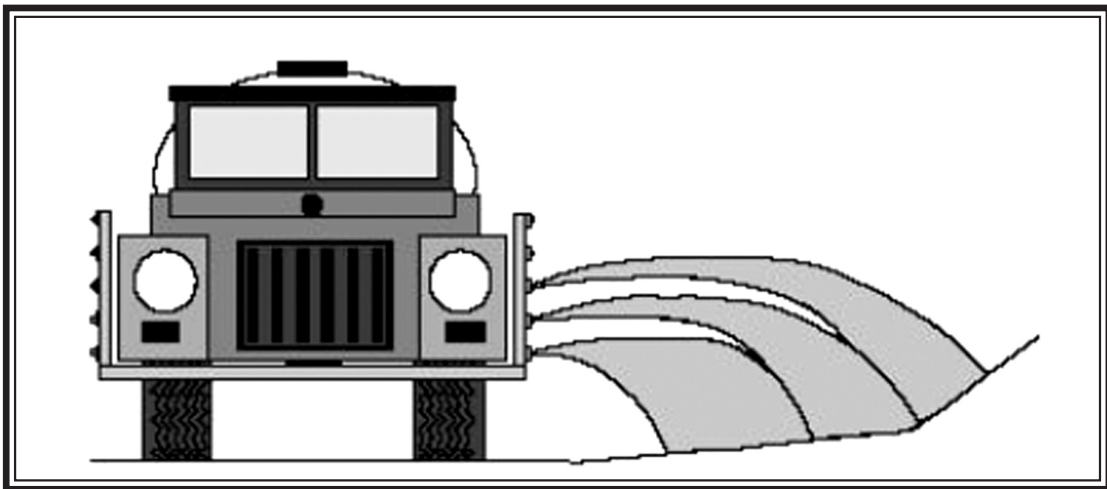


Suggested Maintenance Practices for Roadside Weed and Brush Problems



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**Oklahoma Cooperative Extension Service
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Suggested Maintenance Practices for Roadside Weed and Brush Control

Right-of-way vegetation management is a very important part of the overall roadside maintenance program. The vegetation adjacent to the road surface is a functional part of the road. In addition to mechanical methods, herbicides are used for managing right-of-way vegetation. When used correctly, herbicides can selectively control undesirable weeds and leave nearby beneficial plants unharmed.

This Extension circular summarizes **herbicides**, **rates** of application per acre, **water carrier rates**, **timing** of application, and important **comments** for programs intended to control johnsongrass, annual grasses and broadleaves, silver bluestem (silver beardgrass), switchgrass, bermudagrass encroachment, brush in aquatic situations, and suppression of bermudagrass growth and development along roadside right-of-ways in Oklahoma.

Please remember these are only suggestions and the following information is for preliminary planning. Be sure to follow the manufacturer's directions, notwithstanding the information contained in this circular. Read and follow all label directions.

Johnsongrass Control (Postemergence)

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic + Oust® or equivalent generic. Apply 16 to 24 fluid ounces of product + 1 ounce of product, respectively in 20 to 40 gallons of water per acre.

Timing: May through early June (see comments).

Comments:

1. Application should be made after bermudagrass has broken dormancy and is green and actively growing.
2. Add Roundup Pro® to the tank mixture first and then add the Oust®.
3. Applications should not be made to areas that have little or no bermudagrass to release. It is recommended that a roadside needs at least 30 percent bermudagrass cover. If not, use an MSMA program until you achieve recommended coverage.
4. Applications should not be made on newly sprigged or seeded areas. This treatment will slow the rate of coverage from sprigs and inhibit seed germination.

5. Do not apply if rainfall will occur within 2 hours. Rainfall will wash the Roundup Pro® from the plants and reduce the level of control. Generic glyphosates need to remain on foliage for at least 6 hours before any significant rainfall event.
6. If Roundup Pro Concentrate® is used, apply 13 to 19 fluid ounces of product per acre.
7. Do not mow roadsides prior to treatment. Wait at least 14 days after treatment before mowing or weed control may be reduced.

Johnsongrass Control (Postemergence)

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic + Plateau®. Apply 12 to 16 fluid ounces of product + 6 fluid ounces of product per acre, respectively in 20 to 40 gallons of water per acre.

Timing: May through early June.

Comments:

1. Application should be made after bermudagrass has broken dormancy and is green and actively growing.
2. Add Roundup Pro® to the tank mixture first and then add the Plateau®.
3. Plateau is available through direct purchase from the manufacturer (BASF).
4. Applications should not be made to areas that have little or no bermudagrass to release. It is recommended that a roadside needs at least 30 percent bermudagrass cover. If not, use an MSMA program until you achieve this recommended coverage.
5. Applications should not be made on newly sprigged or seeded areas. This treatment will slow the rate of coverage from sprigs and inhibit seed germination.
6. Do not apply if rainfall will occur within 2 hours. Rainfall will wash the Roundup Pro® from the plants and reduce the level of control. Generic glyphosates need at least 6 hours before any significant rainfall event.
7. If Roundup Pro Concentrate® is used, apply 10 to 13 fluid ounces of product per acre.
8. Do not mow roadsides prior to treatment. Wait at least 14 days after treatment before mowing or weed control may

Johnsongrass Control (Postemergence)

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic + Outrider®. Apply 12 to 24 fluid ounces of product + 0.75 to 1.33 ounces of product, respectively per acre in 20 to 40 gallons of water per acre.

Timing: May through August 15.

Comments:

1. This treatment will produce little if any noticeable injury to bermudagrass. It has the greatest level of bermudagrass safety of any of the suggested johnsongrass treatments.
2. Application should be made after bermudagrass has broken dormancy and is green and actively growing.
3. Add Roundup Pro® to the tank mixture first, and then add the Outrider®.
4. Applications should not be made to areas that have little or no bermudagrass to release. It is recommended that a roadside needs at least 30 percent bermudagrass cover. If not, use an MSMA program until you achieve recommended coverage.
5. Applications should not be made on newly sprigged or seeded areas. This treatment will slow the rate of coverage from sprigs and inhibit germination of seeds.
6. Do not apply if rainfall will occur within 2 hours. Rainfall will wash the Roundup Pro® from the plants and reduce the level of control. Generic glyphosates need to remain on foliage for at least 6 hours before any significant rainfall event.
7. If Roundup Pro Concentrate® is used, apply 10 to 19 fluid ounces of product per acre.
8. After mowing wait until johnsongrass has 12 to 24 inches of regrowth before treating. Wait at least 14 days after treatment before mowing or weed control may be reduced.
9. The addition of certain amine-form broadleaf weed control herbicides to this treatment can result in reduced johnsongrass control (antagonism). This is not desirable and one should consult the Outrider® label before tank-mixing.

Johnsongrass Control (Postemergence)

Herbicide(s) and Rate(s): MSMA. Apply 2 to 3 pounds of active ingredient per acre in 40 gallons of water per acre.

Timing: April through August.

Comments:

1. Two or three applications per year will be required to control johnsongrass. Treatments should start when

johnsongrass reaches 12 to 18 inches in height and retreatments should be made when regrowth is 12 to 18 inches tall (retreatments usually will be made on a 3 to 4 week interval maximum).

2. Preemergent seedling johnsongrass control may be achieved by adding Oust®, Outrider®, or equivalent generic at 1 ounce product per acre when the first MSMA treatment is made. Do not add Oust®, Outrider®, or equivalent generic to subsequent MSMA treatments.
3. Never apply MSMA or DSMA to standing water, creeks, rivers, or ponds. Be sure to shut off spray rigs when passing over bridges.
4. This treatment can be used on newly sprigged or thin roadsides, as MSMA will produce very little injury or slow bermudagrass growth and development.
5. MSMA should not be applied to young bermudagrass seedlings until they have produced stolons from 1 to 3 inches in length.

Winter Annual Grass and Broadleaf Control Using Early Postemergence Herbicides

Herbicide(s) and Rate(s): Campaign® + Ammonium Sulfate (AMS). Apply 2 to 4 pints of product per acre + 17 pounds of product per 100 gallons of carrier (AMS is used only with low end rates of Campaign®). In 20 to 40 gallons of water per acre.

Timing: February 15 through April 15.

Comments:

1. Apply to dormant bermudagrass. Applications made to bermudagrass that is beginning to green-up will result in temporary discoloration and slight bermudagrass green-up delay.
2. Campaign® should be applied alone and at a rate of 3 to 4 pints of product per acre. Campaign® applied at 2 pints product per acre requires the addition of AMS. The AMS treatment will significantly reduce treatment costs while maintaining acceptable weed control.
3. Targeted weeds must be actively growing and may take 2 to 3 weeks before showing any phytotoxicity symptoms from the herbicides (this is because of the cool temperatures).
4. This product is for the control of emerged weeds only, there is no preemergent control of weeds with this treatment.
5. Precautions should be taken to avoid drift to susceptible non-target plants.
6. AMS should be mixed thoroughly into the tank first, then add the Campaign®.
7. This treatment needs to be applied before targeted weeds reach 6 inches tall to assure good coverage and control.
8. Roadsides that are infested with mush thistle would benefit from an addition of Overdrive® at 2 oz./A.

Annual Ryegrass Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Campaign® + Roundup Pro® or equivalent generic + Ammonium Sulfate (AMS). Apply 2 pints product + 16 fluid ounces of product per acre + 17 pounds of product per 100 gallons of carrier in 20 to 40 gallons of water per acre

Timing: March.

Comments:

1. This treatment should only be substituted for a traditional Campaign® program when annual ryegrass becomes a problem in the clear zone.
2. Annual ryegrass requires higher herbicide rates to achieve successful control.
3. If Roundup Pro Concentrate® is used apply at 13 fluid ounces of product per acre.
4. Apply to dormant bermudagrass. Applications made to bermudagrass that is beginning to green-up will result in temporary discoloration and slight bermudagrass green-up delay.
5. Targeted weeds must be actively growing and may take 2 to 3 weeks before showing any phytotoxicity symptoms from the herbicides (this is because of the cool temperatures).
6. This product is for the control of emerged weeds only, there is no preemergent control of weeds with this treatment.
7. Precautions should be taken to avoid drift to susceptible non-target plants.
8. This treatment needs to be applied before targeted weeds reach 6 inches tall to assure good coverage and control.

Annual Ryegrass Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic. Apply 32 fluid ounces of product per acre in 20 to 40 gallons of water per acre

Timing: March.

Comments:

1. This treatment should only be substituted for a traditional Campaign® program when annual ryegrass becomes a problem in the clear zone.

2. Annual ryegrass requires higher herbicide rates to achieve successful control.
3. If Roundup Pro Concentrate® is used apply at 25 fluid ounces of product per acre.
4. Apply to dormant bermudagrass. Applications made to bermudagrass that is beginning to green-up will result in temporary discoloration and slight bermudagrass green-up delay.
5. Targeted weeds must be actively growing and may take 2 to 3 weeks before showing any phytotoxicity symptoms from the herbicides (this is because of the cool temperatures).
6. This product is for the control of emerged weeds only, there is no preemergent control of weeds with this treatment.
7. Precautions should be taken to avoid drift to susceptible non-target plants.
8. This treatment needs to be applied before targeted weeds reach 6 inches tall to assure good coverage and control.

General Broadleaf Weed Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Vanquish® + non-ionic surfactant. Apply 1 to 2 pints of product per acre + 0.25% solution, respectively. In 20 to 40 gallons of water per acre as a broadcast application or 50 to 100 gallons per acre as a handgun or backpack application.

Timing: March through July.

Comments:

1. A quality non-ionic surfactant should be used that has a minimum of 80 percent active ingredient.
2. One timely application per year should control most broadleaf weeds including kochia.
3. Because of different carrier rates, a single tank mixture should not be used for both broadcast and handgun applications. This could cause a severe over or under application of targeted herbicide rates.
4. Vanquish® should provide good broad spectrum broadleaf weed control, however, refer to label for specific weed species.
5. Better control can be achieved by treating smaller seedlings or early vegetative stage weeds that are no taller than 3 inches.
6. For best results on biennial weeds, applications should be made to rosettes or at the early vegetative stage when plants are no taller than 3 inches.
7. Precautions should be taken to avoid drift to susceptible crops. This herbicide can volatilize at higher air temperatures.

Musk Thistle Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Overdrive® + non-ionic surfactant.

Apply 2 to 4 ounces product per acre + 0.25% solution. In 20 to 40 gallons of water per acre as a broadcast application or 50 to 100 gallons per acre as a handgun or backpack application.

Timing: March through April 15.

Comments:

1. Currently, this is the most economical treatment for controlling musk thistle.
2. Rates less than 4 ounces per acre are made under a new 2ee label and is approved for ODOT and pasture use only. The 2ee label must be in possession during the application. Applications at 2 ounces per acre must be made to rosette stage of growth, poor control will result if applied to bolted (flowered) thistles at this rate.
3. A quality non-ionic surfactant should be used that has a minimum of 80 percent active ingredient if used alone.
4. Due to different carrier rates, a single tank mixture should not be used for both broadcast and handgun applications. This could cause a severe over or under application of targeted rates.
5. Applications should be made to actively growing thistles prior to bolting.
6. Extreme growing conditions such as drought or near freezing temperatures prior to, at, and following time of application may reduce thistle control.
7. Precautions should be taken to avoid drift to susceptible non-target plants. This herbicide can volatilize at higher air temperatures.
8. By law (Oklahoma Noxious Weed Law), musk thistles must be prevented from flowering statewide.
9. The 2 ounces per acre rate makes an excellent tank-mix partner with Campaign® + AMS at recommended rates to pick up musk thistle.

Musk Thistle Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Transline® + non-ionic surfactant.

Apply 6 to 10 ounces of product per acre + 0.25% solution. In 20 to 40 gallons of water per acre as a broadcast application or 50 to 100 gallons of water per acre as a handgun or backpack application.

Timing: March through early May.

Comments:

1. A quality non-ionic surfactant should be used that has a minimum of 80 percent active ingredient.

2. Due to different carrier rates, a single tank mixture should not be used for both broadcast and handgun applications. This could cause a severe over or under application of targeted rates.
3. Applications should be made to actively growing thistles prior to bolting (flowering). Lower rates can be used when treating the rosette stage.
4. Extreme growing conditions such as drought or near freezing temperatures prior to, at, and following time of application may reduce thistle control.
5. Precautions should be taken to avoid drift to susceptible non-target plants.
6. By law (Oklahoma Noxious Weed Law), musk thistles must be prevented from flowering statewide.

Scotch Thistle Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Vanquish® + non-ionic surfactant.

Apply 1 to 2 pints of product per acre + 0.25% solution. In 20 to 40 gallons of water per acre as a broadcast application or 50 to 100 gallons per acre as a handgun or backpack application.

Timing: March through early May.

Comments:

1. A quality non-ionic surfactant should be used that has a minimum of 80 percent active ingredient.
2. Due to different carrier rates, it is not recommended that a single tank mixture be used for both broadcast and handgun applications. This could cause a severe over or under application of targeted rates.
3. For best results on biennial weeds, applications should be made to rosettes or at the early vegetative stage when plants are no taller than 3 inches.
4. Precautions should be taken to avoid drift to susceptible crops. This herbicide can volatilize at higher air temperatures.
5. By law (Oklahoma Noxious Weed Law), scotch thistle must be prevented from flowering statewide.

Scotch Thistle Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Escort® or equivalent generic +

non-ionic surfactant. Apply 1 ounce of product per acre + 0.25% solution. In 20 to 40 gallons of water per acre broadcast application or 50 to 100 gallons per acre as a handgun or backpack application.

Timing: March through April.

Comments:

1. A quality non-ionic surfactant should be used that has a minimum of 80 percent active ingredient.
2. Due to different carrier rates, a single tank mixture should not be used for both broadcast and handgun applications. This could cause a severe over or under application of targeted rates.
3. Broadcast applications should be made to rosettes that are 6 inches or smaller in diameter.
4. Poor results will occur if applications are made during drought conditions.
5. Refer to label for other susceptible species.
6. Precautions should be taken to avoid drift to susceptible crops, gardens, and non-target areas.
7. By law (Oklahoma Noxious Weed Law), scotch thistle must be prevented from flowering statewide.

Silver Bluestem Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic. Apply 24 to 32 fluid ounces of product per acre. In 20 to 40 gallons of water per acre.

Timing: May or early June (prior to seed head formation).

Comments:

1. Sprayer equipment must be properly calibrated to ensure desirable silver bluestem control and minimize bermudagrass injury.
2. Roundup Pro®, alone, is used in areas where there is little or no previous history of johnsongrass. In areas where there is a history of johnsongrass, Roundup Pro® plus Oustrider®, Oust®, or Plateau should be used. If a summer preemergent is not added to the treatment in areas where there are johnsongrass seeds in the soil, the seeds could germinate and create an even bigger problem than the silver bluestem that was controlled. This is because Roundup Pro® has no soil activity.
3. Do not apply Roundup Pro® if rainfall will occur within 2 hours. Rainfall will wash the Roundup Pro® off the plants and reduce the level of control. Generic glyphosate products need at least 6 hours before a significant rainfall event.
4. If Roundup Pro Concentrate® is used, apply 19 to 26 fluid ounces of product per acre.
5. Do not mow roadsides prior to treatment. Wait at least 14 days after treatment before mowing or weed control may be reduced.

Silver Bluestem Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic + Oust® or equivalent generic. Apply 24 fluid ounces of product + 1 ounce of product per acre, respectively. In 20 to 40 gallons of water per acre.

Timing: May (prior to seed head formation).

Comments:

1. Roundup Pro® + Oust® or their generic equivalents should be used in areas where there is a past history of johnsongrass problems. If the history of an area is not known, then it is best to add the Oust® to the Roundup Pro® treatment. The Oust® is soil active and will help prevent johnsongrass seeds from emerging.
2. Spray equipment must be properly calibrated to ensure desirable silver bluestem control and minimal bermudagrass injury.
3. Application should be made after bermudagrass has broken dormancy and is green and actively growing.
4. Add Roundup Pro® to the tank mixture first, then add the Oust®.
5. Applications should not be made to areas that have little or no bermudagrass to release. It is recommended that a roadside needs at least 30 percent coverage of bermudagrass, if not, use an MSMA program until you achieve this.
6. Applications should not be made on newly sprigged or seeded areas. This treatment will slow the rate of coverage from sprigs and inhibit germination of seeds.
7. Do not apply if rainfall will occur within 2 hours. Rainfall will wash the Roundup Pro® from the plants and reduce the level of control. Generic glyphosates need at least 6 hours before a significant rainfall event.
8. Do not mow roadsides prior to treatment. Wait at least 14 days after treatment before mowing or weed control may be reduced.
9. If Roundup Pro Concentrate® is used, apply at 19 fluid ounces of product per acre.

Switchgrass Management (Ropewick or Wiper Application)

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic. Apply 1:2 ratio of herbicide to water.

Timing: June (followed by mowing).

Comments:

1. This treatment is to be selectively applied with either a ropewick or wiper-type applicator.
2. An important component of switchgrass management is timely mowings following application. Switchgrass areas should be mowed approximately 1 month and 3 months after treatment. Mowing should occur when switchgrass regrowth begins producing seed heads.
3. Dense stands of switchgrass will require wiping in 2 directions.
4. Do not wipe bermudagrass with this treatment as severe damage will occur.
5. Do not apply to plants that are drought stressed. Wait for a 1/2 to 1 inch of rain before making the application.
6. Do not apply if rainfall will occur within 2 hours. Rainfall will wash Roundup Pro® from the plants and reduce the level of control. Generic glyphosates need at least 6 hours before any significant rainfall event.
7. Do not use drift control products with this treatment.
8. Equipment used should include polyester over acrylic fiber core ropes or canvas and should be cleaned daily with detergent and water. This will remove wax buildup and allow for an even flow of herbicide across the wiping surface.
9. Applications made to plants noticeably covered with dust will result in reduced control.
10. This treatment followed by timely mowings will take a minimum of 2 years to remove switchgrass from safety areas.
11. Do not mow switchgrass areas prior to treatment.
12. Switchgrass should be wiped as low as possible without wiping the bermudagrass.

General Brush Control

Herbicide(s) and Rate(s): Tordon K® + Garlon 4®. Refer to labeled rates for specific brush species. Apply 50 gallons of water per acre as a broadcast application or a minimum of 100 gallons of water per acre as a handgun application.

Timing: Late May through July (see comments).

Comments:

1. The use of this treatment will cause a very quick “brown-out” of the brush species in 7 to 14 days. Public acceptance of the treatment should be considered before choosing this treatment.
2. Refer to herbicide labels for susceptible target species. This treatment, applied in early summer to new leaves, should give very good control of most brush species found along Oklahoma roadsides.
3. Handgun applications should be made on a spray-to-wet basis using a minimum of 100 gallons per acre for low-density brush and up to 250 gallons per acre for high-density brush areas.
4. Due to different carrier rates, it is not recommended that a single tank mixture be used for both broadcast and handgun applications. This could cause a severe over or under application of targeted rates.
5. Most brush species are susceptible to this treatment, extreme caution should be used to prevent off-target movement of fine spray particles.
6. Always use a quality drift control additive to reduce the number of fine spray particles. This will help reduce the hazard of off-target drift.
7. Follow label rates for the specific brush species you are targeting.
8. Use extreme caution when treating near any ground water. Leave a buffer zone around all ground water sources.
9. Tordon K® is a restricted use herbicide because of its potential to move to groundwater sources.
10. Brush should not be removed following application for a minimum of 1 month.
11. This herbicide treatment can volatilize at higher air temperatures.

General Brush Control

Herbicide(s) and Rate(s): Krenite S® + crop oil. Refer to label for specific brush control rates. Apply a minimum of 100 gallons of water per acre as a handgun application or broadcast application.

Timing: June through October (see comments).

Comments:

1. Little or no foliage brownout will occur after treatment. Leaves will drop off the tree in a normal fashion and the following spring the tree will not produce any new leaves.
2. The addition of a crop oil is critical to aid in absorption of the herbicide through the waxy leaves.
3. Handgun applications should be made on a spray-to-wet basis using a minimum of 100 gallons per acre for low-density brush and up to 250 gallons per acre for high-density brush areas.

4. Refer to herbicide label for susceptible species. This treatment does not produce as broad a spectrum of brush control as Tordon K® + Garlon 4®. Identifying problem brush species is very important.
5. Thorough coverage of the entire target plant is necessary for complete control of susceptible species as this treatment has little if any translocation in the treated brush.
6. Do not apply Krenite S® if rainfall will occur anytime during the day of application. The Krenite S® will be washed off the leaves and reduce the level of control.
7. Applications made in October should be made before fall leaf discoloration.

General Brush Control

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generic—**foliar spot treatment only**. Apply 1.5 gallons of product per acre. In 100 gallons of water per acre—**handgun only**.

Timing: August through October.

Comments:

1. Do not make broadcast applications with this treatment. This herbicide treatment will cause severe damage or death of desirable grass understories if applied as a broadcast treatment.
2. This treatment should be applied as a foliar spot treatment using a handgun application only.
3. Apply the herbicide mixture on a spray-to-wet basis.
4. At this rate of application the grass understory will be killed at the base of the spot treatment.
5. Do not apply Roundup Pro® if rainfall will occur within 2 hours. Rainfall will wash the Roundup Pro® off the plant and reduce the level of control. Generics glyphosates require 6 hours before they are rainfast.
6. Refer to the herbicide label for susceptible target species.
7. This treatment should only be used on low-density brush areas.
8. If Roundup Pro Concentrate® is used, apply at 1.25 gallons of product per acre.

Brush Control Using Cut Surface Treatments

Herbicide(s) and Rate(s): Roundup Pro® or equivalent generics—**cut surface treatments only**. Apply 1:1 water to herbicide ratio.

Timing: May through September.

Comments:

1. All brush manually cut by Oklahoma Department of Transportation (ODOT) crews and not previously treated with a herbicide should receive a cut stump treatment to prevent resprouting.
2. Applications should be made immediately after cutting or as soon as possible. Delay in application of more than 30 minutes may result in reduced performance on hard-to-control species.
3. Apply using a backpack sprayer or squirt bottle.
4. Remove wood chips from the stump before application. It is only necessary to treat the outside 1/3 of the top of the cut stump as this is where the cambium layer is found. The cambium will move the herbicide to the roots. Treat the entire circumference of the cut surface.
5. It would be useful to include an agricultural dye in this treatment to prevent waste and mark treated stumps. Use a water soluble dye with Roundup Pro® and oil soluble dye with Garlon 4®.
6. No drift control product should be used with this treatment.
7. The Garlon 4® + oil carrier treatment (low volume dormant basal) should be used in the dormant season instead of Roundup Pro®.

Brush Control Using Dormant Basal Stem and Cut Surface Treatments

Herbicide(s) and Rate(s): Garlon 4® + oil carrier. Apply 4:1 oil to herbicide ratio—**low volume dormant basal and cut surface**. Apply 20:1 oil to herbicide ratio—**high volume dormant basal only**.

Timing: Year-round, especially during the dormant season.

Comments:

1. Low volume applications are made by lightly spraying the cambium area (outside 1/3 of the cut surface) or entire circumference of the trunk (dormant basal) to the point of wetting **but not runoff**. This treatment usually requires the additional purchase of very small nozzle tips that will produce a fine spray. This low volume solution is very concentrated, if runoff occurs the expensive herbicide is wasted.
2. High volume applications are made by spraying the entire circumference of the trunk (dormant basal) to the point where the mixture is allowed to runoff and pool at the base of the target for a few seconds. Most backpack or small hand-pump sprayers when purchased have nozzle tips designed to make this type of treatment.
3. High volume (20:1 oil to herbicide) mixtures should not be used for cut surface applications.
4. It is critical that the entire cambium area (cut surface) or entire circumference of the trunk (dormant basal) is treated to ensure complete control no matter what ratio of oil to herbicide is used. Failure to get good coverage will result in possible resprouting.
5. Dormant basal stem treatments should be made to trees with stems 6 inches or less in diameter.
6. Trunks that are 0 to 3 inches in diameter should be treated to a height of 18 inches. Trunks larger than 3 inches in diameter should be treated to a height of 24 inches.
7. The addition of an oil soluble dye may assist in getting the desired coverage from these treatments as well as marking treated areas.
8. Backpack or small hand sprayers would work well for these treatments, but it is important to only use ones that have Viton® seals. Garlon 4® will cause rubber or pvc seals to leak.
9. Applications may be made up to the edge of water but **may not** be applied to brush in water.
10. No drift control product should be used with this treatment.
11. This treatment should be mixed with a penetrating oil as a carrier and should never be mixed with water as a carrier.

Aquatic Weed Control in Standing or Moving Water

Herbicide(s) and Rate(s): Aquamaster® or equivalent generic + non-ionic surfactant. Apply 1 to 1.5 gallons of product + 0.5 to 1.0% solution, respectively. In 100 gallons of water per acre—**handgun treatment only**.

Timing: May through July.

Comments:

1. A non-ionic aquatic-approved surfactant is critical to the success of this herbicide treatment.
2. If the low end AquaMaster® rate is used then use the high end non-ionic surfactant rate.
3. Apply with a handgun or backpack sprayer only. This treatment should not be made as a broadcast application as the desirable grass understory may be damaged or destroyed.
4. In dense stands of willow or cattails, good coverage is critical. Plants should be treated from both sides if possible.
5. Plants that have not emerged at the time of treatment will not be controlled and they will require retreatment.
6. Do not apply if rainfall will occur within 6 hours. Rainfall will wash AquaMaster® from the plants and reduce control.

Bermudagrass Encroachment Control Using Postemergence Herbicides

Herbicide(s) and Rate(s): Arsenal® + non-ionic surfactant. Apply 4 pints of product per acre + 0.5% solution, respectively. In 40 gallons of water per acre.

Timing: May through July.

Comments:

1. Application is to be made to actively growing bermudagrass.
2. This treatment should only be applied once per year.
3. In areas that have not been treated with Roundup Pro® or equivalent generic + summer preemergent, a herbicide such as Oust® or equivalent generic (2 ounces of product per acre) should be added to control weeds that germinate from seed.
4. In areas that have been treated with Roundup Pro® + summer preemergent for johnsongrass or silver bluestem control, Arsenal® may be applied alone.
5. Do not apply directly to water or wetlands.
6. Do not treat irrigation ditches.
7. Do not apply, drain, or flush equipment on or near desirable trees or other plants; onto areas into which their roots may extend; or into locations where the chemical may be washed or moved into contact with their roots or into water features.

Trade Name	Active Ingredient(s)	Company
Arsenal®	imazapyr	BASF
Aquamaster®	glyphosate	Monsanto Agricultural Company
Campaign®	glyphosate + 2,4-D	Monsanto Agricultural Company
Escort®	metasulfuron	E.I. du Pont de Nemours & Co., Inc.
Garlon 4®	triclopyr	Dow AgroSciences
Krenite S®	fosamine,	E.I. du Pont de Nemours & Co., Inc.
MSMA/DSMA		many companies
Oust®	sulfometuron	E.I. du Pont de Nemours & Co., Inc.
Outrider®	sulfosulfuron	Monsanto Agricultural Company
Overdrive®	dicamba + diflufenzopyr	BASF
Plateau®	imazapic	BASF
Roundup Pro®	glyphosate	Monsanto Agricultural Company
Roundup Pro Concentrate®	glyphosate	Monsanto Agricultural Company
Tordon K®	picloram	Dow AgroSciences
Transline®	clopyralid	Dow AgroSciences
Vanquish®	diglycolamine salt of dicamba	Syngenta

† Restricted-use pesticide.

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