

Field Nursery Weed Control

By Mark Halcomb, UT Extension Area Nursery Specialist
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This handout contains:

Understanding Herbicides Better: Activation, Timing the Application and the Application Suggestions to Improve Success
Useful Facts about the Commonly Used Preemergence Herbicides
Compare the Costs of Potential Tank Mixes
A Fall Application may be the most Important Application of the Year
The Selective and Non-Selective Post-emergent Herbicides
Special Problem Weeds
Management of the Enviromist
Definitions

The web offers:

Sprayer Calibration is offered as a separate handout, also posted on web. It includes how to set-up or rig to spray a band plus an easy to follow step by step guide to determine how many gallons a sprayer is applying per acre and then how to figure how much pesticide is required per tank or any volume of water. A form is provided to record the gear, rpm, pressure, tip size, the determined output and notes on amount of pesticide to be added to tank for future reference.

Table X offers information about the granular, pre and postemergence herbicides commonly used in commercial nurseries to include: how soon rain can fall after a herbicide is applied without reducing the control; how long a preemergence herbicide can wait on rain for activation without reducing the control; inches of water required to activate preemergence herbicides; spray pressure of sprayable herbicides recommended on the label; gallons of water recommended by the label and the number of hours that legally must pass before labor is allowed to return to the area sprayed, referred to as the REI or restricted entry interval. Table X is a separate handout, also posted on web.

Understanding Herbicides Can Provide Better Weed Control

Preemergence herbicides control weeds before they are seen. The chemical usually kills the seedling as it germinates. Post-emergence herbicides kill green, actively growing plants. (Pre means before, post means after and emergence means out of the ground.)

Examples of common nursery preemergence herbicides that primarily prevent grass from emerging out of the soil are Surflan, Pennant, Pendulum and Barricade (formerly Factor). Examples of common nursery preemergence herbicides that primarily prevent broadleaf weeds from germinating are Simazine (Princep), Gallery and SureGuard.

For best all-around control, one of the grass herbicides must be tank mixed with one that prevents broadleaf weeds. SureGuard may be an exception, able to provide control alone. There are other preemergence herbicides; Casoron, Dacthal, Devrinol, Goal, Kerb, and Treflan labeled for nursery stock, but used less often and then for a particular crop or weed.

Activation

A half inch of irrigation or rain or a 1-2 inch shallow cultivation is required within 7-30 days to activate most of the preemergence herbicides; to turn them on, so to speak. This is why they don't work as well when applied in the summer. They may never get turned on if rain does not fall within the 7-30 days (refer to Table X to learn specifically how much irrigation is required for activation and how many days a herbicide can wait for each herbicide). Drip irrigation will not activate preemergence herbicides.

It could be easy to lose the preemergence effect if cultivated too deep. The herbicides need to be mixed into the top 1-2 inches, but mixing them into the top 4 inches would dilute the active ingredient to the point of being useless. In Tennessee, Treflan is the only preemergence herbicide that is commonly incorporated.

Preemergence herbicide weed **control usually lasts about 90 days** during the growing season, when labeled rates are followed. This can vary with the herbicide, rate, soil type and rainfall. Excessive rainfall can reduce the period of control. Two to three applications will be required per year for good weed control. However, with Gallery and SureGuard, broadleaf weed control may last 5-7 months. It is not good to use the same chemistry over and over, year after year.

It is safest to apply SureGuard to one year old and older spaced tree transplants with no green bark on the lower stem where SureGuard might contact it. SureGuard is stronger on broadleaf weeds but has limited preemergence control of grass. As the level of SureGuard weakens, grass seed may begin to germinate before broadleaf weed seeds germinate. In that case, a post emergence grass herbicide application may be needed between applications of Sureguard. One producer gets year round control with two

applications a year but has to apply postemergence grass herbicides in the summer most years, especially during rainy years.

Also, SureGuard has been weak on sicklepod and bullnettle. There are several precautions with this herbicide. Avoid over the top applications with most plants – if in doubt, check the label or treat a few plants to observe phytotoxicity. SureGuard is not as safe as Princep and Surflan, which we have learned to trust.

Timing

February 1 to March 15 is an excellent time to apply preemergence herbicides because there is a very good chance rainfall will occur for activation. A midsummer application may not get activated if it does not rain or get irrigated within the required period.

The fall (Sept-Dec) is an excellent time to spray Simazine (Princep), Gallery or SureGuard to prevent the germination of winter annuals. This application will suppress weed germination into the spring, which will buy time for other important tasks. **The fall may be the most important application of the year.** Apply 1.5 qts Princep, 0.75 to 1 lb. Gallery or 10 oz SureGuard per sprayed acre. Add Barricade, Pendulum, Pennant or Surflan in the blocks that have a spring ryegrass problem. See pg 7 for more information.

Warning: Spraying over swelling buds with a tank mix of Surflan + Princep has occasionally stunted growth in young plants but Pendulum has taken out the central bud and culled first year dogwood buds. First year pear buds have been deformed and stunted, but they usually grow out of it. SureGuard would not be safe.

The Application

It is always **best to spray clean, freshly cultivated and hoed soil** with no existing weeds regardless of the time of year. Preemergence herbicides do not kill green vegetation. A typical protocol is to make a postemergence herbicide application with glyphosate (Roundup) or glufosinate (Finale) using the Enviromist sprayer (www.bdimachinery.net/14.html) two weeks after applying the preemergence herbicide to kill any escapes.

During the growing season, it is imperative to **spray the preemergence herbicide the same day and no later than the next day once the grass and weeds are removed from weedy blocks.** If not, the grass and weed seed that germinate daily will not be controlled by the preemergence herbicide. Seed will germinate several days before emerging out of the ground and be visible. The soil could appear clean.

Do not spray new transplants until after a good settling rain. Apply preemergence herbicides in **20-40 gallons of water per acre** or according to the label. Pressures around **30 psi** are adequate when spraying bare ground or short grass. Higher pressures create finer particles that a breeze can easily blow away. Tall weedy vegetation may require 60 psi.

Performance of summer applied preemergence herbicides will be disappointing when the spray is applied several days after cultivation. It may have appeared clean, but actually the germination of many thousands of seed can occur in one day, during warm soil conditions.

Preemergence herbicides do not kill weeds after germination but SureGuard offers some burn down on weeds less than two inches. **A major reason for herbicide failure is a lack of rain within the required time to activate the preemergence herbicide sprayed.** Herbicides are not miracles. They are not forgiving. They must be used properly in order for them to work correctly.

Suggestions for Spraying Preemergence Herbicides

When spraying preemergence herbicides, the following comments may help improve your success.

- ✓ Read the label.
- ✓ Wait for a settling rain before spraying new transplants.
- ✓ Always cultivate & remove all existing weeds before spraying.
- ✓ Spray immediately after cleaning an area before weed seed germinate. Just one day between the 2 operations can greatly affect the level of control received.
- ✓ A half inch of rainfall or irrigation must occur within 7-30 days (depending on the herbicide used) for activation of the preemergence herbicide. Most labels suggest shallow cultivation of 1-2 inches as an alternative. Don't wait too long. The herbicide is lost without activation.
- ✓ Choose the correct herbicide for the grass and broadleaf weed species present.
- ✓ Determine sprayer output so that the correct amount of herbicide can be applied.
- ✓ It is not good to use the same chemistry over and over, year after year. The Mode of Action (MOA) Group Number is provided for each herbicide to allow a choice to be made in order to avoid using the same chemistry.

Here are some facts on the commonly used preemergence herbicides:

Barricade 65 WDG (prodiamine) (MOA 3) (formerly Factor 65 WDG)

<http://www.cdms.net/LDat/ld1TF000.pdf>

Primarily for grasses, needs help with broadleaf weeds.

Rate is 1.0 to 2.3 pounds per acre (Try 1.5--2.0)

\$41 for 1.5 lb per sprayed acre.

Will wait **14** days on rain. Can go over top.

Low solubility; should stay put. A DNA herbicide.

Barricade 4L: (MOA 3) 1 gal \$147.00; rate is 21-48 oz/A; cost would be \$37 for 32 oz/acre.

<http://www.cdms.net/LDat/ld5JC008.pdf>

Pendulum 3.3 EC (MOA 3) is liquid, labeled for 2.4 - 4.8 qts per acre. A 2.5 qt rate will last about 90 days. See Warning on Pendulum AquaCap below. Will wait 30 days on 0.5" rain to activate. Is a DNA herbicide. Will root prune. Label suggests applying in minimum of 40 gal water per acre. Primarily for grasses, needs help with broadleaf weeds.

\$8.60 per qt or \$22 for 2.5 qt per acre.

<http://www.cdms.net/LDat/ld3HA004.pdf>

Pendulum AquaCap 38.7% (pendimethalin) (MOA 3) <http://www.cdms.net/LDat/ld3BO003.pdf>
Warning: Strong precautions concerning possible plant injury (phytotoxicity) were added to protect the manufacturer's liability. The precautions severely restrict Pendulum's use in nursery crops if all the precautions are followed. Sprayable formulations should not be applied during bud break, over freshly cut-back plants, freshly budded plants, first year budded liners as they are budding out their first spring or immediately after cutting the rootstock back on first year buds. Injury has appeared as stunting and removal of the leader. Treated liners must be well rooted. Appears safe on trees where only the trunk may receive some spray.

Primarily for grasses, needs help with broadleaf weeds.

Labeled rate is 2.1 to 4.2 qts per acre. A 2.1 qt rate will last about 90 days.

Cost: 2.5gal is \$130; \$26/acre for 2qt rate

Will wait **30** days on rain. Is a DNA herbicide. Will root prune.

Pennant Magnum (metolachlor) (MOA 15) <http://www.cdms.net/LDat/ld3EN002.pdf>

Primarily for grasses, needs help with broadleaf weeds.

Best choice for Nutgrass; 70% control for 60 days or so.

1 qt per acre recommended on label. Will wait **7** days on rain.

\$44 per sprayed acre for 1 qt. Lasts about 90 days on common grass.

Direct or wash off foliage. Is a shoot inhibitor; not a root inhibitor.

Surflan (oryzalin) (MOA 3) <http://www.cdms.net/LDat/ld6EC003.pdf>

Primarily for grasses, needs help with broadleaf weeds.

Provides 80% control of Pigweed & 60% control of Lambsquarters.

Will wait **21** days on rain. Can go over top.

Grower's favorite, 2 qts per sprayed acre is recommended and will usually last 90 days.

Is a Dinitroaniline (DNA) herbicide. Will root prune, is water soluble & will leach.

\$33 per sprayed acre for 2 qts.

Princep 4L (MOA5) <http://www.cdms.net/LDat/ld786008.pdf>

(Simazine) <http://www.cdms.net/LDat/ld687004.pdf>

Controls most broadleaf weeds & many annual grasses. Effective on glyphosate resistant marestail.

Labeled rate is 2-3 quarts per acre. Recommend 1 qt -1.5 qt. / sprayed acre.

Is the most cost effective preemergence herbicide for nursery crops.

\$5.72 per qt or \$8.58 for 1.5 qt per sprayed acre. Will wait **10** days on rain.

Tank mix with one of the grass herbicides above.

Can go over top. Is not as dangerous as some think at the lower rates. Rates may have been abused years ago without calibration.

SureGuard (flumioxazin) MOA 14

<http://www.cdms.net/LDat/ld48L013.pdf>

SureGuard is a water dispersible granule; WDG. It offers effective preemergence control of glyphosate resistant marestail. It has only been around since 2004. SureGuard is gaining some favor due to it's greater longevity compared to competition. Valent claims that it can stand alone. Provides limited post-emergent control of weeds less than 2 inches tall, but a surfactant will enhance the control.

Rate is 8-12 oz/acre. I suggest 10. Apply in 20 to 30 gallons water/ acre. 0.5 to 1" rainfall required within 14 days according to Joe Chamberlin with Valent, thou I cannot find it on the label.

It is safest to apply SureGuard to one year old and older spaced tree transplants with no green bark on the lower stem where SureGuard might contact it. SureGuard is stronger on broadleaf weeds but has limited preemergence control of grass. As the level of SureGuard weakens, grass seed may begin to germinate before broadleaf weed seeds germinate. In that case, a post emergence grass herbicide application may be needed between applications of Sureguard. One producer gets year round control with two applications a year but has to apply postemergence grass herbicides in the summer most years, especially during rainy years. Also, SureGuard has been weak on sicklepod and bullnettle. There are several precautions with this herbicide. Avoid over the top applications with most plants – if in doubt, check the label or treat a few plants to observe phytotoxicity. SureGuard is not as safe as Princep and Surflan, which we have learned to trust.

Costs \$600/5 pound bag or \$75/acre for 10 oz.

Gallery 75 DF (dry flowable) (isoxaben) (MOA 21) <http://www.cdms.net/LDat/ld638007.pdf>

Controls most broadleaf weeds, but weak on grasses & ragweed.

Rate is 0.66 to 1.33 pound per sprayed acre. Half pound has provided good control for 90 days. Rate is dependent on weed species.

Cost about \$128 per pound. One pound should last 6+ months but the grass herbicide must be reapplied just prior to 3 months.

Will wait **21** days on rain. Can go over top. Avoid burning bush.

Low solubility, should stay put and not leach.

Very safe, effective & expensive; but much cheaper than a hoe or losing the crop to weeds.

Tower (dimethenamid-P)

<http://www.cdms.net/LDat/ld8BI000.pdf>

12 hr REI; avoid use in greenhouses and shadehouses

Control improved by 0.3 to 0.6 rainfall or irrigation within 30 days of application

Apply with 25 to 50psi; in 20 to 200 gallons water per acre; requires agitation

Rate is 21 fl oz/acre for 3 months control

Precautions: Do not apply over the top; apply directed or shielded; avoid application during bud swell, bud break or a flush of growth; avoid contacting newly budded or grafted tissue. The plant list it is safe to use on is very short but comprised of several commonly grown ornamentals.

Label suggests tank mixing with Pendulum or Gallery or Princep; Roundup or Finale

Costs: _____

Barricade, Pendulum, Pennant and Surflan must be tank mixed with Princep or Gallery to achieve as near total vegetation control as is possible. SureGuard may stand alone. Here are several commonly used tank mixes so you may compare the costs.

Potential Tank Mixes	7-2012 prices Cost per Acre
2.5 qts generic Pendulum EC + 1.0 qt Simazine	\$25.47
2.5 qts generic Pendulum EC + 1.5 qt Simazine	\$28.33
2 qts Surflan + 1.0 qt Simazine	\$38.52
2 qts Surflan + 1.5 qt Simazine	\$41.38
2 qts Surflan + 1 lb Gallery	\$160.70
32 oz Barricade 4L + 1 lb Gallery	\$164.65
1.5 lbs Barricade WDG + 1 lb Gallery	\$169.14
10 oz SureGuard	\$75.00

Fall Applied Preemergence Herbicides Prevent Winter Weeds, will suppress weed germination into the spring, which will buy time for other important tasks. Regardless of how busy a fellow is in the fall, he's got more time in the fall than in the spring to spray. This should keep the soil fairly clean until May 1 or so; depending on several factors.

Three bad weeds will be prevented in addition to the general winter broadleaf annuals by applying a preemergence herbicide in the fall: glyphosate resistant marestalk, ryegrass and thistle. Several producers use to not worry about the general winter broadleaf annuals; they supported foot traffic for pruning, fertilizing, etc.

But winter broadleaf annuals can grow 2-3 feet tall before they bloom in the spring, produce seed and die in the summer. Sixty to seventy percent of thistle seed germinate in the fall.

The fall may be the most important application of the year. Apply 1.5 qts Princep, 0.75 to 1 lb. Gallery or 10 oz. SureGuard per sprayed acre. Add Barricade, Pendulum, Pennant or Surflan in the blocks that have a spring ryegrass problem.

Banding these herbicides down the row saves money over broadcasting. Spraying preemergence herbicides over the top of 4+ inch Crimson Clover should not injure the clover.

The fall preemergence herbicides can be applied Sept - Dec on clean, freshly cultivated and hoed soil or use the Enviromist. Later is okay, as long as the soil is dry enough to drive over. The later the application is made, the later into the spring control can be expected.

A post-emergent herbicide kills green, actively growing plants. There are selective and non-selective post-emergent herbicides. Wait 7-10 days before cultivating.

Common Selective Post-Emergent Herbicides

Selective for young grass only

Envoy Plus	MOA 1
Fusilade II Turf & Ornamental	MOA 1
Segment (formerly sold as Vantage and Poast)	MOA 1

Selective for broadleaf weeds

Lontrel (Clopyralid, formerly sold as Stinger)	MOA 4
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The Selective Post-Emergent Herbicides – for young grass only

In 1986 the post-emergent grass herbicides included Fusilade and Poast. Today, Fusilade II T/O, Segment and Envoy Plus are the post-emergent herbicides labeled to kill green grass in woody ornamentals. They can be safely sprayed over the top of the ornamentals that are listed on their respective labels.

These post-emergent grass herbicides are effective on young, actively growing grasses. Drought stressed and grasses larger than recommended may not be killed. Refer to the label for grass species, sizes and rates.

Thorough coverage is required, especially on the taller grasses. They all become rainfast within one hour and have a 12 hour restricted-entry interval (REI).

Fusilade II T/O and Envoy Plus require the addition of a non-ionic surfactant to increase their ability to stick to the foliage. Segment already has it. Do not use a crop oil concentrate with any of these on ornamentals.

Symptoms require 7-10 and frequently 14 days to show a reddening or evidence that they were sprayed. Be patient.

Fusilade II T/O and Segment have the longest list of ornamentals on their labels. One of the 3 seem to be labeled for most of the commonly grown trees and shrubs in middle Tennessee nurseries. None of the 3 will kill nutgrass or nutsedge or broadleaf weeds. All 3 have aerial labels, with 5-10 gal. /acre water recommended.

Envoy Plus (clethodim) (MOA 1) <http://www.cdms.net/LDat/ld82U002.pdf> is new in the ornamental market. It was marketed briefly in 1995 as Prism. It has been in the row crop market for several years as Select. It has earned a good reputation there.

The **Envoy Plus** label recommends a range of 17-34 fl. oz. per sprayed acre applied in 5-40 gallons of spray solution, at 30-60 psi. Spot spraying can be done with 0.65 - 1.3 fl. oz. per gallon, or 2.0 - 4.0 fl. oz. per 3 gallon, or 2.6 - 5.2 fl. oz. per 4 gallons.

Add 1.0 pint nonionic surfactant per 50 gallons or 0.33 fl. oz. per gallon or 1.0 fl. oz. per 3 gallons or 1.3 fl. oz. per 4 gallons. Spray to wet. Tank mixing is at applicator risk. Envoy Plus carries a WARNING.

Fusilade II T/O (fluazifop-P-butyl) (MOA 1) <http://www.cdms.net/LDat/ld63N010.pdf> and Fusilade DX is 24.5% while the old Fusilade 2000 was 13%. Fusilade DX is not labeled for ornamentals; it does not list the ornamentals that Fusilade is safe on. The Fusilade II T/O label has 4 lists of ornamentals; with degrees of injury to expect. It recommends a rate range of 1.0-1.5 pints (16-24 fluid ounces) per sprayed acre plus 8 fl oz of nonionic surfactant per 25 gallons of spray solution, in 5-40 gallons of spray solution per acre, at 40-60 psi.

Spot spraying can be done with 0.75 fl oz per gallon of water plus 0.5 fl. oz. nonionic surfactant or 2.25 fl. oz. per 3 gallon back pack plus 1.5 fl. oz. nonionic surfactant or 3 fl. oz. per 4 gallons plus 2 fl. oz. nonionic surfactant. Fusilade carries a CAUTION warning.

Note: **River birch** and **burning bush** are listed as expecting more than 50% foliar burn with Fusilade; but Segment is labeled for burning bush and river birch. Envoy Plus is labeled for river birch.

BASF, makers of Poast, transferred the ornamental label to Vantage several years ago. **Segment** (sethoxydim) (MOA 1) <http://www.cdms.net/LDat/ld8B9000.pdf> is the current name. Poast is still being sold in the row crop market but the label no longer explains how to use it on ornamentals, nor lists the ornamentals that it is safe on. It is illegal to recommend or use Poast on ornamentals. Plant injury use to occur if a producer added crop oil instead of surfactant.

Segment is the same chemical but they are adding a non-ionic surfactant at the factory to it. Poast was 18 percent Sethoxydim. Segment is 13 percent. BASF promotes the advantage of not having to add anything else when mixing.

The **Segment** label recommends a range of 2.25-3.75 pints per sprayed acre applied in 5-50 gallons of spray solution, at 30-60 psi. Spot spraying can be done with 2-3 fl. oz. per gallon or 5.75 - 8.75 fl. oz. per 3 gallon or 7.75 - 11.75 fl. oz. per 4 gallons. Use the low rate for grasses under 6 inches and the high rate for grasses over 6 inches. Additional surfactant is not necessary. Segment can be tank mixed with Surflan, Goal and Lontrel according to the label. Segment carries a CAUTION warning.

Lontrel is Selective for Broadleaf Weeds. (clopyralid) (MOA 4)

<http://www.cdms.net/LDat/ld2QB003.pdf> It will kill several broadleaf weeds with less than 5 leaves, post-emergent. Lontrel can be sprayed over the top of Scotch pine, white pine,

Norway spruce, white spruce, American arborvitae and *Taxus media*. It can be directed around a few others.

Very effective on legumes, clover, dock, cocklebur, jimsonweed & musk thistle.

Rate is 0.25 to 1.33 pints per sprayed acre. Costs \$77/pint

One pint per acre will kill ragweed and smartweed with less than 5 leaves.

Fairly expensive. (formerly sold as Stinger; currently sold as Confront in turf market)

Non-Selective Post-Emergent Herbicides

Gramoxone

Glyphosate (Roundup)

Glufosinate sold as Finale and Ignite

Avoid touching bark & foliage with these

– contact only

– systemic

– systemic

Gramoxone (formerly Paraquat) (MOA 22) <http://www.cdms.net/LDat/ld77A041.pdf> It is contact only; not systemic; generally does not kill the plant roots, but is effective on green nutsedge at 1 fluid ounce per gallon. Gramoxone is rainfast in 30 minutes. Its use was greatly reduced when Roundup (glyphosate) came on the market. Gramoxone is more effective than Roundup (glyphosate) to spot spray morning glories. It is a Restricted Use Pesticide (RUP). Two split applications on fescue can be more effective than Roundup (glyphosate). It can damage young bark more severely than Glyphosate.

Glyphosate (Roundup) Facts (MOA 9) <http://www.cdms.net/LDat/ld07A012.pdf>

Many generic glyphosate products are now offered since Roundup lost its patent protection. If they say extra or plus after the name, they have additional surfactant like Roundup Pro.

We realized in 2007 that the inert ingredients in some of the generic brands were incompatible with certain other herbicides when tank mixed. The inert ingredients can vary legally and may be responsible for some variation in control.

The Roundup label use to state 6 hours was required to become rainfast. Monsanto now claims that their new Roundup Pro becomes rainfast in 1-2 hours, with symptoms showing in 5-7 days rather than 10-14 days.

The additional surfactant can cause a foaming problem for some at refilling. Monsanto suggests adding the Roundup Pro last when filling the tank, reduce agitation if possible and use a defoamer. A defoamer will work; in fact, one man added too much and had a very difficult time getting the solution to spray out of the tank.

Roundup has always been more effective in 10 gallons of water per acre than more and on plants as they approach flowering, maturity. The Enviromist is a safe way to apply glyphosate close to foliage and stems. For spot spraying, 1-2 oz per gallon will kill most plants encountered in a nursery.

Glufosinate is sold as Finale and Liberty (formerly Ignite) (MOA 10)

Post-emergent. Avoid bark and foliage. Brand names may change.

Less effective on some perennial weeds than Roundup (glyphosate), requiring very thorough coverage but very effective on glyphosate resistant marestalk or horseweed, *Conyza canadensis* (formerly *Erigeron canadensis*). A separate handout is available on controlling marestalk.

Finale (11.33%) label: http://www.backedbybayer.com/system/product/product_label_pdf/13/Finale-2.5gal.pdf

Ignite 24.5% label: http://fs1.agrian.com/pdfs/Ignite_280_SL_Herbicide_Label1w.pdf \$155.87/ 2.5 gal

I was informed they quit making Ignite but it may be available in other markets. Liberty also by Bayer became available Aug 1, 2012. Liberty is 24.5% Glufosinate, selling for \$195.01 for a 2.5 gal jug; \$19.50/qt <http://www.cdms.net/LDat/ldUA5000.pdf>

Special problem weeds:

Bermudagrass Control where it is too dangerous to use glyphosate: Bermudagrass can grow under and climb in among ornamental plants. When it is unsafe to spray glyphosate, choose Envoy Plus, Fusilade II T/O or Segment, based on the crop. Refer to the label or Table B on web to determine which of the products are labeled for the crops. Envoy Plus is expected to be slightly more effective on bermudagrass than Fusilade II T/O or Segment. Two or more applications will be required. Re-spray a few days after the bermudagrass greens back up, in order that it can absorb a good dose again, but before it can gain too much strength.

Nutsedge: Refer to handout on web

Tall Fescue (In the rows of established nursery blocks.)

Fusilade II T/O, Segment and Envoy Plus are all weak on cool season perennial grasses. Suppression is all that can be expected. High rates and repeated sprays (after regrowth, 3 weeks or so) are not expected to kill established tall fescue. Envoy Plus is best choice. Spot spray with glyphosate very cautiously (in nursery rows). There is nothing better than having fescue in the middles to reduce erosion and support traffic but there is nothing worse than fescue in the row to stunt the crop.

A **shielded sprayer** can be rigged with truck mud flaps, rubber belting or pieces of intertube to keep the harmful post-emergent herbicides from contacting foliage and bark. The shield must extend out from what it is mounted on: tractor or spray tank frame, to facilitate use. A front mount is easiest to observe and guide very close to the plants without causing damage. Have seen nozzles mounted under a rear mounted tank, with a skirt made from mud flaps or tarp. Attempts to build shields have been replaced by the Enviromist.

Proper Management of the Enviromist

It is the most efficient and safest way to apply glyphosate or Gramoxone. The Enviromist can be used safely when too windy to backpack glyphosate. The Enviromist is a good weed control tool. But like all tools, it must be used correctly. Plant injury has occurred due to operator error. No other pesticides can be applied with it. The Enviromist is delivered with a tip for each herbicide. The Gramoxone tip has a larger opening.

Operators have caused damage on tree trunks at the same height on nearly every tree by running with the **hood too high** because they did not realize the danger or because the vegetation was too tall or perhaps because they could not see the mist. The hood should be carried as low as possible, bumping the ground occasionally. Replacing a hood cover every year is cheaper than losing 4 good trees. It is not designed for weeds much taller than 6". It must be able to ride them down.

Operators were not **rinsing the chemical from the tubes prior to leaving it idle** during lunch and at night as the directions suggest. The glyphosate solution becomes stringy or filamentous as it dries. Pieces break loose and float around within the system, allowing the flow rate to fluctuate and eventually clog the filter. Daily flushing of the tubes prevents this by replacing the chemical solution within the tubes with clean water. The Enviromist has a small tank of clean water for this purpose. Learn where the valve is to flush the tubes. A few drops of a liquid dishwashing detergent would help if added to the small tank each time it is filled.

Some operators had the **flow rate or pressure too high**, indicated by seeing the hood drip while moving and the bark being wet. Not good. The book suggests 8 quarts of glyphosate, but 4 to 6 qts is adequate, depending on speed, weeds to control, moisture stress and stage of growth.

Concern was also raised about the **increased surfactant** in Roundup Pro (glyphosate). The additional surfactant makes it more effective, by helping it stick better; but if any of the mist escapes the hood and reaches the trunks, it would more damaging.

Warren County Kubota in McMinnville is the local rep.--931-474-1201 wckubota@blomand.net and will install one for \$4000 to \$5000 on your tractor or ATV. Hoods come 18, 24 & 36" diameters with separate hoods mounted on the rear to treat the middles if desired for total bare ground.

End of Season Care for the Enviromist

At the end of the season, clean and flush the system before storage. Then add 1 fl. oz. liquid dishwashing detergent to 10 gallons of clean water in the tank and allow it to run through the system and spray out. Drain the system and store where it will not freeze. Follow the directions in the Enviromist manual.

Crimson Red Clover drilled into row middles Aug. 1 through Oct. 15 prevents many of the winter annuals from germinating in the middles and retards summer annuals as well. A preemergence herbicide can be banded down the row to keep the row clean. Spraying preemergence herbicides over the top of 4"+ Crimson Clover should not injure the clover.

A handout is available explaining the benefits and how to establish clover. The price of clover seed has caused many to switch to wheat instead with satisfactory results. Either could offer some frost protection the following spring if planted close enough (or broadcast) to small liners, rows of tender seedlings or first year buds. The grasses offer the advantage of being susceptible to being stunted or killed by a band or broadcast spray of Envoy Plus, Fusilade or Segment to prevent the wheat seed from maturing.

Disclaimer: This handout is intended to provide general information about the use of preemergence herbicides in nursery settings. The mentioning of product names is merely for informational purposes and is not intended to endorse or discourage the use of any product. This list of products may not be comprehensive and other products may exist. This handout is not intended to supersede or replace the label. Always refer to a current label before making the application, which may contain updated or additional information not provided in this handout.

Definitions

Rainfast – The period of time required for a sprayable product to dry or be absorbed on to foliage, so that rainfall or irrigation does not affect the effectiveness.

Number of Days Active – The period of time that the pre-emergence manufacturer states on the label that the product will remain active, waiting on activation by rainfall or incorporation.

Inches of Water to Activate – The amount of rain or irrigation (in inches) required to activate the pre-emergence herbicide according to the label.

Spray pressure (psi) – The pressure recommended by the label for application. More important for the post-emergence herbicides if applied over tall or dense foliage, in order to obtain coverage.

Gallons of Water per Acre Recommended – The recommended volume of spray water to use when applying the product, according to the manufacturer's label.

REI (in hours) – The number of hours that legally must pass before labor is allowed to return to the area sprayed. REI stands for restricted entry interval.

References:

The herbicide labels

Dr. David Monks, former UT Ext. Weed Control Specialist, now at NCSU

Dr. Neil Rhodes, UT Ext. Weed Control Specialist

Dr. Jim Wills, UT Ext. Ag. Engineer

Mark A. Halcomb, UT Area Nursery Specialist, Warren Co Extension, 201 Locust St. #10, McMinnville, TN 37110 mhalcomb@utk.edu 931-473-8484 Fax: 931-473-8089

Revisions available under 'Weed Control' at <http://www.utextension.utk.edu/mtnpi/index.html>

Comm/Weed Control/Field Weed Control rev A

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