

EXTENSION NOTES



USING A BACKPACK HERBICIDE SPRAYER TO CONTROL WEEDS

The use of herbicides is one of several methods for protecting tree seedlings from the effects of competition with grasses and other plants.

This Extension Note provides information about two types of herbicides and how to use them safely and effectively.

INTRODUCTION

For tree seedlings to survive and grow they need to be protected from competition from grasses and other plants until they are taller than the surrounding vegetation. This usually takes three to five years, depending on the tree species, the site and the effectiveness of the initial site preparation and the tending.

Compared to alternatives for reducing competition, herbicides are less expensive and require less labour. For example, three consecutive annual applications of the herbicide glyphosate cost approximately \$0.45 a seedling for materials and labour compared to \$0.74 a seedling for the 90 centimetre Brush Blanket mulch material (1994 prices).

Competition from surrounding plants reduces the amount of light, nutrients, moisture and space available to young trees. Competing plants provide habitat for rodents that might feed on seedlings. Nearby plants can also damage seedlings if they are compressed by heavy snow.

For information on other methods of controlling competition see Extension Note *Room to Grow: Controlling the Competition* and *Mulches Help Trees Beat Weed Competition*.

PRE-EMERGENT AND POST-EMERGENT HERBICIDES

Two types of herbicides are available for controlling competition. A pre-emergent herbicide, such as simazine, prevents competition from getting started by killing seeds before they germinate. A post-emergent herbicide, such as glyphosate, is used to eliminate competition from plants that are established.

It's important to inspect trees and control competition during the late spring and early summer — the period of greatest growth. To determine whether a herbicide is needed and which type of herbicide to use, examine the planted area. If there are weeds around the trees, a post-emergent herbicide should be used. If there are no weeds, a pre-emergent herbicide can be applied in October to prevent seeds from germinating in the spring, or in April before competing plants reach a height of 10 centimetres.

Simazine is particularly useful when applied during site preparation. When applied before the tree is planted, simazine generally controls weeds for one to two years. For more information on site preparation see Extension Note *Clearing the Way: Preparing the Site for Tree Planting*.

Table 1 compares the characteristics of simazine and glyphosate, two herbicides commonly used in tree plantations in southern Ontario.

**TABLE 1
COMPARISON OF GLYPHOSATE AND SIMAZINE**

| | Glyphosate | Simazine |
|-------------------------------|---|---|
| Herbicide type | <ul style="list-style-type: none"> • Post-emergent: kills weeds and grasses after they have grown | <ul style="list-style-type: none"> • Pre-emergent: prevents weeds and grasses from germinating |
| Place of absorption | <ul style="list-style-type: none"> • Leaves | <ul style="list-style-type: none"> • Roots |
| How it works | <ul style="list-style-type: none"> • Moves down through the plant into the roots • Inhibits amino acid production | <ul style="list-style-type: none"> • Moves into leaves • Inhibits photosynthesis and the production of carbohydrates |
| Weeds controlled | <ul style="list-style-type: none"> • All weeds and grasses | <ul style="list-style-type: none"> • Kills most grasses and shallow rooted broadleaf species, such as ragweed and foxtail grass • Ineffective against deep rooted weeds, such as alfalfa, bird's-foot trefoil and goldenrod |
| Protection of tree seedlings | <ul style="list-style-type: none"> • Protect tree from herbicide | <ul style="list-style-type: none"> • Can be sprayed directly over tree seedlings |
| Duration of action | <ul style="list-style-type: none"> • No residual activity • Some regrowth of weeds may occur | <ul style="list-style-type: none"> • Can provide weed control for up to two years |
| Recommended spraying period | <ul style="list-style-type: none"> • Beginning of June to first frost | <ul style="list-style-type: none"> • In April before vegetation reaches a height of 10 cm • In October to control weeds the following spring |
| Product name and manufacturer | <ul style="list-style-type: none"> • Vision and Roundup are produced by Monsanto | <ul style="list-style-type: none"> • Princep Nine-T is produced by Ciba-Geigy Canada Ltd. • Simadex is produced by Agro Chemicals Limited |
| Availability ¹ | <ul style="list-style-type: none"> • Roundup is available in stores in 0.5 and 1-litre containers² • An applicator's licence³ is required to buy Vision | <ul style="list-style-type: none"> • An applicator's licence³ is required to buy simazine |
| Helpful hints | <ul style="list-style-type: none"> • Follow instructions on label • Avoid spraying when rain is expected because the effectiveness of this herbicide is reduced if rain falls within six hours of application • Effectiveness is reduced in poor growing seasons, such as those caused by drought • Do not spray on windy days • Use clean water because contaminants may reduce effectiveness | <ul style="list-style-type: none"> • Follow instructions on label • Sufficient rain is needed after application to move herbicide into soil • Apply only once a season |

¹ Landowners may purchase simazine and glyphosate only when it will be used on their own property. Otherwise it must be purchased by a certified agriculturalist or a registered custom sprayer.

² To purchase containers of Roundup greater than one litre, an applicator's licence is needed. The cost per tree for a one-litre container is \$0.07, while the cost per tree for a 10-litre container is \$0.02.

³ To obtain an applicator's licence, contact your local Ministry of the Environment office.

APPLICATION

A simple pressurized garden sprayer or backpack sprayer may be used to apply both kinds of herbicide. The sprayer must have a TeeJet 8003E flat spray tip or a similar tip (Figure 1). This can be obtained from most farm or hardware stores.

To protect trees from herbicide damage buy a 20-centimetre diameter piece of stove pipe (comes in one-metre lengths) to place over the tree while spraying. Adding a handle will make it easier to place it over trees. When the stove pipe is placed over the tree, spray two short one-metre strips on each side of the tree in the same direction as the row of trees. Each strip should be 50-centimetre wide, so that a one-metre square is treated around the pipe (Figure 2).

CALIBRATING THE SPRAYER

The sprayer should be calibrated to ensure that the right amount of herbicide is applied. To calibrate:

1. Mark a square, one metre by one metre, and put a dividing line through it to make two 50-centimetre strips. Place the stove pipe in the centre to represent the tree.
2. Place exactly two litres of water in the sprayer.
3. Pump up the sprayer, then practise holding the nozzle at the correct height to get a spray width of 50 centimetres.
4. With exactly two litres of water in the sprayer, and the nozzle at the proper height, spray the square with two smooth strokes of one-second duration on each side of the tree.
5. Repeat until the tank is empty, pumping the sprayer often to ensure the pressure is the same for each square. Record the number of squares sprayed.
6. For best results, repeat steps 4 and 5, above, five times and record the number of squares sprayed each time. Total the number of squares sprayed and divide the number by 10 (for 5 x 2 litres of water) to obtain the number of squares sprayed for every litre.

| Squares Per Litre | Simadex Flowable Liquid (millilitres of herbicide for every litre of mix ⁶) | | Princep Nine-T (grams of herbicide for every litre of mix ⁶) | | Vision or Roundup (millilitres of herbicide for every litre of mix ⁶) |
|-------------------|---|-------------------------|--|-------------------------|---|
| | Normal Rate | Heavy Soil ⁷ | Normal Rate | Heavy Soil ⁷ | Normal Rate |
| 20 | 13.6 | 22.4 | 7.5 | 12.3 | 11.2 |
| 25 | 17.0 | 28.1 | 9.4 | 15.5 | 14.0 |
| 30 | 20.4 | 33.7 | 11.2 | 18.5 | 16.8 |
| 35 | 23.8 | 39.3 | 13.1 | 21.6 | 19.6 |
| 40 | 27.2 | 44.9 | 15.0 | 24.8 | 22.4 |
| 45 | 30.6 | 50.5 | 16.8 | 27.7 | 25.2 |
| 50 | 34.0 | 56.1 | 18.7 | 30.9 | 28.0 |
| 55 | 37.4 | 61.7 | 20.0 | 34.0 | 30.8 |
| 60 | 40.8 | 67.3 | 22.4 | 37.0 | 33.6 |
| 65 | 44.2 | 72.9 | 24.3 | 40.1 | 36.4 |
| 70 | 47.6 | 78.5 | 26.2 | 43.2 | 39.2 |

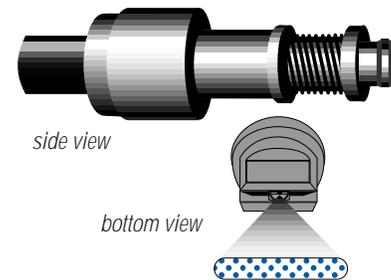
⁴ To spray simazine at the recommended rate of 3.4 kg of active ingredient per hectare and glyphosate at the recommended rate of 2 kg of active ingredient per hectare. Do not use more than the recommended rate.

⁵ Do not mix glyphosate and simazine in the same tank. Clean the sprayer between uses.

⁶ Use a glass measuring cup for liquid herbicides and a plastic measuring spoon for dry herbicides.

⁷ On heavy soils such as clay and clay loam, the recommended application rate for simazine is 5.6 kg active ingredient per hectare. The application rate for glyphosate does not change with soil type.

Figure 1



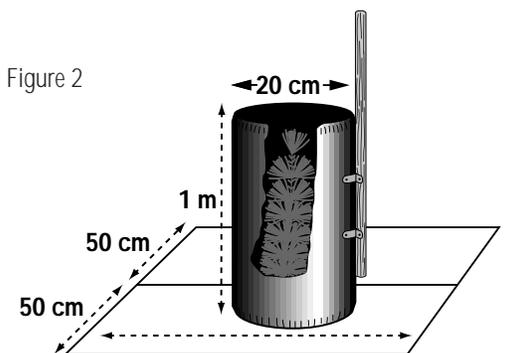
DETERMINING THE AMOUNT OF HERBICIDE TO USE

Use Table 2 to determine the amount of herbicide to put in the sprayer. For example, if using Roundup and a sprayer that sprays 40 squares per litre, put 22.4 ml of Roundup in each litre of water in the sprayer tank. For five litres of water put five times that amount or 112 ml of Roundup in the tank.

ASSESSMENT OF GLYPHOSATE APPLICATION

The plantation should be examined 10 days after applying the herbicide glyphosate. Missed trees should be resprayed.

Figure 2



REDUCING EXPOSURE TO HERBICIDE

The following precautions should be taken to reduce herbicide exposure:

1. Read the entire label carefully before using any herbicide and follow the instructions.
2. Never work alone when handling herbicides.
3. Store herbicides in their original containers with a legible label.
4. Handle concentrated materials carefully and always in a well ventilated area.
5. Do not work in sprayed areas unless properly protected (see below).
6. Do not eat, drink or smoke when using herbicides, and wash before eating, drinking or smoking.
7. Do not leave herbicides or empty containers lying around.
8. Dispose of empty containers according to label instructions.
9. Do not combine herbicides.
10. In the event of a spill, have a supply of absorbent material nearby, such as commercial absorbents or cat litter. For spills greater than one litre, the Ministry of the Environment reporting requirements should be followed. The 24-hour spills hotline number is 1-800-268-6060.
11. Shower and change clothes immediately after applying herbicide. Wash clothes separately from other laundry.
12. Transport herbicides in the open box of a truck, not in the passenger area.
13. Do not re-enter a field until the spray has dried or the specified re-entry time on the label has elapsed.

STORING HERBICIDES

- Store out of reach of children, pets and livestock.
- Store in a locked facility.
- Store away from food for humans and feed for animals.
- Store in a ventilated, heated area.
- Store in original containers, tightly closed.

WHAT TO WEAR WHEN SPRAYING HERBICIDES

Wearing the proper equipment reduces herbicide exposure.

BODY COVERING

- Wear a long sleeved shirt and long pants.
- Coveralls over regular work clothes provide good protection.
- Coveralls that can be thrown away after spraying are available.

BOOTS

- Wear unlined rubber boots.
- Canvas and leather shoes and lined boots can absorb herbicide and it is hard to wash out.
- Always wear pant legs outside boots.

EYEWEAR

- Goggles are recommended because some herbicides can cause eye irritation.

- Do not wear contact lenses when handling or spraying herbicides because lenses can absorb herbicide.

HEADGEAR

- A waterproof hat is recommended.
- A hard hat provides adequate protection.
- Do not wear a baseball cap.

GLOVES

- Wear unlined, elbow length rubber gloves or Neoprene or PVC gloves.
- Check for leaks in the gloves before spraying by filling gloves with water or air.

RESPIRATOR

- A spraying mask provides respiratory protection against some gases and vapours.
- Make sure the proper cartridge is used. Consult manufacturer's guidelines.

