

## Field Nursery Weed Control

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### Understanding Preemergence Herbicides Can Provide Better Weed Control

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

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

For best all around control, one of the grass herbicides must be tank mixed with one that prevents broadleaf weeds. Other preemergence herbicides include Casoron, Dacthal, Devrinol, Goal, Kerb, and Treflan.

### Activation

A half inch of irrigation or rain or a 1-2 inch shallow cultivation is required within 7-30 days to activate them; 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. Drip irrigation will not activate the preemergence herbicides.

It would be easy to cultivate them too deep and lose them. They need to be mixed into the top 1-2 inches, but mixing them into the top 4 inches would dilute them to the point

of being useless.

**Control usually lasts about 90 days**, when labeled rates are followed. Excessive rainfall can reduce the period of control. Two to three applications will be required per year for good weed control.

### Timing

**Feb 1 to March 15** is considered to be an excellent time to apply preemergence herbicides. There is a very good chance of rainfall for activation. A **mid summer** application may not get activated if it does not rain within the required period. See Table 3 to learn the number of days the different herbicides will wait on rain.

**The fall (Sept-Dec)** is the time to spray Princep or Gallery to prevent the germination of the winter annuals. This application **buys time in the spring** and **may be the most important application of the year**. Spray 1-1.5 qts Princep or 0.75 to 1 lb. Gallery per sprayed acre. Add Barricade, Pendulum, Pennant or Surflan only in the blocks that have a spring ryegrass problem. This will reduce hand chopping greatly in the spring.

**Warning:** Spraying over swelling buds with Surflan + Princep has occasionally stunted growth, we thought, 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. Read more about Pendulum in the herbicide section.

### The Application

It's always **best to spray clean, freshly cultivated and hoed soil** with no existing weeds regardless of the time of the year. These do not kill green vegetation. Or use the Enviromist 2 weeks after applying the preemergence herbicide.

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. 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.

**Don't spray transplants until after a good settling rain.** Apply in **20-40 gallons of water per acre, or** according to the label. **Pressures of 30 psi** (pounds per square inch) are adequate when spraying bare ground or short grass. Higher pressures create finer particles that a breeze can easily blow away. Tall vegetation may require 60 psi.

Many producers are unhappy with the performance of summer applied preemergence herbicides when the spray is applied several days after cultivation. It may appear clean, but actually the germination of many thousands of seed can occur in one day, during warm soil conditions. The preemergence herbicides don't kill weeds after germination. They act during or immediately after germination.

A major reason for herbicide failure is a lack of rain within the required time to activate the preemergence herbicide sprayed. A half inch of rain or irrigation is required to

activate the herbicide within 7-30 days, depending on which preemergence herbicide was sprayed. This is very critical and of major concern during the summer.

A good nursery manager should spray freshly cleaned blocks the same day they are cleaned in order to avoid escaped weeds. 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.

- ✓ 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 a few days 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 & weed species present.
- ✓ Determine the sprayer output so that the correct rate can be applied.

### **Banding vs. Broadcast Spraying**

Cultivation or herbicides can be used to maintain a weed free strip 12-18 inches wide the first year. Widen this each year to a maximum of 2-3 feet on each side of the row.

While broadcast spraying is faster, there is no need to spray middles that will be cultivated later. In fact, vegetation in the middles is not harmful to the nursery crop, as long as a sufficiently wide weed free strip is maintained in the row. Vegetated middles reduce erosion.

Band spray preemergence herbicides down the row wherever possible rather than spray broadcast. Banding reduces the amount of chemical required by 1/3 to 1/2, but requires more time, as every middle must be driven 1-2 times with a small tractor.

### **Rigging to Band Spray**

It is possible to **rig a nozzle** on the rear of the spray tank to spray toward the base of the plants in the row, but it can't be watched as easily as if it were in front. Most prefer mounting a spray arm with a single nozzle on the **front bumper** of a small tractor.

A 3-4 foot length of 1 1/4 inch square metal tubing can be mounted horizontally on the front bumper. An 18 inch length of 1 inch tubing can be slid inside of the bigger tube to achieve horizontal adjustment. Drill and weld a nut with a bolt to tighten it in place. Perforated metal tubing available at hardware stores will also provide horizontal adjustment, but vertical adjustment must be achieved by the mount.

Mounting: The 3' tube can be slid through the weight handles of John Deere. It can be secured with multiple zip ties or a 10" length of 2x4 cut diagonally, with a piece driven in from each side. Some are bolted on. The 3' tube could be permanent, but the piece that slides inside and all hoses could be easily removed back to the tank. [Link](#)

Quick couplers would facilitate removal without having to split the rubber hose from the barbs. R&D Sprayers sells brass couplers at 337-942-1001 [www.co2sprayers.com](http://www.co2sprayers.com). They have barbed ends for insertion into the hose. On the website, look under Sprayer parts, Industrial disconnects, page 39. The parts we ordered are under the 'automatic' disconnects (which simply means you can push them together without having to hold the disconnect spring down) and include the coupler for 1/2 inch line (312HBA) and the nipple for 1/2 inch line (312MN). The price for the coupler shown was \$19.00 and for the nipple \$4.47. The manual coupler is only slightly cheaper (\$18.50), so I would definitely recommend using the automatic coupler. They also sell 3/8 inch couplers. Their price list is on the same web page---click on the price option and the prices appear below on the screen by page number. They are set up for credit card on their web page.

The plastic disconnects came from U.S. Plastics 800-537-9724 <http://www.usplastic.com/catalog/default.asp>. Type in their search box the part number 60734 or 60738 to get the particular 1/2" hose parts that are shown. Cost was \$13.55 for coupler 60734 and \$10.47 for nipple 60738. These are made from a high quality material that may last longer than metal, not sure about light issues. Install the female end on the tank side to prevent loss of liquid, but it may not matter.

Attach a nozzle on the end of the 1 inch tube. Run a reinforced spray hose (not anhydrous ammonia hose) to the nozzle from the tank, perhaps under the tractor, avoiding hot areas that will melt the hose. Zip ties are great and allow the hose to be suspended in places. A great idea to reduce driver fatigue and increase safety is to run the hose across the right rear fender (for right handed operators). Cut the hose and install a 1/4 turn ball valve. (Add a second hose and valve if spraying both sides.) This prevents the driver from having to turn around in a straining reach, while also attempting to throttle down, and turn around, while not running over the end plants.

Always measure for the nozzles to be at their widest point before cutting the hoses. Allow some extra. Hoses can't make 90 degree turns without collapsing.

Brass nozzle bodies should be more durable than the nylon. A good quality plumber's paste is easier to use than Teflon tape to stop leaks. It will remain pliable. Always have spare parts of each item that could stop progress, especially pressure gauges, pressure regulating valves, nozzle body strainers, pump, etc. A trip to town plus down time with labor waiting versus an inventory (invested dollars).

A few more minutes of welding will provide vertical adjustment. Vertical adjustment controls band width. A handout with a drawing is available. This method requires that each middle be driven twice.

(Adding another short tube and another nozzle to the other side of the longer tube will cut the trips in half; driving each middle once, spraying both sides of each middle, if the rows are not too wide. So what if the rows are not perfectly straight? Satisfactory weed control will still be achieved by the **18-24 inch band sprayed on each side.**)

It use to be common to find rigs applying 50 gallons of water per acre with 8004 tips, because of the slow speed. Changing the tip size to 8002 cut the rate in half, but produced a finer spray that was more difficult to see and easier for the wind to move. I prefer 25 gal/acre for convenience because most rigs have a 50 gal tank. Drivers like to see the spray. Seeing the spray helps guide the driver to spray the lower 2-3" of each shade tree stem for proper overlap.

Standard flat fan spray tips require a minimum of 30psi to develop a full pattern. An XR (Extended Range) tip will develop a full pattern at 15psi. Both will operate up to 60psi. The VisiFlo tip is color coded for convenience. The code on a tip might read XR8004VS. They have a stainless steel center.

A **Boom**: Multiple tips should generally be mounted 20 (16-24) inches apart and carried 17 to 19" above the target. An 80 degree tip will cover a swath 30" wide when carried 20" above the target. A 110 degree tip will cover a swath 38-42" wide when carried 20" above the target. The target may be bare soil or the average height of weeds to be sprayed.

Strainers are recommended for use within the nozzle body. A check valve strainer will stop dripping at around \$3.50 each. Clean them occasionally with a soft discarded toothbrush under water. The check valve strainer requires an extra 10psi to operate.

Preemergence herbicide labels recommend a sufficient water volume to obtain uniform coverage; a minimum of 20 gallons; 20 to 100; a minimum of 40, etc. Refer to the label. Any more than the recommended spray volume merely wastes time in filling up more often. This can be significant if the tractor has to be driven a long distance to a water source.

It is possible to apply 10 to well over 100 gallons of spray water per acre. Once it is determined how many gallons of spray water is being applied per sprayed acre, there is a simple calculation to determine how much pesticide to add to the tank. This is covered in the calibration section.

An off-center (OC) tip reaches out further from the tractor and is useful in some applications. An OC-02 will apply the same volume as an 8002. An off-center tip is available in most sizes. Brass off-center tips cost about \$7.00 compared to \$2.50 for regular flat fan tips.

I seldom see a need for a swivel joint. A wider band may require another nozzle alright, but not from the same swivel; due to an uneven pattern. I will be happy to give ideas on how to rig a sprayer to band, or help figure out how many gallons of water a sprayer is

spraying per acre. **It is essential to know gallons sprayed per acre in order to know how much pesticide to add to the tank.**

## **Sprayer Calibration**

Calibration is the process of modifying or adjusting a sprayer to give the desired application rate with uniform coverage. Applying pesticides correctly is very important to obtain control without wasting product. Preemergence herbicide labels require so much per acre; not so much per volume of water like most liquid insecticides and fungicides. Before you can know how much preemergence herbicide to add to a tank, you must first figure how many gallons of water the sprayer is applying per acre (output). There is more than one accurate method to determine sprayer output.

The 1/128th of an Acre Method is based on a gallon of liquid containing 128 fluid ounces (fl oz). If an area equal to 1/128 of an acre is sprayed for calibration purposes, the number of fluid ounces applied is equal to the application rate in gallons per acre. (If we catch sprayer output for a time equal to the drive time, the ounces caught equal gallons per acre.) There are no mathematical equations.

(One acre = 43,560 sq ft) (43,560 divided by 128 = 340) 1/128th of an acre = 340 sq ft. We need to determine how long it takes us to spray 340 sq ft and how many gallons of water would be applied with our sprayer set-up. We will determine how wide we are spraying and how many feet we would have to travel to spray 340 sq ft. The length of the course can be calculated easily by dividing 340 by the width in feet of the sprayed area covered by one nozzle.

The key to the successful use of the 1/128th acre method is to select the proper course length, accurate measurements of the course, time to drive the course and of the ounces caught.

If spraying a band, use the effective band width to determine the course length to drive and time. If using a spray boom, use the nozzle spacing. Catch the output for the same time period. The procedure is outlined but feel free to ask your local Extension agent.

**Calibration Steps**, for pre and post-emergent herbicides or any soil applied pesticide. [Link to PPT](#)

The number of **gallons of water sprayed (output) per acre must be known** before the amount of product to add to the tank can be calculated. Once the output is known, divide the gallons of water put in the tank by the output to determine the acreage sprayed per tank. If tank size is 50 gal and output is 27 gallons of water per acre: (50 divided by 27 = 1.85 acres sprayed with 50 gallons). Then multiply the acreage sprayed per tank times the Amount of product desired per acre to determine how much product to add to each tank.

1. Hook up sprayer and insure that it works properly. If the sprayer hasn't been used

since last season; remove all spray tips, filters, plug and filter in bottom of tank. Flush the tank. Replace the plug, add water and flush the entire system with clean water. Fill at least half full with clean water.

2. Insure that the pressure gauge works and that the pressure can be adjusted with the pressure regulator valve. Regular flat fan spray tips require a minimum of 30psi to achieve their full pattern. Up to 60 pounds pressure (psi) may be required when spraying a post-emergent herbicide down into dense, tall vegetation. A liquid filled unit is easier to read. Repair all significant leaks, etc.

3. Determine the location of the spray tip; one or both sides of front bumper, mid-point under tractor belly, or rear of tank, etc.

4. Determine the desired spray **width** and how to achieve. Raising or lowering the nozzle body is okay to make spray band width changes. A spray boom is generally carried 18 to 20 inches above the target to achieve a proper spray pattern. A single nozzle can be used at any height to achieve the width desired.

5. Operate the sprayer at the desired RPM and psi, but at a much slower speed in order to determine the **effective spray width**. (The spray pattern will be more visible with the greater volume of water applied at the slower speed. It will be easier to see on concrete, asphalt, gravel, etc.) Work on level ground and out of the wind. This is the most important step to be accurate.

A standard flat fan spray tip sprays a feathered edge so that the dose will not be doubled when used side by side on a spray boom. Also so there will not be a void either. Approximately 4-6 inches on each side is feathered. Final adjustment needs to be made in the field, with the same soil conditions as the actual application will be made. The weight of the tractor will sink into loose soil and the nozzle body will need to be raised to compensate and provide the desired width.

6. Accurately measure and clearly mark a course length based on the width of the spray band. See Table 1, or calculate yourself by dividing 340 feet by the spray width in feet; (divide width in inches by 12; a 20 inch band is 1.67 feet).

7. The actual driver that is familiar with the tractor, that will be making the application, should assist. The driver should know the gear and rpm that is preferred; otherwise, determine a safe speed that can be used over the entire farm. Make this determination by driving and spraying down a typical row, not on a hard surface.

**Time** the tractor and sprayer operating through the course. Do a running start instead of a dead start from the line. (Begin 10 feet before reaching the starting line, with everything operating; the gear, rpm, psi, etc.) Don't hesitate to begin over if the driver will be more comfortable, more confident with a different gear, placement of the nozzle, etc. Begin over if the driver alters the speed.

8. Repeat the procedure on the return trip. Average the 2 times.
9. Park the tractor. With the engine running at the same rpm, psi, etc., **catch** the output for the travel time in a bucket. Measure accurately in fluid ounces. (If 2 nozzles spray side by side to achieve the width required, with only the normal overlap; catch their output separate. Their output should be equal. If more than 1 nozzle is spraying the same band, (in order to increase the output) catch all and total together for the gallons per acre.) **Ounces caught equal gallons per acre with this method.** Any changes in rpm require re-timing on the course. The output should remain the same as long as the gear, rpm, pressure, spray tip size, etc. remain the same. Re-calibrate at least annually.
10. Most pre and post-emergent herbicides require no more than 20-30 gallons of water per acre. More than 30 gallons wastes time in requiring more fill-ups. Always follow the label, however.
11. **To increase output:** Increasing spray pressure and/or slowing the tractor speed will make slight increases in the output. Changing to a larger spray tip is the simplest and easiest way to increase output. See Table 2 to learn the type of change expected.
12. **To decrease output:** Decreasing spray pressure and/or increasing the tractor speed will make only slight decreases in the output. Changing to a smaller spray tip is the simplest and easiest way to decrease output. See Table 2 to learn the type of change expected.

**NOTE:** Re-time the tractor if you change the gear or rpm.

13. Use this formula to determine the acres sprayed per tank & the amount of product to add to the tank. It is not the tank size; but the number of gallons put in it.

$$\frac{\text{Gallons in Tank}}{\text{Gal. applied/acre (or Output)}} \times \text{Amount of Product desired per acre} = \text{Amount of product to add/tank}$$

14. To determine the amount of product (Surflan, Princep, etc.) to add to each tank, multiply the amount of pesticide required or desired per acre, times the number of acres sprayed with each tank, (2.0 above) 2.0 x 2 qts Surflan/acre = 4qts put into the 50 gallon tank. Two acres covered; 2 qts per acre.

Ex.  $\frac{50 \text{ gallon tank}}{25 \text{ gals. sprayed/acre}} = 2 \text{ acres/tank} \times 2 \text{ qts Surflan/acre} = 4 \text{ qts Surflan per tank}$

The example is for a 50 gal. tank, on a spray rig applying 25 gallons of water per acre. Each 50 gallons will cover 2 sprayed acres. If banding, more than 2 acres will be driven across to actually spray 2 acres of ground. We desire to apply 2 quarts of product per acre. Put 4 qts in each 50 gal.

15. If an 18" band is sprayed on both sides of a row; a 36" or 3' strip is sprayed per row. A sprayed 3' strip in a 6' row spacing treats half of the field. Two acres are driven over to spray one acre. Four acres are driven across to actually spray 2 acres, which can be done with one 50 gal. tank that applies 25 gal. of water per acre.

16. More examples explained:

$$\frac{50 \text{ gallon tank}}{30 \text{ gallons sprayed/acre}} = 1.67 \text{ acres/tank} \times 2 \text{ qts.} = 3.33 \text{ qts/tank of 50 gal.}$$

Since it is difficult to measure a fraction of a unit, convert to ounces or liquid ounces. (0.33 qts x 16 fl oz = 5.28 fl. oz.; so, 3 qts and 5.28 fl. oz. = 3.33 qts. Or 3.33 qts x 16 = 53.28 fl. oz.)

Situation: We have sprayed several tanks, and we like 1 more block. We estimate that 15 gallons of solution will finish the job. We place 15 gallons of water in the 50 gallon tank to finish.

$$\frac{15 \text{ gal in tank}}{25 \text{ gallons sprayed/acre}} = 0.60 \text{ acres/tank} \times 2 \text{ qts} = 1.2 \text{ qts} / 15 \text{ gal}$$

**Table 1**

<u>Band Width in inches</u>	<u>Course length in ft</u>	<u>Band Width in inches</u>	<u>Course length in ft</u>
14	292	22	185
16	255	23	177
18	226	24	170
19	215	26	157
20	204	28	146
21	194	30	136

**Table 2**

Standard flat fan spray tips, operated at 30 psi and 4 mph, will spray the following amounts per sprayed acre. (Most of our band applications are made at travel speeds between 1 - 2.4

miles per hour.) The output will be greater at slower speeds.

<u>Tip</u>	<u>Output in gallons per acre</u>	<u>Tip</u>	<u>Output</u>
8001	06.4 gallons	8006	39 gallons
8002	13	8008	52
8003	19	8010	64
8004	26	8015	97
8005	32		

It is not necessary to know the tractor speed with this method; but, if you would like to know, here are 2 easy formulas:

$$\frac{\text{Distance in feet} \times 60}{\text{Time in seconds} \times 88} = \text{Speed in miles per hour}$$

Or: Distance in feet x 0.68 and Divide that by the travel time in seconds = mph

Note: Use a distance greater than 200 feet and average 2 or 3 runs for greater accuracy.

The units (qts, ounces, pints) used for the amount of product desired per acre will be the same units in the amount of product to add to the tank. It may be more accurate to convert everything to ounces however, rather than trying to guess at 3.7 qts, for example. (2 qts = 64 fluid ounces)

$$\frac{50 \text{ gal}}{27 \text{ gallons}} \times 64 \text{ fl oz} = 118.4 \text{ fl. oz. or } 3.7 \text{ qts.}$$

Here are some facts on the commonly used preemergence herbicides:

**Barricade 65 WDG** (formerly Factor 65 WDG)

Primarily for grasses, needs help with broadleaf weeds.

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

\$43 per pound or \$64 for 1.5 lb per sprayed acre.

Will wait **14** days on rain. Can go ovetop.

Low solubility; should stay put. A DNA herbicide.

**Barricade 4L:** 1 gal \$229.50; rate is 21-48 oz/A; cost would be \$38/A at low rate.

**Pendulum 60 WDG** (Water Dispersible Granule)

Warning: Strong precautions concerning possible plant injury (phytotoxicity) were added to both labels in late 2001 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 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. User beware. Appears safe on trees where only the trunk is sprayed.

Primarily for grasses, needs help with broadleaf weeds.

Labeled rate is 3.3 to 6.6 pounds per acre. The low rate should last about 90 days.

\$10 per pound or \$33 per sprayed acre for 3.3 lb rate.

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

**Pendulum 3.3 EC** is liquid, labeled for 2.4 - 4.8 qts per acre.

\$10.00 per qt or \$25 per sprayed acre for 2.5 qt, low rate per acre.

**Pennant Magnum** Primarily for grasses, needs help with broadleaf weeds.

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

2 pints per acre recommended on label.

Will wait **7** days on rain.

\$43 per sprayed acre for 2 pints. Lasts about 90 days.

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

### **Surflan**

Primarily for grasses, needs help with broadleaf weeds.

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

2-4 quarts per sprayed acre recommended on label; 2 qts recommended.

\$43 per sprayed acre for 2 qts. 2 quarts will normally last 90 days.

Will wait **21** days on rain. Can go overtop.

Grower's favorite, but... Will root prune, is water soluble & will leach.

Is a Dinitroaniline (DNA) herbicide.

**Princep 4L (Simazine)** Controls most broadleaf weeds & many annual grasses.

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.

\$4 per qt or \$6 for 1.5 qt per sprayed acre. Will wait **10** days on rain.

Tank mix with one of the grass herbicides above.

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

**SureGuard** Is a water dispersible granule

New for the 2004 season. Too little is known yet.

Controls some broadleaf and some grass species. Valent claims can stand alone. (?)

Costs \$680/5 pound bag or \$120/pound or \$68/acre at the 8 oz rate.

**Must be directed** when foliage is present. Apply in 20 to 30 gallons water/ acre.

Provides limited post-emergent control of weeds less than 2 inches tall, but a surfactant will enhance the control.

**Gallery 75 DF** (dry flowable)

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 \$127 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 overtop. 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.

Barricade, Pendulum, Pennant or Surflan must be tank mixed with Princep or Gallery to achieve as near total vegetation control as is possible.

**These Nov. 2007 prices are not exact, but adequate for comparison.**

2.5 qts Pendulum EC + 1.0 qt. Simazine	= \$ 30 / acre
2.5 qts Pendulum EC + 1.5 qt. Simazine	= \$ 31/ acre
3.3 lbs. Pendulum WDG + 1.0 qt. Simazine	= \$ 37 / acre
2 qts Surflan + 1.0 qt. Simazine	= \$ 47 / acre
2 qts Surflan + 1.5 qt. Simazine	= \$ 49 / acre
2 qts Surflan + 0.5 lb Gallery	= \$106 / acre
2 qts Surflan + 1 lb Gallery	= \$170 / acre
1.5 lbs Barricade + 1 lb Gallery	= \$191 / acre

**Fall Applied Preemergence Herbicides Prevent Winter Weeds & Buys Time in the Spring**

Two weeds will be prevented in addition to the general winter broadleaf annuals by applying a preemergence herbicide in the fall--ryegrass and thistle. I use to only be concerned with the general winter annuals, but very few growers were. After all, these weeds only get a few inches tall during the winter. They provide a carpet to walk on.

But these winter broadleaf annuals grow up during the spring. They can grow 2-3 feet tall before they bloom, produce seed and die in June or so. Sixty to seventy percent of the thistle seed germinate in the fall.

One and a half quarts of Princep (Simazine) does a very good job of preventing the germination of thistle and most of the winter broadleaf weeds. Gallery can probably be used where Princep can not be used. I would recommend trying the 0.75 pound rate per sprayed acre in the fall.

Princep or Gallery can be used alone except where ryegrass is anticipated. Add a grass herbicide, such as Surflan, Barricade, Pennant or Pendulum to prevent the ryegrass.

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.

In addition to preventing a lot of thistles and ryegrass, fall applied preemergence herbicides will buy a busy shipper some time in the spring. Regardless of how busy a fellow is in the fall, he's got more time in the fall than in the spring. This should keep the soil fairly clean until May 1 or so; depending on several factors.

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

Fusilade II T/O

Segment (formerly sold as Vantage)

#### **Selective for broadleaf weeds**

Lontrel (Clopyralid, formerly sold as Stinger)

### **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** 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 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** 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 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 0.5 pint 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 fluid (fl.) ounce (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 and recently to **Segment**. Poast is still being sold in the row crop market, but the label on Poast no longer tells how to use it on ornamentals, nor lists ornamentals that it is safe on. It is illegal to recommend or use Poast on ornamentals.

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 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**

Will kill several broadleaf weeds with less than 5 leaves, post-emergent.

Can be sprayed over the top of Scotch pine, white pine, Norway spruce, white spruce, American arborvitae and *Taxus media*.

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

Rate is 0.25 to 1.33 pints per sprayed acre. Costs \$76/pint

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

Fairly expensive. (clopyralid, formerly sold as Stinger)

**Non-Selective Post-emergent Herbicides**      Avoid touching bark & foliage with all.

Gramoxone – contact only

Roundup (glyphosate) – systemic

Finale – systemic

**Gramoxone** (formerly Paraquat) 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. It's 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).

**Roundup (glyphosate) Facts**

The patent protection is off. Glyphosate is now sold under several different trade names. Be aware of different concentrations. Touchdown (28.3%), Honcho, Jury, Glyfos, Gly-4, Cornerstone and Silhouette are common generic names we see. If they say extra or plus after the name, they have additional surfactant like Roundup Pro.

We began to suspect that the generics were not equal in 2007. The inert ingredients can vary legally and may be responsible for some variation in control. Our marestail was not being controlled with the Enviromist in 2008.

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, too much will make it difficult to spray out.

Roundup (glyphosate) 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 Roundup (glyphosate) close to foliage and stems. For spot spraying, 1-2 oz per gallon will kill most plants encountered.

**Finale**

Rate is 3 to 6 qts per acre or 1.5 to 4 fl. oz. per gallon for spot treatment.

Post-emergent. Avoid bark and foliage. Same as Ignite.

Less effective on some perennial weeds than Roundup (glyphosate), requiring very

thorough coverage.

### **Special problem weeds:**

#### Bermudagrass Control where it is too dangerous to use Roundup (glyphosate):

Bermudagrass can grow under and climb in among ornamental plants. When it is unsafe to spray Roundup (glyphosate), choose Envoy Plus, Fusilade II T/O or Segment, based on the label (crop safety). 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.

#### Nutsedge:

[Link](#)

#### 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 to try. Spot spray with Roundup (glyphosate) very cautiously (in nursery rows).

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 plant 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**

[Link to image](#)

It is the most efficient and safest way to apply glyphosate or Gramoxone. It can be used safely when too windy to backpack Roundup (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.

Operators have caused dead bark 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. 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 Roundup (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. The 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.

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, 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 local rep.--931-474-1201 [wckubota@blomand.net](mailto:wckubota@blomand.net) \$4000 to \$5000 installed on your tractor or ATV. Hoods come 18, 24 & 36" with models designed for the rear to treat the middles.

#### 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 of the book.

**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 it clean. Spraying preemergence herbicides over the top of 4 inch 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 use 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 seed or budded seedlings. The grasses offer the advantage of being susceptible to Envoy Plus, Fusilade or Segment and could be stunted or killed before seeding with a band or broadcast spray after frost.

#### **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

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**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.

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