

Garlon 4

Low environmental impact control of woody plants and broadleaf weeds without harming grass.



Garlon 4 is a selective, systemic, herbicide with application flexibility that provides selective control of hard-to-control deciduous trees, pine and broadleaf weeds without harming grass. It is registered to control many broadleaf weeds and woody plants on sites and rights-of-way, pipelines, roadways, railways and electrical power lines including military bases, airports, industrial manufacturing and storage sites. Garlon 4 is non-residual in the soil and degrades quickly in the environment, giving it a favorable environmental profile.

Product features

- Broad spectrum control of deciduous brush and broadleaf weeds
- Control of entire plant down to the root
- Fast visual evidence of activity
- Low environmental impact
- Service and support by the leader in industrial vegetation herbicides

Vegetation management benefits

- A single pass to control target vegetation simplifies management and saves time
- Reduces regrowth and extends time between control cycles
- Reduces risk application
- Confidence and peace of mind in the application decision

Vegetation controlled

Garlon 4 is registered for control of the following:

Woody plants: Alder, ash, aspen, basswood, beech, birch, blackberry, buckthorn, cherry[†], chokecherry[†], cottonwood, dogwood, elderberry, elm[†], hawthorn, hickory, hop-hornbeam, honey locust[†], locust, maples, mulberry, oaks[†], poison oak, pines[†], poplar, red maple[†], raspberry[†], sassafras, sumac, sycamore, tamarack, wild rose, willow, witch hazel.

Broadleaf weeds: Burdock, chicory, curled dock, dandelion, field bindweed, lamb's-quarters, ragweed, smartweed, smooth bedstraw, vetch, wild lettuce.

[†]Higher rates recommended to minimize a possible need to retreat the following year. See label for detailed rates and directions for application.

Application methods

Include broadcast foliar, direct spray (hose and hard gun) and basal bark.

- Foliar applications achieve maximum effectiveness after full leaf development, when soil moisture is adequate for normal plant growth and prior to autumn coloration of leaves.
- Basal bark application, where triclopyr penetrates the cambium region of the woody stem, are effective year-round provided there is no moisture or frost present on the stems. (See Dow AgroSciences fact sheet "Facts on Basal Bark Application" for complete details on basal bark application).

Mode of action

Garlon 4 contains 480 g/L of the active ingredient triclopyr ester. Triclopyr is a plant growth regulator herbicide that mimics growth hormones found exclusively in plants. When applied to leaves and stems, triclopyr uses the plant's own water and nutrient transportation system to move into the leaves and roots. It then initiates rapid mature cell growth, which causes cell walls to rupture. This hinders the plant's ability to move food and use energy from the leaves, causing the plant to die.

Fate in soil

Garlon 4 binds (adsorbs) to soil particles and following rainfall, tends to stay within 30 cm of the surface. There is little risk of triclopyr reaching groundwater, and it poses no significant environmental hazard due to leaching.

In the soil, Garlon 4 undergoes degradation by soil micro organisms (fungi and bacteria) and sunlight. Final breakdown products are carbon dioxide, water and organic acids. The average half-life of triclopyr in the soil is 30 – 46 days.

Fate in water

Like most herbicides, Garlon 4 is not approved for application to water surfaces, and should be kept out of lakes, ponds and streams. Always maintain all provincially mandated buffer zones on water bodies.

Even if Garlon 4 inadvertently reaches water, it dissipates through a variety of environmental processes that collectively remove it very rapidly. It undergoes simple hydrolysis in water to form triclopyr acid, which breaks down through exposure to ultraviolet rays in sunlight (photolysis).

Vegetation management with herbicides

Using a herbicide such as Garlon 4 provides selective vegetation control, i.e. ends growth of targeted woody plants and weeds without harming established grass. This leaves the grass cover to provide competition, making it harder for new weeds and brush to establish. This provides a management tool for preventing unwanted vegetation growth on electrical utility, gas pipeline, rail and road rights-of-way and around airports and industrial sites.

Selective herbicides can be a safe, simple, cost effective alternative to mechanical control methods such as trimming and mowing when companies need to manage unwanted weeds and brush to ensure the reliability and safety of the services they offer or perform.

Electrical utilities must limit service interruptions, ensuring branches do not contact power lines or prevent electricity from reaching the consumer. During routine maintenance and repair, crews have to access substations, power lines, poles and towers easily and safely.

Highway vegetation management helps ensure motorist safety by controlling encroaching weeds and brush that can conceal road signs, emerging wildlife and intersecting or oncoming traffic. Without vegetation control, snow may get trapped and drift across roadways.

Railway vegetation hazards include weeds that reduce traction, hide damaged equipment during inspections, limit motorists' line of sight at crossings and cause drainage problems that lead to deteriorating ties and destabilized track beds.

Pipeline lines of sight that remain clear are important so that inspection and repair crews can spot leaks or repair problems.

Airports need to keep vegetation low to provide safe runoff areas. Long term control of vegetation and minimizing the activity near landing runways increases airport safety.

Industrial sites need vegetation management to prevent brush and weeds that can interfere with operations, create fire hazards and decrease the security provided by protective fences.

Integrated pest management (IPM) focuses on the judicious, integrated use of selected, but different vegetation control techniques to achieve maximum results, at affordable costs, and with minimal environmental impact. IPM helps vegetation managers meet their efficacy, budgetary, social, environmental and safety goals.

- By establishing longer maintenance cycles, herbicide treated areas require less frequent intervention and lower costs than mechanical methods.
- Herbicides also effectively control tree roots, which eliminates undesirable vegetation and allows low-growing plants to form a barrier against invading brush, weeds and tall-growing trees.
- Mechanical methods result in higher worker injury rates; insurance coverage costs less for herbicide treatments. An article generated from Ontario Worker's Compensation data reports that injuries on manual tending programs occur 14 times more frequently than reportable injuries from herbicide tending programs.

Prescriptive treatment methods such as the use of Garlon 4 save companies product costs through efficient, effective applications. Research clearly shows that herbicides increase control and reduce vegetation management costs.

- By leaving roots intact, hand cutting and mowing results in strong plant regeneration. For every one cut stem of a poplar or birch tree, an average of 18 more stems grow back.^{2,3}

Environment and wildlife impact

When it comes to vegetation control, research recommends herbicide applications over mechanical methods for three major reasons.

1. Mowing can cause ground damage. Heavy machinery use can also lead to slumping, rutting, soil compaction and soil erosion. Herbicides don't pose these ground hazards.
2. Mechanical methods often destroy all desirable right of way vegetation, prohibiting future plant diversity and opening the door to undesirable invasive plants.

3. Mechanical methods that clear vegetation can disturb or destroy nesting habitats and kill animals that come in contact with the large machines.

Researched thoroughly by Purdue University, the "Edge Effect" identifies three zones: wire zone (e.g. under directly under the transmission wires), border zone and forest. The combination of low grass cover in the wire zone, shrubby border zones and tall forest alongside produces an excellent habitat for diverse species of wildlife on electrical utility rights-of-way.¹

As highlighted in research¹. The edge or border zone serves as the busiest wildlife area. It possesses more individual creatures, and has three times the animal variety of most other communities, so preventing tall forest encroachment is important.

The plant diversity that results from herbicide methods increases food and ground cover for some wildlife populations, increasing animal diversity within the right of way. Mechanical methods, by contrast, thoroughly disturb the plants, insects and animals of the area for a very long time.

Grazing and forage tolerances

Triclopyr, the active ingredient in Garlon 4, does not bio-accumulate in body tissues. Animal metabolism studies demonstrate that triclopyr is rapidly excreted unchanged, primarily in the urine.

After treatment with Garlon 4, areas may be grazed by livestock or harvested for forage. See label for specific details on intervals.

Superior Service and Support

Garlon 4 is a product you can use with confidence, because we at Dow AgroSciences strive to reduce risk and continuously improve through effective management systems. Our Emergency Response Tech Advisors are on call 24 hours a day 7 days a week in the unlikely event of an emergency.

Garlon 4 toxicological information

The following detailed data can serve as guidelines for human and environmental safety. Always read and follow label and Material Safety Data Sheet (MSDS) directions to prevent unnecessary exposure. The active ingredient in Garlon 4 is triclopyr BE ester.

Oral toxicity

Oral toxicity is moderate. Although small amounts of Garlon 4 swallowed incidental to handling are unlikely to cause injury, avoid contact with the mouth. The Oral LD⁵⁰ for Garlon 4 (triclopyr BE ester) is 1,581 mg/kg for male rats.

Chronic toxicity to mammals

Long term testing has produced no evidence that triclopyr causes carcinogenic, mutagenic or teratogenic effects in mammals. Mammals do not metabolize triclopyr. If ingested, triclopyr is rapidly excreted unchanged. Animal studies have shown that triclopyr consumed in the diet will be cleared from the body within 3 days of intake, with no accumulation in the body organs.

Skin contact

A single, prolonged exposure to undiluted Garlon 4 is unlikely to be absorbed through the skin in harmful amounts. Prolonged or repeated exposure may cause allergic reactions in some individuals. No allergic skin reaction is expected with the product as diluted for use in the field. Wear personal protective equipment specified on the label. The Dermal LD⁵⁰ for Garlon 4 (triclopyr BE ester) is 2,315 mg/kg for male rabbits.

Eye contact

When handled in a manner consistent with proper operator-use procedures as specified on the product label, it is unlikely that undiluted Garlon 4 will come in contact with eyes. If however, undiluted Garlon 4 does come in contact with eyes, it may cause temporary irritation. Flush eyes with plenty of water and seek medical attention.

Toxicity to aquatic organisms

Under proper operator-use procedures as specified on the product label, Garlon 4 poses no threat to aquatic organisms. Triclopyr has a very low toxicity to aquatic organisms. When formulated as Garlon 4, triclopyr BE ester has a higher toxicity, but in water it rapidly degrades to triclopyr acid, which is virtually non-toxic. Garlon 4 is not labelled for application to water surfaces.

Questions and answers about Garlon 4

Why a herbicide? Why not just cut the vegetation?

Besides being very labor intensive, mowing creates multiple resprouts, the plant's natural response to cutting. This only worsens the vegetation problem and requires more frequent management. Garlon 4 eliminates resprouting. Because of this improved control, crews and machinery visit the site less often and have less impact.

Who will be applying Garlon 4?

A vegetation manager plans herbicide treatments and oversees crew activities. Trained, professional applicators apply Garlon 4 in designated area using approved application techniques. Applicators follow directions on the product label, which is reviewed by Health Canada's Pest Management Regulatory Agency (PMRA).

How will Garlon 4 be applied?

Options include foliar, basal bark and cut stump treatments. Foliar applications spray solution on the plant's leaves. Basal bark techniques apply small amounts of solution to the lower 30 to 50 cm of bark at the base of the plant. Cut stump applications spray or brush solution on the stump's surface after tree removal to prevent re-sprouting.

Is Garlon 4 toxic?

If ingested, Garlon 4 has low toxicity when compared to many substances we contact in daily life. For example, Garlon 4 has a similar toxicological profile to Aspirin or vitamin A, and is in fact less toxic than caffeine or nicotine. It's unlikely that anyone, including applicators, should receive a large enough dose to be harmed.

Will Garlon 4 hurt animals?

Garlon 4 affects plants only. The herbicide's active ingredient disrupts the growth process within the plant by affecting enzymes unique to plants. Garlon 4 does not have a similar effect on animals or insects, and there is a large margin of safety for birds.

For aquatic organisms, often the most sensitive organisms, Garlon 4 study results show that the moderately toxic ester formulation quickly converts to a practically non-toxic technical acid within two hours. Field trials of intentional

application to water show with Garlon 4 did not reach toxic levels for the length of time necessary to cause harm.

Can I protect myself?

Stay away from the treated area until leaves, stems and bark have dried. You can control your exposure by using common sense and avoiding the area for those few hours.

What if I ate treated berries?

You should not consume berries treated with Garlon 4. However, scientists have determined that a 150 lb. (68 kg) person could accidentally consume 10.4 liters of treated berries every day for the remainder of his or her life without experiencing any adverse effects.

What if I walk across a treated area?

Exposure may occur from walking across an area still damp from a foliar treatment. However, the dose you would receive is not likely to cause any harm. Scientists have determined that a 150 lb. (68 kg) person has a safety factor of 2,000 times over such exposure. Of course, we still do not do not recommend walking through a treated area until the vegetation has dried completely.

Will Garlon 4 harm the soil?

Garlon 4 is broken down by soil micro organisms (fungi and bacteria) and sunlight. Final breakdown products are carbon dioxide, water and other organic materials. The breakdown rate depends on rainfall, soil temperature and micro organism activity. The time for 50 percent for the active ingredient to break down ranges from 30 – 46 days.

Will Garlon 4 seep into groundwater?

It is not likely, because Garlon 4 binds tightly to soil organic matter and clay particles, and this limits its downward movement in the soil. Researchers find that most of the active ingredient remains in the upper 30 cm of the soil – far from the water table.

¹ Bramble, W.C., R.H. Yahner and W.R. Byrnes. 1992. Breeding Bird Population Changes Following Rights-of-Way Maintenance Treatments. *Journal of Aboriculture*. 18(1):23-32.

² Guggenmoos, Sig, P.Ag. 1989. Why Use Herbicides in Disturbance Line Clearance?

³ Transalta Utilities, 1991, Using Herbicides to Control Brush.

What else do you need?

For even more information on how Dow AgroSciences can meet your industrial vegetation management needs, visit our website at www.dowagro.ca.

