Dow AgroSciences Garlon* Ultra Herbicide

Dow AgroSciences Release* Herbicide

FACTS ON

BASAL BARK APPLICATION

With Garlon* Ultra and Release* herbicide.

Basal bark applications provide effective, highly selective control of trees and brush for industrial and forestry uses, such as conifer release or thinning. Dow AgroSciences supplies specialized vegetation management herbicides ideally suited to basal bark application:

- **Garlon Ultra for industrial vegetation management**
- **Release for forestry**

The active ingredient (triclopyr) readily penetrates the bark and enters the cambium layer of target species. From the cambium, it moves throughout the nutrient and water movement systems of the plant, even into the roots to prevent re-sprouting.

ADVANTAGES

- Effective year-round for selective control of trees and brush.
- Can be applied at any time of the year, including the winter months, except when snow or water prevents spraying at the desired height above ground level.
- Year-round usage allows efficiency in crew allocation and supervision.
- Can be used where foliar applications aren't convenient, such as on steep or uneven terrain.
- Applications are targeted, greatly reducing the potential for injury to off-target vegetation.
- Minimized impact on environmentally sensitive or erosion prone areas.

HOW BASAL BARK TREATMENTS WORK

Young bark is lipophilic, meaning its structure acts like an open lattice, and allows fatty substances to move readily within it. That is why Release or Garlon 4 mixed with an oil carrier is able to move within and through young bark tissue. Basal bark treatments work best on young tender bark.

This inward movement reaches and penetrates the cambium (conductive tissue) and results in the herbicide creating a chemical girdle of the stem. Complete control depends on the stem being entirely encircled – termed "wrap." Once the chemical girdle is formed, it acts like a physical girdle to prevent downward movement of nutrients to the roots, thus eventually killing the treated plant.

FACTORS AFFECTING TREATMENT

Optimal results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing older trees.

"Free water" on stems resulting from melting frost, wet snow or rain, causes emulsification and failure to penetrate bark. Emulsified herbicide runs down the treated stem like water, showing no evidence of "wrap." If the wetting front formed by the oil in the bark does not wrap, then control is likely to be incomplete.

FROST. If no emulsification occurs (dry frost), then the solution is working. If the oil solution does not penetrate the frost (ice), shut down the application. Watch for frost as temperature rises above 0° C and moisture appears on stems.

POTENTIAL SPRAY DRIFT. Keep application pressure low to prevent vapour drift. Small quantities of vapour drift, which may not be visible, can seriously injure susceptible plants and sensitive non-target vegetation.

RAIN. Basal bark and cut stump applications cannot be made to wet stumps or emulsification may occur and the target trees will not be controlled. However, rain immediately after an application will not affect the efficacy of the product as it will have already entered the bark.

SNOW. When snow prevents access to ground line at the base of target trees, one-sided application should be stopped. Two-sided streamline application should be used on larger stems to assure wrap.

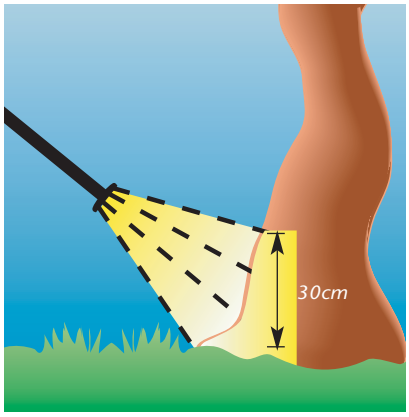
TEMPERATURE. Do not apply Garlon Ultra/Release when the temperature is below 10°C. Slight coagulation may form, which can plug spray nozzles.

APPLICATION METHODS

ONE-SIDED

This method provides good control of woody plants with stems less than 15 cm in basal diameter.

- Use 20 to 30 litres of herbicide in enough diluent to make 100 litres of spray solution (20 to 30 percent solution). Use the 30 percent solution for harder-to-control species such as hardwood trees, or when applying in the dormant season.
- On at least one side of each stem, spray the base enough to thoroughly wet the lower 30 cm, including the root collar. Do not wet to the point of runoff.
- Application should not be made if stems are wet, or have frost or snow on them, because these conditions will prevent penetration of the bark.

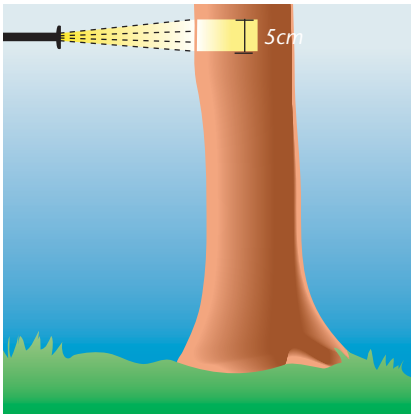


For stem less than 15cm basal diameter

Streamline

This has proven to be the fastest and most effective method of basal bark application. Best results are on young, actively growing stems less than 8 cm in diameter.

- Use 20 to 30 litres of herbicide in enough diluent to make 100 litres of spray solution (20 to 30 percent). Use the 30 percent solution for harder-to-control species such as hardwood trees, or when applying in the dormant season.
- Achieving complete "wrap" of the solution around the entire stem circumference is essential to effectiveness.
- Spray 30 to 50 cm above ground level:
  - For stems less than 8 cm basal diameter, spray a band 5 cm wide on one side of each stem.
  - For stems 8 to 15 cm basal diameter, spray a band 5 cm wide on two sides of each stem (two-sided streamline).
- With sufficient volume, the treated zone should widen to encircle the entire stem circumference within 30 minutes.

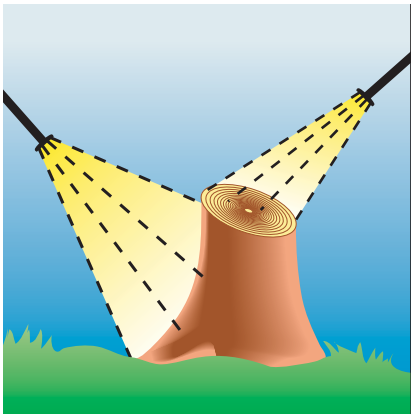


For stem less than 15cm basal diameter. Best results on stems less than 8cm basal diameter.

CUT STUMP

This method is excellent for prevention of re-sprouting. It also reduces the need for repeated cutting of large diameter stumps of species that sprout from the base or sucker from roots. Applications may be made to both old and freshly cut stumps. This provides more consistent results than treating stumps with glyphosate, which must be applied immediately after the cut is made.

- Use 20 to 30 litres of herbicide in enough diluent to make 100 litres of spray solution (20 to 30 percent). Use the 30 percent solution for harder-to-control species such as hardwood trees, or when applying in the dormant season.
- Thoroughly wet the stump, including:
  - Cut surfaces, especially the cambium layer just inside the bark.
  - The remaining bark to the ground line, including the root collar.



REQUIRED SPRAY EQUIPMENT

- **LOW PRESSURE BACKPACK SPRAYER:** Piston pump pressure control system with aflack, vicon or nitrile seals (i.e. Hardi K-15, Yardmaster™ 189). Use separate sprayers for basal bark applications to prevent emulsion from water in the backpack. Basal bark sprayers require a positive shutoff to eliminate drips and different nozzles than those for foliar applications. Many foliar sprayers also have pump pressure too high for basal bark application.
- **WAND:** Spray gun with a light trigger, shutoff at nozzle, having teflon or nitrile seals, and of a length suited to method of treatment. One-sided treatment requires wands of 16 – 18", while wands of 12 – 16" are appropriate for Streamline treatment.
- **NOZZLES:** Flat fan pattern, stainless steel, narrow angle (15º to 25º), large orifice (0.2 or 0.3) such as SS1502, SS1503, SS2502, or SS2503. On larger trees (> 8 cm dbh) where One-Sided or Cut Stump treatments are being performed, a wider angle, large orifice nozzle (2503) should be used. On smaller trees (< 5 cm dbh) where Streamline treatment is being performed, a narrow angle, small orifice nozzle (1502 or 1503) should be used.

SETTINGS FOR EFFECTIVE APPLICATION

- Lowest possible pressure to generate a straight stream "braided trickle".
- Correct nozzle orientation:
  – Streamline treatment: fan vertical.
  – One-Sided treatment: fan horizontal.
- Nozzle 2 – 4 cm from target point on stem.

CARE AND MAINTENANCE OF EQUIPMENT

- Use filter when filling.
- Tighten pump clamp ring twice daily.
- Wipe outside of pack with dry cloth/paper towel after each fill.
- Replace a main flack seal on pump every other year.
- Replace shut-off valve seat on spray gun as soon as drip occurs.
- Install higher quality braided hose on backpack immediately upon purchase.
- Support first 10 cm of hose with outer case of larger diameter hose.

MAXIMIZING EFFECTIVENESS OF BASAL BARK TREATMENTS

- Carry spare pump/operating arm link pins and hair pins.
- Carry spare nozzles, seats and changing wrench.
- In the pre-job evaluation decide on the nozzle angle, know what "wrap" is and how to use it to judge treatment effectiveness.
  – Keep pressure low, nozzle 2 – 4 cm from target and make a single, smooth treatment pass.
  – On large stems, use Streamline until "wrap" fails, then use Two-sided or Three-sided Streamline as necessary to achieve wrap within 30 minutes.
  – Speed and ease of monitoring by the sprayer are greatest with Streamline application.
  – Switch from streamline to one-sided treatment if treating a few, scattered larger stems among large numbers of smaller stems, or when treating conifers.
  – Use Two-Sided Streamline when many larger (> 6 – 12 cm diameter) stems are being treated or if any portion of the lower 30 cm of target stems have free water on them.
- Use minimum effective concentration for the target species and season of application.
- Only spray once – no back and forth or up and down.
- Do NOT pull gun "full on".
- NO DRIPS. Use a positive shutoff spray gun.
- Know what emulsification is, what it looks like and what it means: STOP SPRAYING WHEN YOU SEE IT.

PROBLEMS AND SOLUTIONS

BLOW-BY. Spray mixture sprays past target stem onto adjacent vegetation and ground or snow, making stained ground or snow behind target trees when using dye.

SOLUTIONS: Move nozzle closer to target, keep backpack pressure down, shorten dwell time, achieve a tighter sweep across target zone when using streamline treatment, change nozzle angle (i.e. from 25º to 15º fan).

SPATTER. Spray mixture "bounces" back off target stem, making "stained" ground or snow in front of target tree when using dye.

SOLUTIONS: Prevent excess pressure buildup in backpack by pump only once when pressuring backpack, pump less often, drain down pump – i.e. spray back into the tank to reduce pressure.

OVERDOSE. Spraying needless or excess amount of herbicide and diluent on treatment zone, the use of one-sided treatment when streamline treatment is sufficient and creating huge wrap on treated stems are all examples of potential overdose.

SOLUTIONS: Do not spray up and down during one-sided treatments or back and forth during streamline treatments. Use one-pass treatments, use a short and quick trigger pull (i.e. flick and let go), change nozzle to one size down (i.e. from 0.3 to 0.2).

EMULSIFICATION. Emulsifier present in Release or Garlon Ultra is activated by "free" water on the stem. The diluent/herbicide mixture is now an emulsion (oil droplets encased in water) and can no longer penetrate bark, so spray turns milky and runs down the stem instead of creeping around the stem.

SOLUTIONS: Wait for stems to dry; move treatment zone up to avoid "free water" on the base caused by melting frost, wet snow, or rain.

VOLATILITY. If mineral oil diluent is used in daytime temperatures above 25°, or on a south exposed area where "an oven" environment could occur, chemical instability of oil could lead to poor efficacy and could risk off-target damage to desirable plants.

SOLUTIONS: Change to a more appropriate diluent.

VAPORIZATION. If a backpack sprayer is over pressured, the spray solution comes out as very small particles and turns to a gas before hitting the target. A common warning sign is sprayer operators may complain of headaches. Over-pressuring lowers efficacy and increases chance for off-target injury.

SOLUTIONS: Pump only once when pressuring backpack, pump less often, drain down pump – i.e. spray back into the tank to reduce pressure.

DILUENTS

Experience has shown that off-the-shelf mineral oil such as ISOPAR®M works well and poses little risk to the environment or users. While it is not particularly harmful when in contact with skin, it will de-fat the skin (dissolve the fat near the surface) leaving white patches of skin – which if left unattended, may result in dermatitis conditions. Immediate washing with soap and water will prevent this condition. Applicators should always wear the proper personal protective equipment when dealing with diluents.

- Avoid the use of mineral oils above 25°C as they are lighter oils and have the potential to volatilize.
- Canola oil is recommended and used when daytime temperatures exceed 25°C. Canola oil is a "heavier" oil and will prevent volatilization of the solution from the stem. Canola oil cannot be used when temperatures are below 10°C, and is generally not recommended unless your average temperature during application is above 25°C. The oil becomes too thick and improper application occurs in cool temperatures.
- Do not spray when temperature exceeds 28°C.

MIXING

Place the required amount of diluent in the mixing tank, add Garlon Ultra or Release and mix thoroughly. When mixing with diluent oils, read and follow the use directions and precautions on the product label prepared by the oil manufacturer.

For more information on Garlon Ultra or Release herbicides, contact your Dow AgroSciences IVM Territory Manager or visit dowagro.ca. If you have further questions or require technical assistance, please contact the Solutions Center at 1.800.667.3852.

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