



Pest Management Guide

HAZELNUT

Hazelnut Pest Management Guide for BC Commercial Growers

September 2004 Edition

This guide is produced for commercial growers and includes currently recommended practices for pest control in hazelnuts. It includes only products that are registered for use in Canada at the time of publication, and are available in BC.

When planning a spray program, follow integrated pest management (IPM) principles to avoid unnecessary pesticide sprays. These principles are given in the Berry Production Guide (BCMAL and LMHIA publication).

Follow the pesticide recommendations in this guide to avoid excessive residues on food crops. Exceeding recommended rates or decreasing the days before harvest can result in high pesticide residues. Be sure to read the label on the pesticide container for complete instructions, warnings and legal restrictions regarding the use of the pesticide.

The label is the legal document concerning the pesticide use. Crops found with high residues or residues of unregistered pesticides can be seized and destroyed by the Health Protection Branch of Health



Canada. For more information on the safe use of pesticides and calibrating sprayers refer to the 2002/03 Berry Production Guide (BCMAL and LMHIA) available from the Lower Mainland Horticultural Improvement Association (LMHIA).

Pesticide registrations and residue tolerances may vary in countries to which fresh or processed crops or products are exported. If the crop is to be exported, use products that have acceptable residue tolerances in the country of destination. Other products should not be used.

The BC Ministry of Agriculture and Lands does not assume liability for crop loss, animal loss, health, safety or environmental hazards caused by the use of products or practices listed in this guide.

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Weeds	Registered product	Application rate	Directions for use; comments
Residual control of most seedling weeds	Princep Nine-T WDG (simazine)	2.0 – 2.5 kg/ha (0.8 – 1 kg/acre)	Apply in the early spring, to trees established at least one year, before the seedling weeds emerge. If weeds are present, tank mix with 5 L/ha Gramoxone – see “Gramoxone – Directions for use” below. Simazine requires rainfall to be activated.
Emerged weeds	glyphosate (e.g. Roundup Original, Roundup Transorb Liquid) Or glyphosate (e.g. Roundup Dry)	2.25 – 3.5 L/ha (0.9 – 1.4 L/acre) 1.26 – 1.96 kg/ha (0.5 – 0.8 kg/acre)	For use in plantings established more than one year. Avoid contact or drift onto hazelnut leaves or green bark. Provides non-selective, non-residual weed control. Use higher rates for established and hard-to-control weeds. Apply as a directed spray to the weeds near the base of the tree using low pressure (less than 275 k Pa). Do not apply within 14 days of harvest.
Emerged weeds and green suckers	Gramoxone (paraquat) [⚠]	75 ml/10L water for directed spot treatment of green suckers or 2.8 – 5.6 L in 550 – 1100 L of water/ha (1.1 – 2.3 L in 225 – 500 L of water/acre) or apply 5.0 L of Gramoxone plus 2.0 – 2.5 kg/ha of Princep Nine-T for residual annual weed control.	For use in plantings established more than one year. Provides non-selective, temporary weed control. Avoid contact or drift onto hazelnut leaves and desired green growth. Applications made under low sunlight condition enable greater translocation within the weeds and thus improved root-kill. Use higher rates for established and hard-to-kill weeds. For green sucker control, use the higher rates and apply thorough coverage to the point of run-off.
Insects	Registered product	Application rate	Directions for use; comments
Aphids	Clean Crop Lagon 480 (dimethoate)	5 L/ha (2 L/acre)	Several aphid types attack hazelnuts. New leaves usually curl; old leaves become sticky from honeydew. Heavy infestations reduce nut size and yield so should be controlled. Apply primarily on young trees when aphids appear. Use reduced rate for smaller, immature trees. Do not apply within 45 days of harvest. One application per year.
	Lorsban 4E (chlorpyrifos)	4.2 – 4.8 L/ha (1.7 – 1.9 L/acre)	Apply a minimum of 100 L of spray per hectare. (40 L/acre). Apply a maximum of 3 ground applications per year. Use lower rate for smaller trees. Do not apply within 14 days of harvest.
Leafrollers	Dipel 2X DF	1125-1675 g/ha 455-678g/acre	Use sufficient volume to obtain good coverage. Treat both surfaces of foliage. Apply when caterpillars are young. Repeat as necessary. Apply up to day of harvest.

Note: Ladybird beetles and other naturally occurring control agents frequently provide adequate aphid control, especially in mature orchards. To avoid harming the biological control agents and to minimize expenses, aphid control sprays should only be applied when natural control is inadequate.

[⚠]Although the toxicity rating of Gramoxone (paraquat) has not been clearly established as “very toxic” there is no doubt that swallowing it could be fatal. There is no specific antidote for Gramoxone (paraquat). Use extreme precautions to avoid accidental swallowing of this herbicide.

Diseases	Registered product	Application rate	Directions for use; comments
Bacterial blight (<i>Xanthomonas arboricola</i> pv. <i>corylina</i>)	Guardsman Copper oxychloride 50 WP or UAP Copper Spray (PCP #19146).	3 – 9 kg/ha in 1000 L of water (0.8 – 2.4 kg/acre in 400 L of water) Use a spreader sticker.	Apply the first spray in late August/early September before the start of the fall rains and nut drop. Repeat after harvest at ¾ leaf fall. Repeat early spring just before leaf bud break. Use the higher rate on mature trees and a lower rate on small trees in proportionately less water.
	Disinfectant treatments for pruners		Bacteria are readily spread by infested pruning tools. There are several disinfectants that can be used to clean pruning equipment.
Disinfectants 5% Virkon 10% bleach* DCD Floralife (16 mL/L) Ethanol 70%	Treatment time quick dip quick dip quick dip 20 seconds		
Eastern Filbert Blight (<i>Anisogramma anomala</i>)	Guardsman Copper Oxychloride 50 (PCP #13245) or UAP Copper Spray (PCP #19146)	3 - 9 kg/ha Apply in 1000 L of water per hectare.	Apply during the spring at bud swell and repeat at 10-14 days intervals for a maximum of 3 applications/year. Use low rate on small trees, and high rate on large trees. May be applied up to 1 day before harvest.
	QUADRIS Flowable Fungicide (250 g/L azoxystrobin)	900 mL/ha Apply in 1000 L of water per hectare.	Apply from bud swell to bud break (approximately mid March to mid May), when tissues are susceptible. The label recommends 2 sequential applications followed by 2 or more applications of fungicides with different modes of action (copper). Do not use within 45 days of harvest. Do not allow drift onto apple or crabapple.

Diseases

Bacterial blight

(*Xanthomonas arboricola* pv. *corylina* (formerly *X. campestris* pv. *corylina*))

The bacteria enter trees via pruning cuts, wounds, fresh leaf scars and frost injured tissue. It is favoured by wet periods with temperatures above 20 °C although it can occur at lower temperatures.

Disease incidence also seems to increase following freezing weather. This may be because the trees are weakened, or because there may be more entry sites through wounds.

Symptoms include brown shrivelled buds, brown leaf spots and reddish-brown slightly sunken cankers on the bark. Clusters of dead leaves that remain attached to dead branches in the fall are readily noticeable. Bacterial blight should not be confused with eastern filbert blight which is caused by a fungus.

Bacteria are readily spread by infested pruning tools. There are several disinfectants that can be used to clean pruning equipment (see table).

Sprays do not cure infections but can protect trees against new infection. If blight is discovered, several copper sprays per season are required plus pruning to remove infected wood. Cut at least 60 cm below the canker. Remove and destroy prunings.

For more information refer to the factsheet *Control of Bacterial Blight of Hazelnut* available on the BCMAL website at:

www.al.gov.bc.ca/cropprot/hazelnutblight.htm.

Eastern Filbert Blight

(*Anisogramma anomala*)

In spring, spores are released from mature cankers in infected hazelnut trees. Wind-driven rain spreads spores to young, developing shoots, where infection occurs. No symptoms are visible for approximately 15 months. The second summer following infection, the fungus starts to produce the spore-producing structures that are used for identification. These structures will release spores the following spring.

Scouting for symptoms is critical to the management of this disease. Prune out any diseased cankers about 2-3 feet below the site of infection and burn diseased wood.

Preventative sprays at bud break with copper oxychloride or Quadris (azoxystrobin) will help to prevent new infections of eastern filbert blight. This preventative action is strongly recommended for cultivars that are highly susceptible (Ennis and Daviana). Protective sprays may also be warranted for the moderately susceptible varieties (Barcelona, Du Chilly, Butler, and others). A second application 2-4 weeks after the first spray has been shown to improve disease control.

For more information refer to the factsheet *Eastern Filbert Blight* on the BCMAL website at: www.al.gov.bc.ca/cropprot/filbertblight.htm

Pesticide Safety - Emergency Response

- Know the poisoning symptoms of the pesticides that are used. Read pesticide labels for symptoms. Effects from pesticide poisoning vary from person to person and are often difficult to recognize. Some poisoning symptoms are headache, tiredness, nausea, dizziness, irritation of the skin or nose or throat, blurred vision, tiny pupils, trembling, perspiration, difficult breathing, vomiting, and unconsciousness. Call a doctor or the Poison Control Centre immediately if poisoning is suspected. Follow their instructions.
- Keep the phone numbers for Poison Control Centre, doctor, ambulance, and Provincial Emergency number 1-800-663-3456 nearby. The Poison Control Centre phone number is in the front of the telephone book.
- Have protective gear and equipment easily available.
- Keep absorptive material, a container for contaminated waste, tools to pick up contaminated material, bleach, and hydrated lime available.

First Aid

Make sure that all people working on the farm know what to do in case of an emergency. Consider taking a first aid course and CPR course.

If someone has been poisoned:

1. Protect yourself.
2. Move the victim from the area of contamination.
3. Check if the victim is breathing. If breathing has stopped or is very weak, clear the airway and begin artificial respiration. Continue until the victim is breathing normally or until medical help arrives. When doing mouth-to-mouth resuscitation, use a plastic mask to protect yourself from poison.
4. Call the Poison Control Centre, doctor or ambulance. Be ready to tell them the pesticide name and PCP Act registration number.
5. Unless the doctor or Poison Control Centre tells you otherwise, follow the procedures listed below, then;
6. Transport the patient to the nearest hospital.

If a pesticide contacts the eyes, put on waterproof gloves and hold the eyelids open and rinse with clean water for 15 minutes or more. Do not use an eye cup.

If pesticide contacts the skin, put on waterproof gloves, remove the contaminated clothing, and wash the affected area of the skin with lots of soap and water.

If pesticide was breathed in, take the victim to fresh air as quickly as possible; loosen tight clothing and watch for signs of unconsciousness or convulsions. Keep the airway open and begin resuscitation if breathing has stopped or is difficult. Use a plastic face mask to protect yourself.

If a pesticide is swallowed check the label to see if vomiting is recommended. Do not induce vomiting if:

- the label says not to,
- the substance swallowed contains a petroleum product,
- the victim is unconscious or convulsing, or
- if the substance is corrosive.

To induce vomiting, give the victim water and tickle the back of the throat and tongue with your finger. If the victim cannot sit, place the person face down on his or her side. Keep the airway free of vomitus.

If a corrosive substance was swallowed and the victim is conscious and able to swallow, give him or her a half to full glass of milk or water. Do not give large amounts to drink as it may induce vomiting.

Warning: Do not induce vomiting if an acid, alkali or petroleum product is swallowed.