

Integrated Pest Management Program - IPM Manual for Home & Garden Pests in B.C. - Chapter 8

Integrated Pest Management

IPM Manual for Home and Garden Pests in British Columbia

Chapter 8: Herbicides

Learning Objectives

When you have completed this chapter, you should be able to:

1. Describe the properties of common herbicides available for yard and garden use, including:
 - weeds controlled
 - areas of use
 - activity and residual effects
 - toxicity to people, wildlife or pets
2. Describe a 'preferred' herbicide recommended for yard and garden use.
3. List higher risk herbicides and describe precautions for using them.

[↑ Top](#)

Introduction

This chapter lists the key characteristics of 10 commonly used herbicides and the active ingredients (according to a survey of BC pesticide vendors). The active ingredient is shown on every pesticide product label after the word **Guarantee**. Dispensers should have a good understanding of these pesticides because they are so frequently used around yards and gardens.

Dispensers should be able to explain how each herbicide works, the plants it controls, and safety precautions.

Preferred Herbicides: Dispensers should know which herbicide is 'preferred' for use by home and garden customers and why. Fatty acids should be the first choice for yard and garden customers because it:

- presents the least short- and long-term health risk to humans
- has the lowest environmental impact primarily due to short residual effects

Other Herbicides: Products containing more toxic or persistent chemicals are in this chapter under Other Herbicides. In general, these are products of last resort, due to their toxicity, risk of harming non-target plants, persistence or problems with storage and disposal. It is essential that customers know what safety equipment is recommended for using these herbicides.

There are other less frequently used herbicides than those described here. Dispensers should be able to look up information on these in other reference resources as needed.

If a customer has not selected a herbicide and wants to know what to use for a particular problem, see Section III, Pest Management.



Mixed Fertilizer/Herbicide Products: Using mixed products can result in unnecessary herbicide use because lawns usually need fertilizers more often than they need herbicides. In fact, a well fed and managed lawn should need little, if any, treatment with herbicides to keep it weed-free. The small amount of herbicide that may be required is best applied in spot treatments. Combination herbicide/fertilizer products should only be used on established lawns (they are damaging to new lawns), and usually as a last resort. For example, it might be appropriate to use them to renovate lawns that have severe weed infestations. Customers should be advised to use a drop spreader and not a broadcast fertilizer spreader when using combination products. This is because granules

can accidentally be thrown onto desirable vegetation, damaging or killing the plants.

**Information in this chapter is intended only as a guide.
Always apply pesticides according to directions on the label.**

[↑ Top](#)

Preferred Herbicides

Acetic Acid

General Description

- contains the same acid as in vinegar
- non-selective herbicide that acts on contact to kill foliage of most plants
- fast acting, can show results within a few hours
- no herbicidal activity in soil, non-residual

Weeds Controlled

- **annual plants:** common ragweed, chickweed, black medic and lamb's-quarters
- **perennial weeds:** provides suppression or top-kill of: dandelion, plantain (broad-leaved and narrow-leaved), wild carrot and quackgrass

Areas of Use

- Use acetic acid in and around the garden, on patios, sidewalks, driveways, under fences and around established trees and shrubs.
- Use to edge along driveways, sidewalks and to control weeds in gravel and mulch.

Application Notes

- For best results apply in sunny warm weather to actively growing young weeds less than 10 cm tall.
- Weeds that are mature, dormant or hardened due to moisture stress tend to be more tolerant to herbicide treatments.
- Retreatment of large weeds and regrowth of perennial weeds will be required.

Precautions

- Avoid contact with skin, eyes and clothing. Wash immediately after use.
- Avoid all contact with desirable plants. Overspray or drift will injure contacted foliage.
- Avoid application to reactive metals such as aluminum, tin, iron, or items such as fencing or lawn furniture in order to prevent staining, mottling, or otherwise interfering with finished metal surfaces.

Health and Environmental Information

- very low mammalian toxicity
- moderately irritating to skin, eyes and throat
- low toxicity to fish and wildlife
- non-persistent
- keep out of all bodies of water

 [Top](#)

Corn Gluten Meal

General Description

- pre-emergent weed seed germination inhibitor
- for use in established lawns

Weeds Controlled

- dandelion
- smooth crabgrass

Areas of Use

- in established lawns

Application Notes

- May inhibit dandelions and smooth crabgrass seed germination when used in conjunction with a sound lawn maintenance program.
- Established smooth crabgrass and dandelions at time of application will not be inhibited.

Precautions

- Should not be applied if a member of the household has a sensitivity or allergy to corn.
- Avoid contact with skin, eyes or clothing.
- Avoid inhaling dusts.
- Wear a long-sleeved shirt, long pants, closed footwear and gloves.
- Wear a dust mask when transferring the product to the spreader.
- Do not apply the product on newly seeded grass.

Health and Environmental Information

- very low mammalian toxicity
- no toxic effects have been identified in mammals, birds, or fish

 [Top](#)

Fatty Acids

General Description

- naturally occurring fatty acid compound
- non-selective herbicide that acts on contact to kill foliage of most plants
- fast acting, can show results within 2 hours
- no herbicidal activity in soil, non-residual

Weeds Controlled

- **annual plants:** grasses, redroot pigweed, lamb's- quarters, corn spurry, mustards, and chickweed
- provides suppression or top-kill of some perennials including plantain

Areas of Use

- Use fatty acids outdoors around shade trees, nurseries, parks, sidewalks, driveways, mulch, fence posts, greenhouses and before planting grasses, ornamentals and vegetables.

Application Notes

- Apply fatty acids in spring or summer to actively growing weeds less than 13 cm tall.

Precautions

- Do not plant in fatty acid treated soil for three days after treatment.
- Do not apply fatty acids if rainfall is expected within two hours.
- Avoid spray drift on desirable plants.

Health and Environmental Information

- very low mammalian toxicity
- moderately irritating to skin, eyes, and throat
- low toxicity to fish and wildlife
- non-persistent

[↑ Top](#)

Other Herbicides

Glyphosate

General Description

- synthetic amino acid herbicide
- non-selective herbicide that can kill any plant, including well-established trees
- readily absorbed through leaves and moves through stems and roots to kill entire plant
- sold as ready-to-use and concentrated liquids
- some herbicidal activity in soil, non-residual

Weeds Controlled

- annual and perennial plants: alder, bentgrass, blackberry, brush, chickweed, crabgrass, dock, grasses, horsetail, Johnsongrass, knotweed, lambsquarters, maple, milkweed, morning glory, mustards, oxalis, pigweed, plantain, poplar, purslane, quackgrass, raspberry, sedges, and thistles

Areas of Use

- outdoors around buildings, vacant lots, and storage and recreational areas
- outdoors to prepare or renovate beds before planting ornamentals, vegetables, or lawn

Application Notes

- apply to vigorously growing annuals anytime



- apply to perennials after seed heads, berries, or flowers appear
- re-treatment may be necessary as seeds continue to germinate through season
- cut large or rampantly growing vegetation (for example, blackberry, brushy species) to the ground, then treat re-growth after it sprouts from stumps
- visible symptoms may require a week or more to appear, with burndown usually in 2-4 weeks
- do not spray to the point of run-off as effectiveness is reduced if glyphosate is over-applied (because top dies before the plant has a chance to move the herbicide down to the roots) and there is greater risk to non-target plants

Precautions

- Do not use in vegetable gardens, flower beds, around shrubs or ornamental plants, or on lawns because it can kill or damage any plant contacted.
- Mix concentrates only with clean water; dirty water will deactivate the glyphosate.
- Avoid drift or accidental application to desirable plants (do not spray in windy conditions), damage to non-target plants from glyphosate drift is quite common.
- Do not apply if rainfall is forecast for the time of application (rainfall occurring within six hours of application will reduce effectiveness).
- Do not mix or store in galvanized metal containers as it can react with the metal to release gases.

Health and Environmental Information

- low mammalian toxicity
- may cause eye and skin irritation
- low toxicity to fish, birds and other wildlife
- moderately persistent in soil (though not herbicidal), depending on conditions

 [Top](#)

2, 4-D*, Dicamba & Mecoprop (Used as a Mixture or Separately)

General Description

- synthetic herbicides that control broadleaf plants only and do not affect grasses
- absorbed into plant cells and disrupts plant growth
- sold as ready-to-use liquids, concentrated liquids or granular formulations
- also sold in mixtures with fertilizers
- moderate to long residual effects (dicamba has the longest effects, lasting 3-12 months)

Weeds Controlled

- **Mixture:** a wide range of annual and perennial broad-leaf plants
- **2,4-D alone:** bindweed, catsear, dandelions, heal-all, knapweeds, morning glory, pearlwort, pigweed, and plantain

- **Dicamba alone:** buckwheats, chickweed, clover, dock, English daisy, knotweed, smartweed, thistles, and velvetleaf
- **Mecoprop alone:** black medic, buttercup, chickweed, clover, corn spurry, dock, English daisy, knotweed, lambsquarters, mallow, mustards, oxalis, plantain, purslane, and veronica

Areas of Use

- use outdoors on lawns and non-crop areas

Application Notes

- post-emergence herbicides
- dicamba is also used as a pre-plant and pre-emergence herbicide
- post-emergence herbicides are most effective on young, rapidly growing plants
- temperature during application should be between 10°C and 32°C
- use a drop spreader when applying combination fertilizers and herbicides
- mecoprop acts relatively slowly, requiring 3-4 weeks for control

Precautions

- Do not use for controlling weeds in vegetable gardens, flower beds, around shrubs or ornamental plants.
- Apply only to well-established lawns and do not use on lawns that are drought-stressed and or in unusually hot or wet weather.
- Avoid drift or accidental application to desirable plants. (do not spray in windy conditions or use broadcast spreaders for granular formulations).

Note: Misapplication of 2, 4-D and dicamba are a common cause of reduced vigour or death of lawns, trees and shrubs

* 2,4-Dichlorophenoxyacetic Acid

Health and Environmental Information

2, 4-D

- moderate mammalian toxicity and a suspected endocrine disrupting chemical
- moderately toxic to birds and other wildlife
- low toxicity to honeybees and earthworms
- persists 1-4 weeks in soils, longer in cold, dry soil

Dicamba and Mecoprop

- low mammalian toxicity
- may cause eye irritation
- low toxicity to fish and wildlife
- may persist in soils in dry conditions
- relatively mobile in moist soil (dicamba only)

Soil Sterilants – Amitrole, Borate, Bromacil, Dichlobenil, Simazine

General Description

- synthetic insecticides with long residual effects on all plants
- sold as ready-to-use and concentrated liquids and granulars
- also sold mixed with other herbicides

Amitrole

- synthetic triazole herbicide
- post-emergence herbicide
- absorbed by roots and foliage and moves through plant to growing tips
- moderate residual effect, generally persists in soil 2-4 weeks

Borate

- manufactured from borax, which is mined from deposits in the earth
- pre-emergence and post-emergence herbicide
- absorbed through roots and causes plant tissues to dry up
- long residual effect, sterilizes soil up to one season

Bromacil

- synthetic uracil herbicide
- post-emergence herbicide
- absorbed through roots and moves through growing plant
- long residual effect, persists in soil up to six months

Dichlobenil

- synthetic benzonitrile compound
- pre-emergence herbicide for germinating annual and perennial seedlings
- affects growing tips of plant roots
- long residual effects, persists in soil 2-12 months

Simazine

- synthetic triazine compound
- pre-emergence herbicide (at low rates) for germinating annual and perennial seeds
- post-emergence herbicide (at higher rates) to kill all vegetation
- absorbed through roots, moved to growing shoots
- long residual effects, breaks down slowly in soil, not readily leached from soil

Weeds Controlled

- annual and perennial broad-leaved plants and grasses

Areas of Use

- outdoors around driveways, walkways, patios, walls, fences, and similar areas
- simazine and dichlobenil at low rates can be applied around some well-established woody plants to control weeds if proper precautions are taken (follow label directions carefully)

Application Notes

- make sure no roots of non-target plants reach into the treatment areas as they will take up the herbicide and be killed. Unless stated otherwise on the label, to protect desirable plants, applications should be kept at least two metres out from the drip line or from where the roots may be expected to reach
- unless otherwise stated on the label, applications should be no closer to a tree than a distance equal to twice the height of the tree
- do not apply to slopes or flood the area after applying soil sterilants as they can move downhill to non-target plantings via irrigation or rainfall runoff

Precautions

- Do not use soil sterilants to control weeds in lawns, vegetable beds, or flower beds during the growing season. Some products can be used on established woody planting and during the dormant season.
- Use only around woody ornamentals and trees listed on the labels.
- Avoid drift or accidental application to desirable plants. Do not spray in windy conditions or apply where runoff can move the chemical out of the treatment area.
- Some products can make an area unsuitable for growing plants for up to two years and remain phytotoxic for up to five years.

Health and Environmental Information

- low mammalian toxicity; amitrole is a suspected endocrine disrupting chemical
- some products may cause skin and eye irritations
- low toxicity to fish and wildlife
- moderately to extremely persistent in the environment

 [Top](#)

STUDY QUESTIONS

Answers are provided [here](#).

1. Describe the difference between a foliar applied herbicide and a soil sterilant with respect to where they are used and persistence in the environment.

2. List three herbicides that control broadleaf plants but not grasses.
3. List three precautions for using glyphosate.

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