Publication 360D

Crop Protection Guide for Tender Fruit

2021

Ministry of Agriculture,
Food and Rural Affairs

Ontario

Discard old editions of this publication. Each year a committee comprised of representatives from provincial government, industry, academia and grower organizations review the pesticides listed in the publication.

To the best knowledge of the committee, at the time of publishing, the pesticide products listed in this publication were federally registered.

The information in this publication is general information only. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) does not offer any warranty or guarantee, nor does it assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

This publication lists a number of brand names of pesticides. It is neither an endorsement of the product nor a suggestion that similar products are ineffective.

THE PESTICIDE LABEL

Consult each product label before you use a pesticide. The label provides specific information on how to use the product safely, hazards, restrictions on use, compatibility with other products, the effect of environmental conditions, etc.

The pesticide product label is a legal document. Follow all label instructions.

REGISTRATION OF PESTICIDE PRODUCTS

The Pest Management Regulatory Agency (PMRA) of Health Canada registers pesticide products for use in Canada following an evaluation of scientific data to ensure that the product has value, and the human health and environmental risks associated with its proposed use are acceptable.

1. Full Registration

Pesticide registrations are normally granted for a period of 5 years, subject to renewal.

2. Emergency Registration

An emergency registration is a temporary, time-limited registration of no more than 1 year, approved to deal with serious pest outbreaks. An emergency is generally deemed to exist when both of the following criteria are met:

A. An unexpected and unmanageable pest outbreak or pest situation occurs that can cause significant health, environmental or economic problems; and

B. Registered pesticides and cultural control methods or practices are insufficient to address the pest outbreak.

MAXIMUM RESIDUE LIMITS

The PMRA has established maximum residue limits (MRLs) for pesticides. An MRL is the maximum amount of pesticide residue that may remain on food after a pesticide is applied as per label directions and which can safely be consumed. Processors or retailers may demand more restrictive limits. Growers should seek advice of their intended market to determine if more restrictive limitations apply. Keep accurate and up-to-date records on pesticide use in each crop.

SUPPLEMENTAL/AMENDED LABELS

Supplemental/amended labels provide label directions for new approved uses for a registered pesticide that do not appear on the current label. These label directions MUST be followed when using the pesticide for these purposes.

Examples of when you must use a supplemental/amended label include:

- **Emergency Use Registration**
- **Minor Use Label Expansion**

You can obtain a copy of a supplemental amended label from the pesticide manufacturer or pesticide vendor, the grower association that sponsored the emergency registration or minor use, from OMAFRA crop specialists or PMRA's Pest Management Information Service.

For more information on the federal registration status, check the PMRA website at www.healthcanada.gc.ca/pmra or call 1-800-267-6315.

REGULATION OF PESTICIDES IN ONTARIO

The Ontario Ministry of Environment, Conservation and Parks (MECP) is responsible for regulating pesticide sale, use, transportation, storage and disposal in Ontario.

Ontario regulates pesticides by placing appropriate education, licensing and/or permit requirements on their use, under the Pesticides Act and Regulation 63/09.

All pesticides must be used in accordance with requirements under the Pesticides Act and Regulation 63/09, which are available on the e-laws website at ontario.ca/laws or by calling the ServiceOntario Publications Toll-Free number: 1-800-668-9938 or 416-326-5300.

CLASSIFICATION OF PESTICIDES

As of May 1, 2020, Ontario's pesticides classes have been aligned with the federal government's pesticide categories to remove duplication and reduce complexity for the sale and use of pesticides in Ontario, while ensuring continued protection of human health and the environment.

MECP automatically classifies pesticides in Ontario as Class A, B, C, D or E. The Ontario pesticide classification system provides the basis for regulating the distribution, availability and use of pesticide products in Ontario. For more information on the classification of pesticides, visit the MECP website at ontario.ca/pesticides.

CERTIFICATION AND LICENSING

Growers and Their Assistants

For information about farmer training and certification requirements, visit the MECP website at ontario.ca/pesticides and for information on courses check the Ontario Pesticide Education Program website at www.opep.ca or call 1-800-652-8573.

Pesticide Commercial Applicators (Exterminators) and Their Assisting Technicians

For more information about exterminator licensing and technician training, visit:

- the Ontario Pesticide Training and Certification website at www.ontariopesticide.com or call 1-888-620-9999 or 519-674-1575
- the Pesticide Industry Council's Pesticide Technician Program website at www.horttrades.com/pesticide-technician or call 1-800-265-5656 or e-mail pic@hort-trades.com
- the Pesticide Industry Regulatory Council (PIRC) at www.oipma.ca.

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Acknowledgements

The information contained in this publication is printed following review by the Fruit Technical Working Group, comprised of representatives from provincial and federal governments, academia and industry.

If you need technical or business information

Contact the Agricultural Information Contact Centre at
1-877-424-1300
ag.info.omafra@ontario.ca

Looking for fruit production information on the Internet?

Check the OMAFRA website at ontario.ca/crops

This publication contains pesticide control products that have been registered as of October 31, 2020, on fruit crops. Any updates to this information will be posted on the OMAFRA website at ontario.ca/crops

Cover Images

Top left: San Jose scale on plum
Top right: Pear infected with fire blight
Bottom: Peach with brown rot

COMING SOON!

For the 2022 growing season, you will be able to access the information currently listed in this publication through a new, digital application.

The application will replace OMAFRA's crop protection publications and provide you with information in one single location.

This one-stop tool for crop protection information will allow you to:

- ✔ customize and navigate through information based on your specific needs;
- ✔ access information when you need it to make important business decisions; and
- ✔ access information digitally, either through desktop, tablet or mobile.

Updates can be found at:
ontario.ca/crops

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Introduction

Products Listed in This Publication

- Products listed in this publication are registered for use on tender fruit in Ontario as of October 31, 2020. The information contained in this publication is provided as a guideline only and has been prepared in consultation with the Fruit Technical Working Group, comprised of representatives from provincial and federal governments, academia and industry.
- Products are organized by pest. Many products are under re-evaluation by the Pest Management Regulatory Agency (PMRA) and may change within the lifetime of this publication. Consult each product label before you use a pest control product. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php.

Levels of Control for Fungicides and Insecticides/Miticides

The value of all insecticides, miticides and fungicides is evaluated by the PMRA prior to registration, which includes an assessment of efficacy. Wording on the product label such as control, suppression or partial suppression is used to describe the level of pest management provided by these products. The definitions of "control" and "suppression" for insecticides have a somewhat different meaning than the same terms applied to fungicides, according to the PMRA's *Value Guidelines for New Plant Protection Products and Label Amendments*.

Fungicides

Control: A consistent level of disease management, as defined by commercial standards and expectations in the market. In general, disease control ratings would be between 80%–100%.

Suppression: A consistent level of disease management that is less than full control, as defined by commercial standards and expectations in the market. In general, disease control ratings would be between 60%–100%. Suppression is defined as consistent disease reduction to a level that is not optimal but is still of commercial benefit.

Partial suppression: A level of disease management that is less than suppression, as defined by the commercial standards and expectations in the market. This label claim will generally only be considered for non-conventional fungicides. In general, disease control ratings would be less than 60%.

Insecticides/Miticides

Control: The product, when applied in accordance with the label directions, consistently reduces pest numbers or pest damage to a commercially acceptable level.

Suppression: The product, when applied in accordance with the label directions, does not reduce pest populations or damage to a level typically required to achieve commercially acceptable control. Under such situations, the level of performance offered by the product should still have value in a pest management program.

Source: Pest Management Regulatory Agency (PMRA), 2016.

> **Note**: These guidelines are currently suggestions and are under review by the PMRA. Current, approved Canadian labels may also include a statement "reduction in damage from" the target pest. This is an undefined level of control less than suppression, and this statement is still under review with the PMRA.

It is important to consider the level of control of a product and how it is incorporated into a pest management program. Together with cultural control, biological control or promoting natural enemies, products used for suppression might be enough to prevent significant crop damage. Products labelled for suppression may also play a role in resistance management. By alternating with products from different families, the risk of pest resistance to important products can be reduced. However, when using a new product for pest suppression, try to leave an untreated check and evaluate the benefits of using these products compared to the cost of application.

1. Using Pesticides in Ontario

Visit www.ontario.ca/usingpesticides for up-to-date information on provincial pesticide use requirements. Some of the information provided in this generic chapter may not apply to all crops.

Read the label before use.

Product labels may change.

Review the Grower Pesticide Safety Course Manual at https://www.opep.ca/courses/pick-up-a-gpsc-manual/

Keep detailed spray records.

Federal Registration of Pesticides

Before a pesticide (pest control product) can be sold or used in Ontario, it must be registered under the federal *Pest Control Products Act* (PCP Act). The Pest Management Regulatory Agency (PMRA) of Health Canada registers pesticides for use in Canada following an evaluation of scientific data to ensure that any human health and environmental risks associated with its proposed uses are acceptable, and that the products have value.

The PMRA re-evaluates registered pesticides to determine whether today's health and environmental protection standards are still met when the pesticide is used according to the label. The PMRA also assesses whether the pesticide still has value. Re-evaluations are initiated every 15 years. Outcomes of a re-evaluation can be:

- no change to the registration
- amendments to the label (e.g., changes to personal protective equipment requirements, restricted entry intervals, buffer zones)
- modifications to existing Maximum Residue Limits (MRLs)
- elimination or phasing-out of certain uses or formulations
- discontinuation of the registration

A special review of a registered pesticide can be initiated at any time by the PMRA if the PMRA has reason to believe its use may pose unacceptable risk to human health or the environment or the pesticide no longer has value. Special reviews focus on a specific concern (e.g., neonicotinoid pesticides and impacts to pollinator health).

The pesticide label is a legal document. Follow all label directions. Labels for all registered pesticides are under "Search Pesticide Labels" on the PMRA website at www.healthcanada.gc.ca/pmra. Ensure you have the most current label and are aware of any re-evaluation decisions. Emergency registrations are temporary registrations (1 year or less) for pesticides needed by growers to manage a new invasive pest or pest outbreak. Know the expiration date for pesticides you are using under an emergency registration.

Maximum Residue Limit (MRL)

When you apply a pesticide to a crop, some residue may remain on the crop at harvest time. A Maximum Residue Limit (MRL) is the maximum amount of pesticide residue that may remain on food after a pesticide is applied as per label directions and which can safely be consumed. The PMRA sets the MRL well below a level that may cause harm to human health. The MRL is specific for every pesticide-crop combination.

The Canadian Food Inspection Agency (CFIA) is responsible for enforcing the MRLs established by the PMRA. OMAFRA's Food Inspection Branch conducts an annual Produce Food Safety Monitoring Program which involves collecting Ontario grown fresh fruits and vegetables and testing them for pesticide residues and pathogenic organisms (e.g., *Listeria monocytogenes, E. coli* O157:H7).

If you apply a pesticide at a higher rate, make too many applications or harvest a crop before the Pre- Harvest Interval has ended, there may be pesticide residues in excess of the MRLs set by PMRA.

When exporting your food product, it is important to confirm the importing country's MRLs because it may be different than ours. Processors or retailers may demand more restrictive limits. Growers should seek advice of their intended market to determine if more restrictive limitations apply. Keep accurate and up-to- date records on pesticide use in each crop.

For more information on MRLs, see:

- PMRA's MRL database at http://pr-rp.hc-sc.gc.ca/ mrl-lrm/index-eng.php provides information on established Canadian MRLs. This database includes importing MRLs that may have pesticide- crop combinations that are not registered for use in Canada. Always check the current Canadian pesticide label for registered uses.
- Global MRL Database at www.globalmrl.com provides free access to U.S. MRL information.
- Agricultural Chemical Companies can provide MRL information for their products. Companies' contact information are found on the pesticide labels, company websites and in OMAFRA's crop protection publications.
- Summaries of OMAFRA's Food Safety Monitoring Program results can be found at www.ontario.ca/producesafety.
- CFIA's Chemical Residue Surveillance Program at https://www.inspection.gc.ca/food-safety-for-industry/food-chemistry-and-microbiology/food-safety-testing-bulletin-and-reports/eng/1453324778043/1453327843364

Regulation of Pesticides in Ontario

The Ontario Ministry of the Environment, Conservation and Parks (MECP) is responsible for regulating the sale, use, transportation, storage and disposal of pesticides in Ontario. Ontario regulates pesticides by placing appropriate education, licensing and/or permit requirements on their use, under the *Pesticides Act* and Regulation 63/09. All pesticides must be used in accordance with requirements under the *Pesticides Act* and Regulation 63/09, which are available on the e-laws website at ontario.ca/laws or by calling Service Ontario at 1-800-668-9938 or 416-326-5300.

Classification of Pesticides

The PMRA classifies a pesticide into one of four classes – manufacturing, restricted, commercial and domestic. As of May 1, 2020, Ontario's pesticides classes have been aligned with the federal government's pesticide categories to remove duplication and reduce complexity for the sale and use of pesticides in Ontario, while ensuring continued protection of human health and the environment.

The MECP automatically classifies pesticides in Ontario as Class A, B, C or D based on the federal classification system plus one additional class (Class E) for regulating the sale and use of neonicotinoid-treated corn and soybean seed.

Table 1–1. Federal and provincial classification

Federal product class	Federal Class Description	Provincial Class
Manufacturing	The pesticide is only used to manufacture a pest control product.	Class A
Restricted	The pesticide is restricted by the federal government out of concern of environmental risk or human health. Additional information must be shown on the label regarding essential conditions for display, distribution and limitations on use. Specific qualifications may be required for a person to use this product.	Class B
Commercial	The pesticide can only be used in commercial activities that are specified on the label.	Class C
Domestic	The pesticide is primarily used by the general public for personal use and in and around their homes.	Class D
N/A	—	Class E* Corn and soybean seeds that are treated with imidacloprid, clothianidin or thiamethoxam neonicotinoids

* Class E pesticides do not apply to:
- popping corn
- sweet corn
- corn used for the production of seed
- soybean seed planted for the purpose of producing a soybean seed crop of certified status under contract
- corn seed and soybean seed treated only with fungicide

Each Ontario Class has specific certification, licensing and/or permit requirements and restriction on its use and sale.

Certification and Licensing

Certified Farmers and Their Assistants

Farmers must be certified through the Grower Pesticide Safety Course (GPSC) in order to buy and use Class B and C pesticides on their farms. Certification is not required to buy and use Class D pesticides for agricultural purposes.

Farmers become certified by successfully completing one of the following certification options:

- one-day in-person course and pass an open book certification test with a mark of at least 75%, or
- online course and successfully complete quizzes and case studies to become certified.

Farmer assistants and supervised farmers using Class B or C pesticides must complete training and assist or be supervised by a certified farmer. Farmer assistants and supervised farmers must complete one of the two training options:

- participate in a GPSC (assessment is not required) or
- participate in an On-Farm training session given by an On-Farm Instructor.

For information about farmer training and certification requirements visit the MECP website at ontario.ca/pesticides and for information on courses visit the University of Guelph's Ontario Pesticide Education Program website at www.opep.ca or call 1-800-652-8573.

To buy and use Class E pesticides, farmers are required to:

1. Complete the Integrated Pest Management (IPM) Course for Corn and Soybean
2. Complete a pest risk assessment and a pest risk assessment report
3. Sign an IPM Written Declaration Form stating that you considered IPM principles to decrease the risk of early season insect damage.

Farmers must provide these pieces of information to a vendor sales representative or custom-seed treater in order to purchase Class E pesticides. They must retain these records for at least two years.

Farmers must also carry with them or have readily available at the field when they are planting a copy of their certificate of completion of the Integrated Pest Management (IPM) Course for Corn and Soybean and pest risk assessment report.

For information on the requirements for Class E pesticides visit the MECP website ontario.ca/pesticides. For information on the IPM Course visit the University of Guelph's website at IPMCertified.ca.

Pesticide Commercial Applicators (Exterminators) and Their Assisting Technicians

All applicants for a pesticide exterminator licence must first become certified by passing an examination. Once certified, you can apply to the MECP for an exterminator licence.

For more information on how to become certified, refer to Ontario Pesticide Training and Certification

University of Guelph, Ridgetown Campus
1-888-620-9999

Email: rcoptc@uoguelph.ca
Website: www.ontariopesticide.com

For further information on pesticide licensing please refer to the document Guide to Pesticide Licensing available at ontario.ca/pesticides.

For information on technician training, visit:

- the Ontario Pesticide Training and Certification website at www.ontariopesticide.com or call 1-888-620-9999 or 519-674-1575
- the Pesticide Industry Council's Pesticide Technician Program website at www.horttrades.com/pesticide-technician or call 1-800-265-5656 or email pic@hort-trades.com
- the Pesticide Industry Regulatory Council (PIRC) at www.oipma.ca

Ontario's Cosmetic Pesticide Ban and Excepted Uses

Ontario prohibits the use of certain pesticides for cosmetic (non-essential) purposes.

Only low risk pesticides and biopesticides may be used for cosmetic purposes such as in lawns and gardens, and these are listed in the publication "List of Active Ingredients Authorized for Cosmetic Uses (Allowable List)"

Under the ban, the use of an active ingredient that is not on the Allowable List is permitted for appropriately licensed individuals if the use falls under one of the exceptions to the ban. There are exceptions for public health and safety (including for public works, buildings and other structures that are not a public work, and to control poisonous plants), golf courses, specialty turf, specified sports fields, arboriculture and the protection of natural resources, if certain conditions are met. There are also exceptions for agriculture, forestry, research and scientific purposes, uses of pesticides for structural exterminations (e.g., in and around homes to control insects), and uses of pesticides required by other legislation.

To locate your local MECP District Office:
https://www.ontario.ca/environment-and-energy/ministry-environment-district-locator

To speak with your local MECP Pesticide Specialist:

South West Region – 519-668-9292

West Central Region – 905-512-0981

Central Region – 416-990-1694

Eastern Region – 613-540-6874

Northern Region – 705-562-0853

Pesticide Application Information

When you decide to use a pesticide, choose the least toxic and least volatile option for your situation. Use an appropriate application method and ensure equipment is properly maintained and calibrated. Take all possible precautions to prevent the exposure of people and non-target organisms to the pesticide, before, during and after the application. Read the most current pesticide label thoroughly before application. The pesticide label is a legal document and must be followed. Pesticides may only be used in accordance with label instructions. The label provides important information, such as:

- directions for use (e.g., rates of application, crops/sites it can be used on, target pests, crop rotation restrictions, total number of applications, droplet size, application equipment, timing, appropriate weather conditions)
- required personal protective equipment (PPE)
- hazard symbols and warnings
- restricted entry intervals
- pre-harvest intervals
- buffer zones / vegetative strips
- precautionary statements
- steps to be taken in case of an accident
- disposal
- equipment sanitation

For more information on hazards, consult the Safety Data Sheet (SDS) or contact the manufacturer.

For more information on pesticide application, see:

- Sprayers 101 at www.sprayers101.com
- OMAFRA Factsheet *Pesticide Drift from Ground Applications*
- Ontario Pesticide Education Program (University of Guelph, Ridgetown Campus) videos at www.opep.ca/resources/
- OMAFRA Agriculture and Agri-Food Canada booklet Best Management Practices — *Pesticide Storage, Handling and Application,* Order No. BMP13
- OMAFRA Factsheet *Pesticide Contamination of Farm Water Supplies*
- PMRA's Factsheet *Understanding Restricted Entry Intervals for Pesticides* (English, French and Spanish): www.healthcanada.gc.ca/pmra, search for Restricted Entry Interval

Restricted Entry Intervals

Restricted Entry Interval (REI) is the minimum period of time that must elapse before hand labour tasks can be performed in an area treated with pesticide. The REI allows the pesticide residues and vapours to dissipate to safe levels to protect agricultural workers.

Hand labour tasks involve substantial worker contact with treated surfaces such as plants, plant parts or soil. Examples of these activities include planting, harvesting, pruning, detasseling, thinning, weeding, scouting, topping, sucker removal, mowing, roguing and packing produce into containers in the field or greenhouse. You can only perform these tasks after the REI has passed. Hand labour generally does not include operating, moving or repairing irrigation or water equipment, except for hand-set irrigation.

An REI can range from 12 hours to several days depending on the crop and the task (e.g., scouting, harvesting). A minimum 12-hour REI must be observed in agricultural crops, even if no REI is indicated on the label. However, REIs do not apply to biopesticides (e.g., microbials, pheromones) unless specified on the label. For golf courses and residential turf applications, the spray solution must be dry before re-entry can occur. When tank-mixing pesticides that have different REIs, you must observe the longest REI.

A Certified Farmer or Licensed Commercial Applicator (i.e., a holder of the appropriate Exterminator License, such as an Agriculture Exterminator License or a Greenhouse/Interior Plant Exterminator License) may need to enter a treated area early to do short-term tasks before the end of the REI. In these cases, the Certified Farmer or Licensed Commercial Applicator may enter between 4–12 hr after the application wearing a NIOSH-approved respirator and any other protective clothing (PC) and personal protective equipment stated on the label for mixing and loading. This Certified Farmer or Licensed Commercial Applicator (exterminator) must not be in the treated area during the REI for more than a total of 1 hr in any 24-hr period.

See Figure 1-1 for an example of a 24-hr REI on a pesticide label.

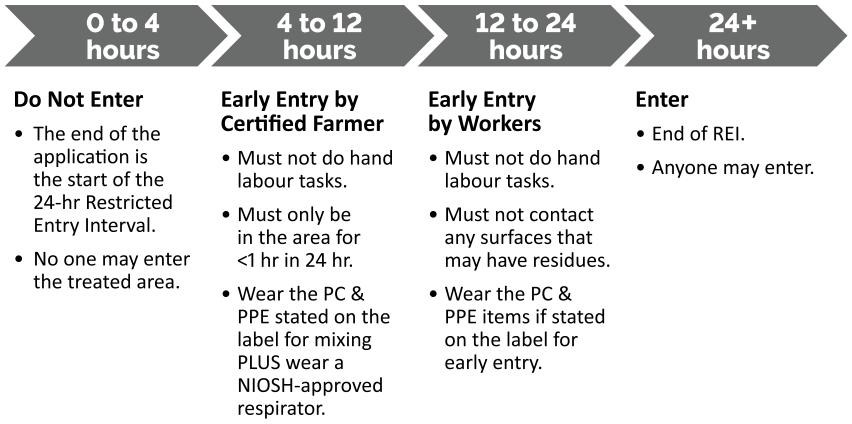

Figure 1–1. Example of a 24-hr REI on a pesticide label.

Certified Farmers and Licensed Commercial Applicators should plan pesticide applications around work tasks so that no one needs to enter treated areas before the restricted entry interval has passed.

Days to Harvest Intervals for Food Crops (Pre-harvest, Pre-grazing and Feeding Intervals)

These intervals state the minimum time that must pass between the last pesticide application and the harvesting of the crop or the grazing and cutting of the crop for livestock feed. If you harvest a crop before the pre-harvest interval (PHI) has ended, there may be pesticide residues in excess of the maximum residue limits (MRLs) set by PMRA.

"Up to the day of harvest" means the same as 0 days PHI; however, the REI may be more restrictive (e.g., a 12-hr restricted entry interval) and must be observed for harvesting that occurs on the day of pesticide application.

To avoid exceeding the maximum residue limits, always follow the directions on the label.

Spray Buffer Zones

Spray buffer zones are no-spray areas required at the time of application between the area being treated and the closest downwind edge of a sensitive aquatic or terrestrial habitat. Spray buffer zones reduce the amount of spray drift that enters non-target areas.

Sensitive terrestrial habitats include hedgerows, grasslands, shelterbelts, windbreaks, forested areas and woodlots.

Sensitive freshwater habitats include lakes, rivers, streams, creeks, reservoirs, marshes, wetlands and ponds.

The pesticide label indicates the size of the spray buffer zone, which depends on the product used, the method of application, and the crop being sprayed.

Unless forbidden by the pesticide label, Health Canada's online Buffer Zone Calculator may allow applicators to reduce the spray buffer zones based on weather conditions, the category of the spray equipment and the droplet size. For more information, search for "Buffer Zone Calculator" at www.canada.ca.

For soil fumigation, a buffer zone is an area established around the perimeter of each application block.

Vegetative Filter Strips

A vegetative filter strip is:

- a permanently vegetated strip of land.
- sits between an agricultural field and downslope surface waters.
- must be at least 10 m wide from edge of field to the surface water body.
- must be composed of grasses, but may also contain other vegetation (shrubs, trees, etc.).

Vegetative filter strips reduce the amount of pesticide entering surface waters from runoff by slowing runoff water and filtering out pesticides carried with the runoff. Certain pesticide labels will require a vegetative filter strip. Other labels will recommend a vegetative filter strip as a best management practice.

Protect the Environment

Protect Water Sources

According to the British Crop Protection Council (BCPC), 40%–70% of surface water pesticide contamination comes from mixing and filling areas.

Where possible, load or mix pesticides on impermeable surfaces located safely away from watercourses or environmentally sensitive areas. Collect drainage and run-off and dispose of it safely (Your Guide to Using Pesticides, BCPC 2007).

Clean your spray equipment away from wells, ponds, streams and ditches. Apply the diluted rinse water (usually at a ratio of 10:1) to the treatment area (crop), but do not exceed the pesticide rate recommended on the label.

Do not make a direct connection between any water supply (e.g., public supply, wells, watercourse or pond) and a spray tank. Use an anti-backflow device or intermediate system to prevent back-siphoning that could contaminate the water supply.

Immediately contain and clean up any spills to prevent contamination to water sources.

Check the pesticide label for specific instructions on protection of water sources.

For more information on protecting water sources, see ontario.ca/crops:

- OMAFRA Factsheet *Pesticide Contamination of Farm Water Supplies*
- OMAFRA Factsheet *Groundwater — An Important Rural Resource: Protecting the Quality of Groundwater Supplies*
- OMAFRA Agriculture and Agri-Food Canada booklet *Best Management Practices — Pesticide Storage, Handling and Application*, Order No. BMP13

Bee Poisoning

Honey bees, native bee species (e.g., bumble bees, squash bees) and other pollinating insects are important pollinators for many Ontario crops.

Insecticides, some of which may negatively affect bees, require careful management to achieve both pollination and insect control of pest species. Growers and licensed commercial applicators can protect bees by following these suggestions:

- Time insecticide applications to minimize bee exposure (e.g., apply post bloom). Daytime treatments, when bees are foraging, are most hazardous. Insecticide applications in the evening are the safest, unless there is evidence of a strong temperature inversion or high humidity. Under normal circumstances, spraying after 8 p.m. allows the spray to dry before the bees are exposed to it the next day. Spraying during

early morning is the next best time, when fewer bees are foraging, but pesticide residues may still be present. Spraying should be completed well before 7 a.m. While honey bees and most other pollinating insects do not usually forage at temperatures below 13°C, bumblebees do. If you plan to spray in the morning, contact beekeepers who have bees within 5 km of your crop and spray site. The beekeepers may then have the option of taking any possible protective action.

- Do not apply insecticides while fruit trees are in bloom. The Bees Act makes it an offence to do so in Ontario. Do not spray any flowering crop on which bees are foraging.
- To prevent drift toward nearby hives, do not apply insecticides on windy days or when there is evidence of a strong temperature inversion.
- Bees and other pollinators may be poisoned by visiting flowering weeds, trees and cover crops that have come into contact with an insecticide via spray drift or drift of insecticide-contaminated dust during planting. Avoid spray drift to flowering weeds that are adjacent to or within the target field. Where possible, mow down flowering cover crops or flowering weeds in and bordering target fields prior to spraying to help safeguard the bees. Control dandelions and other flowering weeds within fields before spraying or planting seeds treated with an insecticide. Take measures to reduce movement of dust from insecticide seed treatments to flowering trees, weeds and water sources that are in or adjacent to the target field. For more information on reducing dust movement, search for "Pollinator Protection and Responsible Use of Treated Seed — Best Management Practices" at www.canada.ca.
- Systemic insecticides may also pose a high risk to bees and other insect pollinators. Bees can be exposed to insecticide residues in or on flowers, leaves, pollen, nectar and/or surface water. Do not apply insecticide or allow it to drift onto blooming crops or off-site habitat if bees are foraging in or adjacent to the treatment area.
- In crop settings where pesticide use is highly likely, beekeepers should remove honey bee colonies as soon as pollination and bloom are complete in the crop and before any insecticides are applied post bloom.

  In emergency situations, if the colonies cannot be removed in time, beekeepers can place burlap or cloth soaked in water at the entrance of the hive to disrupt the flight of the bees for up to 12 hr and provide more time for spray to dry. To help prevent overheating of the hive during this time, keep an opening of 2.5 cm on each side of the hive entrance so bees can still get out and ventilate the hive. Also, the water on the burlap or cloth will help cool the colony.
- Not all pesticides are equally toxic to bees. If there is a risk of honey bee poisoning, try to choose an insecticide that is not highly toxic to bees. When there is a choice, choose a product formulation that is less hazardous to bees.
- Always read the most current pesticide label for guidance. Some pesticides cannot be used when bees are active in the crop.

For more information on ways to reduce bee poisoning, see:

- *Practices to Reduce Bee Poisoning from Agricultural Pesticides in Canada*, available at honeycouncil.ca. Select "Bee Health Roundtable."

Manage Drift

Pesticide drift is the aerial movement and unintentional deposit of pesticide outside the target area. Drift results in wasted product, may compromise crop protection and can adversely affect nearby sensitive environmental areas, crops and wildlife. The following strategies can help reduce the risk of pesticide drift:

- Do not spray when wind direction is changeable, or wind speeds are high or gusty. These conditions increase the potential for off-target drift. While most pesticide labels indicate allowable wind speeds, some do not.
- Regularly monitor wind conditions during spraying, preferably in the field with a handheld wind meter at nozzle height or elevated to the top of the target canopy from within the planted area. Record the wind speed and direction. As conditions change, make adjustments to manage drift potential. Adjustments may include a coarser droplet size, minimizing nozzle-to-target distance, adjusting air energy or vector on air-assisted sprayers, slowing travel speed, using a drift reducing adjuvant or discontinuing spraying until conditions improve.

- Do not spray during periods of dead calm. Periods of dead calm may occur between late evening and early morning and can result in the vapour or fine spray droplets remaining aloft, like fog. Spray-filled air can move unpredictably over great distances several hours after the spray event is completed.

Temperature inversions create problems for spray applicators because pesticide spray can:

- remain suspended and active in the air above the target for long periods of time
- move with light breezes in changeable and unpredictable directions
- move down slopes and concentrate in low-lying regions

Field air temperatures are often very different from local or regional forecasts, so the most reliable method of detecting inversion conditions is to measure temperatures at, and several metres above, the ground. Commercial hand-held inversion detectors are now available. Spray applicators can also recognize a temperature inversion from environmental cues, such as when:

- there is a big drop from daytime to nighttime temperature
- wind dies down by early evening and night
- far away sounds can be heard clearly
- odours seem more intense
- daytime cumulus clouds collapse toward evening
- overnight cloud cover is 25% or less
- smoke or dust hangs in the air and/or moves laterally in a sheet

Temperature inversions start to form about 3 hr prior to sunset, become stronger as the sun sets and continue until sunrise when the surface warms and air mixing begins. If you suspect there's an inversion, don't spray. Often, warnings for the risk of inversions are stated right on the product label.

- If specified, use the sprayer output indicated on the pesticide label.
- Use a nozzle at a pressure that will produce the droplet size specified on the pesticide label or delivers droplets appropriate for the job.
- Coarser droplets reduce drift significantly. Air induction nozzles used above 2bar (30psi) will produce Coarse to Ultra Coarse droplets. They can be used in the top nozzle positions on air-assist sprayers in specialty crops, or along conventional horizontal booms. Ensure the droplet size and volume are appropriate for the application being performed.
- Minimize the distance between nozzle and target as much as possible while still maintaining spray uniformity.
- Establish buffer zones for the protection of adjacent sensitive areas. Some pesticide labels will state buffer zone setbacks; follow these carefully.
- Use drift reduction technology, such as hoods, shrouds, screens or air curtains.
- If appropriate, use drift-reducing adjuvants in the spray tank. The intense agitation in air-assist sprayers for specialty crops has been shown to reduce the effectiveness of drift-reducing adjuvants. Certain combinations of drift-reducing adjuvants and air-induction nozzles have been shown to increase the incidence of fine droplets. Consult with the adjuvant manufacturer.
- When possible, use non-volatile pesticide formulations or products.

For more information about spray drift, see:

- Sprayers 101: www.sprayers101.com
- OMAFRA website: ontario.ca/spraydrift
- OMAFRA Factsheet Pesticide Drift from Ground Applications
- OMAFRA Agriculture and Agri-Food Canada booklet *Best Management Practices — Pesticide Storage, Handling and Application*, Order No. BMP13
- Ontario Pesticide Education Program (University of Guelph, Ridgetown Campus) *Drift of Pesticides video* series, available at www.opep.ca/resources (click the "YouTube" icon)

Waste Management

Empty Pesticide and Fertilizer Containers up to 23 L

Never re-use empty pesticide containers.

The Ontario Empty Pesticide and Fertilizer Container Recycling Program, an industry-led program, is available free of charge to growers and commercial applicators. Through this program, you can return triple-rinsed or pressure-rinsed plastic pesticide and fertilizer containers up to 23 L to container collection depots located throughout the province. Remove the cap and booklet from the pesticide container and metal handle from the fertilizer pail before recycling. To locate the closest container collection depot, visit www.cleanfarms.ca, call your local dealer or contact Cleanfarms at 416-622-4460 (toll-free at 877-622-4460) or info@cleanfarms.ca.

Empty Pesticide Containers Greater than 23 L (Totes and Drums)

Growers and commercial applicators should return pesticide containers that are greater than 23 L in size to the point of sale or local collection site for disposal. Contact your local dealer for details on disposal of these containers, or contact Cleanfarms at 416-622-4460 (toll-free at 877-622-4460) or info@cleanfarms.ca.

Empty Seed and Pesticide Bags

Growers can return their empty seed and pesticide bags to select retail locations. Contact your local dealer for details on disposal of these empty seed and pesticide bags, or contact Cleanfarms at 416-622-4460 (toll-free at 877-622-4460) or info@cleanfarms.ca.

Surplus Spray Mix

The best approach is to plan the spray job accurately to avoid creating a surplus.

When this is unavoidable, dispose of excess spray mix by spraying it on other crops that require an application of this pesticide. Before spraying, check the label to make sure the pesticide is registered for use on that other crop.

If you cannot find another allowable crop to spray, then dilute the remaining spray mix by adding 10 parts of water for each 1 part of spray mix.

The diluted solution can be safely applied to the original treated area as long as you do not exceed the pesticide rate recommended on the label. Be sure to check the label for any restrictions about crop rotation, days to harvest or disposal of surplus spray mix.

Never re-spray the treated field with undiluted spray mix. Spraying an area twice at the same pesticide rate will double the labeled pesticide rate. This may cause illegal pesticide residues in the harvested crop or harmful residues in the soil that can cause crop damage.

Surplus Pesticide Disposal

Be sure to safely dispose of pesticides that you do not need or cannot use. Options for proper disposal include:

- Contact the supplier. It is sometimes possible to return unused pesticide if it is still in its original, unopened container.
- Hire a licensed waste hauler who is licensed under Part V of the *Environmental Protection Act* to carry hazardous wastes.
- Cleanfarms operates a free Obsolete Pesticide and Animal Health Product Collection Program throughout the province every 3 years. To locate the closest collection point and date, visit the Cleanfarms website (www.cleanfarms.ca), contact Cleanfarms at 416-622-4460 (toll-free at 877-622- 4460) or info@cleanfarms.ca or contact your local dealer for program details.
- Contact your municipality to see if any hazardous waste collection days are scheduled and verify whether quantities of agricultural pesticides will be accepted.

Storing Pesticides

Ontario's *Pesticides Act* and Regulation 63/09 provide details on storage requirements for pesticide storage facilities. As shown in Table 1-2, the storage requirements that must be followed are dependent on which classes of pesticides you store.

Table 1–2. Requirements for Pesticide Storage Facilities

Storage requirements	Pesticide Classes		
	Class B****	Class C	Class D
No contact with food or drink	YES	YES	YES
Not an impairment to health and safety	YES	YES	YES
Clean and orderly	YES	YES	YES
Warning sign G posted*	YES	YES	YES
Emergency telephone numbers posted**	YES	YES	YES
Vented to outside	YES	YES	NO
Limited access (locked)	YES	YES	NO
No floor drain	YES	YES	NO
Respiratory protection and protective clothing kept readily available	YES	YES	NO
Area used primarily for pesticides	YES	YES***	NO

Note: Sufficient precautions are needed in your storage area to prevent the pesticide from entering the natural environment. Ensure your floor drain does not enter the natural environment.

* See ontario.ca for requirements for warning sign G (Search for sample warning signs for pesticide use). These signs can be purchased from your pesticide dealer/vendor.

** Emergency contact numbers must include telephone numbers for the local fire department, hospital and poison control centre. The number for the MECP Spills Action Centre (1-800-268-6060) should also be readily available.

*** Only applies to Class C pesticides that are fumigants

**** Does not apply to animal repellent products that only contain the active ingredient Capsaicin or Capsaicin and related capsaicinoids.

For more information about storing pesticides, see:

- OMAFRA Factsheet Farm Pesticide Storage Facility
- OMAFRA Agriculture and Agri-Food Canada booklet *Best Management Practices — Pesticide Storage, Handling and Application*, Order No. BMP13
- Ontario Pesticide Education Program (University of Guelph, Ridgetown Campus) *Grower Pesticide Safety Course Manual*, available at www.opep.ca. Select "Learn."

Pesticide Spills

Part X of the *Environmental Protection Act* defines a spill as a discharge of pollutant (including pesticides) that is abnormal in quality or quantity, from or out of a structure, vehicle or other container into the environment. An overturned pesticide sprayer that results in the release of the pesticide spray solution to the environment is an example of a spill. A pesticide container that ruptures and leaks its contents is another example of a spill. The discharge or spraying of a pesticide in an unapproved area is also considered a spill.

Part X of the *Environmental Protection Act* requires every person having control of a pollutant that is spilled or who spills, causes or permits a spill of a pesticide shall immediately notify:

- the Ministry (through the Spills Action Centre)
- the municipality within the boundaries of the spill, and
- the owner of the pesticide or the person having charge, management or control of the pesticide.

Ontario's Spills Action Centre receives calls 24 hours a day (1-800-268-6060). Your local municipality may have additional reporting numbers such as fire department and Medical Officer of Health.

Where a spill causes or is likely to cause an adverse effect as defined by the Act, Part X of the *Environmental Protection Act* requires the owner of the pesticide and the person having control of the pesticide to:

- immediately do everything practicable to prevent, eliminate and ameliorate any harm, and
- restore the natural environment or other property to the state it was in prior to the spill.

Additionally, Ontario Regulation 63/09 under the *Pesticides Act* requires the person responsible for a pesticide to immediately notify the Ministry's Spills Action Centre in the event of a fire or other occurrence that may result in the pesticide being discharged into the environment out of the normal course of events if the discharge would be likely to:

- cause impairment of the quality of the environment for any use that can be made of it;
- cause injury or damage to property or to plant or animal life;
- cause harm or material discomfort to any person;
- adversely affect the health of any person;
- impair the safety of any person; or
- render directly or indirectly any property or plant or animal life unfit for use by humans.

Before you begin to clean up a spill of any nature, remember to protect yourself against pesticide exposure. Wear the proper protective clothing and personal protective equipment. If the spill occurs inside an enclosed area (e.g., a pesticide storage area or a vehicle during transport), ventilate the area first. Once you have protected yourself and removed other persons or animals from the spill site, take additional measures to stop the spill at the source and prevent it from spreading and/or contaminating watercourses. Specific precautions, emergency contact information and first aid procedures may be found on the label.

For minor spills, it may be possible to rectify the problem:

- **For a liquid spill —** Cover the spill with a thick layer of absorbent material such as kitty litter, vermiculite or dry soil. Sweep or shovel the material into a waste drum and dispose of the contents as you would a hazardous waste.
- **For a dust, granular or powder spill —** Sweep or shovel the material into a waste drum and dispose of the contents as you would a hazardous waste.

For major spills, it is essential to stop the spill from spreading.

The clean-up guidelines above may not be appropriate for all spill situations. Once you have contained the spill, follow directions from the manufacturer and regulatory authorities on cleaning the contaminated area.

Some of the information contained in this chapter is not authoritative. It is derived from the *Pesticides Act*, Ontario Regulation 63/09, *Environmental Protection Act* and the federal *Pest Control Products Act, Fisheries Act* and *Species at Risk Act* and is for informational purposes only. Efforts have been made to make it as accurate as possible, but in the event of a conflict, inconsistency or error, the requirements set out in the referenced legislation take precedence. For specific legal details, please visit ontario.ca/laws (for Ontario legislation) and www.laws-lois.justice.gc.ca (for federal legislation) and consult your lawyer if you have questions about your legal obligations.

For information on preventing spills, see:

- OMAFRA Factsheet Ways to *Avoid Pesticide Spills*
- OMAFRA Agriculture and Agri-Food Canada booklet *Best Management Practices — Pesticide Storage, Handling and Application*, Order No. BMP13
- Ontario Pesticide Education Program (University of Guelph, Ridgetown Campus) *Grower Pesticide Safety Course Manual*, available at www.opep.ca. Select "Learn."

For pesticide poisonings and pesticide injuries, call:

Ontario Poison Centre: 1-800-268-9017
(TTY) 1-877-750-2233

For more information, see Emergency and First Aid Procedures for Pesticide Poisoning on inside back cover.

2. Pest Management

Integrated pest management (IPM) is an approach to managing pests that uses all available strategies to reduce pest populations below an economic injury level. IPM does not advocate a continuous pesticide spray program to eradicate pests. Instead, it promotes the integration of cultural, mechanical/physical, biological, behavioural and chemical control strategies. With IPM, adverse effects of pesticides are minimized and economic returns are maintained.

An IPM program makes management decisions based on:

- pest identification, biology and behaviour
- resistance management strategies
- beneficial organisms
- monitoring techniques
- use and timing of appropriate management tools
- stage of crop growth
- record keeping
- sprayer calibration

More detailed information on IPM for tender fruit can be found on Ontario CropIPM at ontario.ca/cropIPM

Current information is also available on the ONfruit blog at onfruit.ca.

Pest Management Tools

Cultural and Mechanical/Physical

Integrated pest management incorporates cultural and mechanical/physical practices to prevent or delay the development of pest outbreaks. Management tools include, but are not limited to:

- Site selection — Choose sites less favourable for pest development. Avoid planting in poorly drained locations.
- Resistant/tolerant cultivars — Select cultivars less susceptible to disease or insect pressure.
- Clean, certified nursery stock — Use trees tested and determined to be free from virus and grown according to guidelines that minimize the presence of other pathogens and insects.
- Orchard sanitation — Chop and plow under or remove all sources of pests, such as prunings and mummified fruit, from the orchard.
- Elimination of alternative hosts — Eliminate wild fruit trees adjacent to the orchard. They can act as alternate hosts for many pests.
- Maintain good weed control in the tree row. This promotes air movement in the orchard to facilitate drying of leaves and fruit.
- Encouraging natural enemies — Modify insect habitat through the introduction of cover crops, border crops or naturalized hedgerows to promote beneficial organisms.
- Training and canopy management — Manipulate the canopy to improve air movement within the canopy to facilitate drying and to improve spray coverage.

- Water management — Use trickle irrigation or schedule overhead irrigation so that plants are not wet overnight.
- Nutrient management — Avoid excessively lush growth, which is more susceptible to some diseases and more attractive to some insect pests.

Biological

Biological control uses beneficial organisms to help suppress pest populations. These biological control agents may be predatory insects, parasites, pathogens or nematodes. Many beneficials occur naturally in the environment; others may be introduced.

Beneficials will not completely eliminate damage by pests. However, once they are established, they can maintain pest populations at lower levels. They are generally effective against indirect pests such as aphids, leafhoppers and mites, but may be less effective at keeping populations of direct pests, which attack the harvested product, at levels acceptable for commercial production. Important insects and mites for biological control include ground beetles, mullein bugs, minute pirate bugs, lacewings, lady bird beetles and phytoseiid mites.

Natural pathogens of insects and mites include bacteria, viruses, fungi and protozoa. Pathogens circulate naturally in insect populations. Under the right conditions, they can cause disease outbreaks in insects, which can significantly reduce insect populations. Aphids and caterpillars are routinely infected by cycles of viral or fungal disease, which thrive when the environment is moist.

Follow these practices to conserve and encourage beneficial insects in fruit crops:

- Avoid use of pesticides that are toxic to the important beneficials in a cropping system.
- Encourage a diverse habitat within and/or around the perimeter of the orchard where beneficial insects can live. Small flowering plants are an important food source for parasitic wasps.
- Avoid ultra-clean cultivation. Crop residue, mulch or ground cover will encourage ground beetles and other important predators in the soil.

For additional information on predators and parasitoids, see Ontario CropIPM at ontario.ca/cropIPM or OMAFRA Publication 208, *Predatory Insects in Fruit Orchards*.

Behavioural

Behavioural control uses a pest's natural behaviour to suppress the population. The most commonly used behavioural control in orchard systems is mating disruption.

Managing insects using mating disruption is very different from using insecticides. Mating disruption products are highly specific, targeting a single or few very closely related insect pests. They do not kill the target pest, nor will they control immigration of mated females from untreated or poorly managed areas.

For more information on using mating disruption in tree fruit, see OMAFRA Factsheet 03—079, *Mating Disruption for Management of Insect Pests.*

Chemical

Chemical controls include synthetic, inorganic, botanical and biological pesticides. They kill/inhibit development of target pests and thus limit subsequent pest populations. Plant defence activators (e.g., Regalia Maxx) induce natural plant defences against crop pests, but do not directly impact the plant pathogen itself. Applications of plant defence activators to crops may "activate" the defence response of the plant, thus inhibiting infection.

Chemical controls are important tools for crop protection when used as part of an IPM program. Understand the pest's life cycle and apply chemicals at the stage when the pest is most vulnerable. Select the appropriate product for the target pests. To control insects and mites, monitor blocks closely. Spray according to action thresholds, degree-day timing (see below) or at critical stages of crop development. To control disease, apply fungicides prior to disease infection and development. Use factors such as weather conditions, crop stage and disease prediction models (where available) to assist in fungicide spray timing.

All organic pest control products must be registered by the PMRA on the pest and crop on which they are used and meet the requirements of the Canadian Organic Standards and any additional requirements of the local organic certification body.

While organic and biopesticide products are used most widely by organic producers, they can also be useful tools for conventional growers. Possible advantages for conventional producers include:

- lower potential for pest resistance
- providing a rotational option to help manage resistance development in other conventional products
- shorter re-entry and preharvest intervals
- potentially lower toxicity to non-target organisms

Although many organic and biopesticide products are formulated, packaged and applied in a very similar fashion to conventional pesticides, the active ingredients are different. They have unique, specialized modes of action that make them more susceptible to numerous biological and environmental factors.

Some of the possible challenges associated with using these products are:

- more frequent applications needed to control pests
- slower acting than conventional pesticides
- may provide suppression rather than control of the pest
- more expensive than conventional pesticides
- fewer pests controlled

Degree-Day Modeling

Temperature, light and moisture affect the growth and development of plants and pests. Of these, temperature is the most important factor for insect and mite development. These pests need a certain amount of heat to move to the next development stage.

The amount of heat required for insect and mite development remains constant from year to year, but depending on weather conditions, the amount of actual time that it takes to complete development can vary. Insects and mites have a minimum and maximum base temperature below or above which development does not occur. These base temperatures are different for each organism.

Degree-Days Celcius (DDC) are used to estimate the growth and development of pests in the growing season. Events such as egg-laying, egg hatch, movement of crawlers or the occurrence of disease infection can be predicted and used to schedule inspection and spray programs. For example, degree-day calculations can predict the first hatch of Oriental fruit moth eggs or the probability of fire blight infection.

There are several methods used to calculate DDC, but the method commonly used with simple monitoring equipment is the averaging method or “max/min” method. DDC for a given organism are calculated as follows:

$$\text{DDC} = \frac{(\text{Daily max } °\text{C}) + (\text{Daily min } °\text{C})}{2} - \text{minimum base temperature for pest}$$

Degree-Days Celcius are accumulated daily. The averaging method works well in most years. However, the actual DDC accumulations may be underestimated in extended periods of cool weather or overestimated in hot weather.

An example of the averaging method on a relatively cool spring day:

For a given pest:
Lower base temperature = 10°C
Upper base temperature = 35°C

On a given day:
Minimum temperature = 5°C
Maximum temperature = 15°C

Degree-Days Celcius (DDC) for that day is = (maximum + minimum temperature) / 2 – lower base temperature = (15+5) / 2 – 10 = 0 DDC

Note that the maximum temperature was higher than the base temperature for the insect, so growth and development were possible for at least part of the day. However, no DDC were accumulated. This illustrates how cool temperatures, especially over several days, could lead to an underestimation of insect development.

Degree-Days Celcius are either accumulated from a set start date, such as April 1, or from a specific event known as a biofix. A biofix is a biological event or indicator of a developmental event, that initiates the beginning of DDC calculations. A common biofix used for insects is the first sustained catch in pheromone traps. Using a biofix provides predictions that are more accurate and requires tracking temperatures over a shorter period.

There are several limitations to degree-days models:

- Factors such as humidity, light intensity and rainfall also affect pest development. As a result, DDC predictions are only estimates of pest development. Verify these predictions with field observations.
- Temperatures used to determine DDC must represent the environment where organisms develop. Use weather data collected from within a mile or less of the actual orchard or field being monitored. Site specific information can be obtained by using data loggers. Ventilated heat shields should be used with temperature sensors data loggers to ensure accurate air temperatures. Place data loggers at locations in the crop where the pest is normally active.

Managing Pest Resistance

Pest Resistance to Fungicides, Insecticides and Miticides

Random natural mutation may result in a small proportion of a population that is resistant to a particular chemical, or group of chemicals with similar modes of action. When a population is exposed to a pesticide, the resistant individuals survive and the susceptible individuals are killed. The resistant survivors then multiply and pass their resistant traits on to the next generation. When the same pesticide is applied again, the proportion of resistant individuals increases, replacing the susceptible ones in the population. Once the resistant population dominates, the pesticide has lost efficacy. A pest population is considered resistant when it is able to survive exposure to rates of a pesticide that previously controlled it.

Resistance to one pesticide can result in resistance to a different pesticide or a group of pesticides, in which pesticides have similar action sites. This is called **cross-resistance**. It develops when exposure to one pesticide causes selection for resistance in other related ones and is the result of a single mechanism or genetic mutation.

Multiple resistance involves 2 or more mechanisms acquired independently through exposure to pesticides with different action sites. Pests with multiple resistance are resistant to pesticides from 2 or more groups at the same time.

Multiple resistance and **cross-resistance** create serious challenges to the success of integrated resistance management strategies.

Pest control failures are not necessarily caused by resistance. Factors such as product selection, timing, rate, spray coverage, spray water pH and weather conditions also affect the success or failure of a pesticide application.

Assessing Resistance Risk

The development of resistance depends on characteristics of both the pest and the group of pesticides involved, as well as the way in which pesticides are used. Table 2–1. Factors *Favouring the Development of Resistance* describes situations where resistance is most likely to occur.

Table 2–1. Factors Favouring the Development of Resistance

Pests most likely to develop resistance	Pesticides or use patterns where resistance is likely to develop
• have a prolific life cycle, with many generations per year, produce lots of spores or offspring, or multiply very quickly • have a pre-existing resistance to other products in the same group • do not migrate between crops/ regions, so gene pool is not diluted	• are used repeatedly or have persistent residues, exposing many generations or life stages to these residues • are toxic to beneficial insects as well as the pest • have a specific mode of action that works on a single site • are used at deficient rates or improper times

Resistance Management Strategies

Resistance management strategies include rotating products or tank-mixing from different groups and limiting the total number of applications from a single group within a growing season. Specific knowledge is required for growers to manage resistance effectively.

General Resistance Management Strategies

- Follow an integrated pest management program that makes use of a variety of different pest control strategies, including resistant varieties when available, monitoring, and cultural, biological and chemical control options.
- Spray only when necessary. Use established thresholds where available.
- Do not use pesticides at levels below label rates.
- Use adequate water volumes to deliver the pesticide to all tissues.
- Spray at the best timing for the pest and the product you are using.
- Make each spray application count. Be sure the sprayer is calibrated, the correct rate is applied, and spray coverage is complete.
- Read the product label. New products include resistance management recommendations on the label.
- Know the active ingredient of a pesticide. Many chemicals with the same active ingredients are marketed under different brand names. For example, the insecticide permethrin is marketed under the brand names Perm-UP and Pounce.
- Know the product group. Choose products from different groups when possible in your spray rotation. For example, both Bumper and Indar are in the same fungicide group (Group 3). To use Indar after Bumper is equivalent to using Bumper after Bumper, since resistance to both chemicals develops in the same way.
- For a list of groups and their modes of action, see Table 2–2. *Fungicide/Bactericide Groups*, Table 2–3. *Insecticide/Miticide Groups* or "*Products Used on*" tables at the end of each crop calendar.
- In addition to these general resistance management strategies for all products, more specific strategies have been developed for fungicides, insecticides and miticides.

Managing Resistance to Fungicides

- Know the fungicide groups. Over a season, choose fungicides from different groups whenever possible.
- Limit the total number of applications, and the number of sequential applications, of a particular fungicide group per season. Look for specific resistance management strategies on the product label.
- Know which disease is targeted by which fungicide group. For combination products, know which fungicide component is controlling which disease.
- Apply fungicides before disease occurs. Applications of fungicides after the disease is established are more likely to select for resistant populations of the pathogen.
- Make use of Group M fungicides. These fungicides are known as multi-site inhibitors (Table 2–2. *Fungicide/Bactericide Groups*). They affect a wide range of metabolic processes in fungi and are less prone to the development of resistance. While there is no risk of resistance development to group M fungicides, integrated pest management should still be applied. It should be noted that the bacteria causing fire blight can develop resistance to copper products.
- Tank-mix products from different groups. Wherever possible, one of the tank-mix partners should be a fungicide from Group M, with a multi-site mode of action. This is an accepted resistance management strategy for fungicides, although not recommended for insecticides.

Resistance management strategies by fungicide group and disease for Ontario tender fruit crops

Resistance management strategies are important for diseases like powdery mildew, brown rot, cherry leaf spot and peach and pear scab because these pathogens have characteristics which favour the development of resistance (see Table 2–1. *Factors Favouring the Development of Resistance*).

The suggested strategies for preventing fungicide resistance were developed using the recommendations of the Fungicide Resistance Action Committee (FRAC), which is a working group of Crop Life International. They were then adapted specifically for Ontario based on:

- the resistance risk of the pathogen to a fungicide group
- the number of rotational options registered for use at the time

Two components of a resistance management strategy for a fungicide group are:

- limiting the number of consecutive applications before rotating to a different group
- observing a maximum number of applications per season.

The following strategies reduce the risk for resistance development and may be more stringent than label guidelines.

- For high-risk pathogens with fungicide options from many groups, rotation to a different group is advisable after a single application of a resistance-prone fungicide, although this is not necessarily required by the label.
- For pathogens controlled by only a few registered fungicide groups, use no more than 2 consecutive applications of a resistance-prone fungicide and then alternate to a different fungicide group.

When a product contains active ingredients from more than one group, each application counts as a single use for each group. For example, one application of Pristine counts as a single use of boscalid (Group 7) and a single use of pyraclostrobin (Group 11).

In some cases, a single fungicide group can control more than one pathogen. In this case, the maximum number of consecutive and total applications per season are based on the pathogen with the highest risk of developing resistance.

Solo products have one active ingredient. Combination products have more than one active ingredient and are indicated with an asterisk (*).

Group 1: Senator

- **Pear** - Tank-mix with a half rate of a Group M fungicide.

*Group 3: Aprovia Top *, Bumper, Cevya, Fitness, Fullback, Funginex, Indar, Inspire Super *, Jade, Miravis Duo *, Nova, Princeton, Quash*

- **Pear** – For scab, use single a.i. fungicides once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season as a solo or mixture product.
- **Stone fruit** – For brown rot, cherry leaf spot and powdery mildew, use once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season as a solo or mixture product.

*Group 7: Aprovia Top *, Cantus, Fontelis, Kenja, Luna Tranquility *, Luna Sensation *, Miravis Duo, Pristine *, Sercadis*

- **Pear** – For scab, use single active ingredient products once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season as a solo or mixture product. See Group 11 for recommendation for Pristine use.
- **Stone fruit** – For brown rot, cherry leaf spot, powdery mildew and scab, use once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season as a solo or mixture product.

*Group 9: Scala, Inspire Super *, Luna Tranquility **

- **Pear** – For scab, use once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season.
- **Stone fruit** – For brown rot, powdery mildew and scab, use once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season as a solo or mixture product.

*Group 11: Cabrio, Flint, Sovran, Pristine *, Luna Sensation **

- **Pear** – For scab, use single active ingredient products once then rotate to a different fungicide group. Use fungicides from this group no more than 3 times per season as a solo or mixture product.
- **Stone fruit** – For brown rot, cherry leaf spot and powdery mildew, use once then rotate to a different fungicide group. Use fungicides from this group no more than 2 times per season as a solo or mixture product.

Group 13: Quintec

- **Stone fruit** – For powdery mildew, use once then rotate to a different fungicide group. Use no more than 2 times per season.

Group 17: Elevate

- **Stone fruit** – For brown rot, use once then rotate to a different fungicide group. Use no more than 2 times per season.

Group 24: Streptomycin
Group 25: Kasumin
Group M: Copper 53 W, Copper Spray, Cueva

- **Pear** - for fire blight, use once then rotate to a different group. Resistance to streptomycin and copper has been detected in populations of *Erwinia amylovora* in other pome fruit growing regions.

Group U12: Equal, Syllit

- **Pear** – For scab, tank-mix with a Group M fungicide. Use fungicides from this group prebloom only and no more than once per season as a solo or tank-mix.
- **Stone fruit** – For cherry leaf spot, use once then rotate to a different fungicide group. Use no more than once per season.

Table 2–2. Fungicide/Bactericide Groups

Group	Chemical Group	Product Name	Active Ingredient	Resistance Risk[2]
1	MBC (methyl benzimidazole carbamates)	Mertect SC	thiabendazole	High
		Senator 50 SC	thiophanate-methyl	High
3	DMI (demethylation inhibitors) Note: sometimes loosely known as sterol inhibitors (SI)	Aprovia Top 195 EC	difenoconazole[1] + benzovindiflupyr	Medium
		Bumper 432 EC	propiconazole	Medium
		Cevya	mefentrifluconazole	Medium
		Fitness	propiconazole	Medium
		Funginex DC	triforine	Medium
		Indar	fenbuconazole	Medium
		Inspire Super	difenoconazole[1] + cyprodinil	Medium
		Jade	propiconazole	Medium
		Miravis Duo	difenoconazole[1] + pydiflumetofen	Medium
		Nova	myclobutanil	Medium
		Princeton	propiconazole	Medium
		Quash	metconazole	Medium
7	SDHI (succinate dehydrogenase inhibitors)	Aprovia Top 195 EC	difenoconazole + benzovindiflupyr[1]	Medium
		Cantus WDG	boscalid	Medium–High
		Fontelis	penthiopyrad	Medium–High
		Kenja 400 SC	isofetamid	Medium–High
		Luna Sensation	fluopyram + trifloxystrobin[1]	Medium
		Luna Tranquility	fluopyram[1] + pyrimethanil	Medium
		Miravis Duo	pydiflumetofen[1] + difenoconazole	Medium
		Pristine WG	boscalid[1] + pyraclostrobin	Medium
		Sercadis	fluxapyroxad	Medium–High
9	AP (anilinopyrimidines)	Inspire Super	difenoconazole + cyprodinil[1]	Low
		Luna Tranquility	fluopyram + pyrimethanil[1]	Medium
		Scala SC	pyrimethanil	Medium
		Switch 62.5 WG	cyprodinil[1] + fludioxonil	Low

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC, or group not indicated on product label. P = Plant defence inducers.
U = Mode of action has not been determined.

[1] Indicates the active ingredient (a.i.) that puts it in this group.

[2] According to Fungicide Resistance Action Committee (FRAC) Visit www.frac.info and search "FRAC Code List 2020" for more information. In co-formulations, the resistance risk listed is for the combination of a.i.'s, not for the individual components.

Table 2–2. Fungicide/Bactericide Groups (cont'd)

Group	Chemical Group	Product Name	Active Ingredient	Resistance Risk[2]
11	QoI (quinone outside inhibitors) Note: strobilurins belong in this group, but not all QoI are strobilurins	Cabrio EG	pyraclostrobin	High
		Flint	trifloxystrobin	High
		Luna Sensation	fluopyram + trifloxystrobin[1]	Medium
		Pristine WG	boscalid + pyraclostrobin[1]	Low–Medium
		Sovran	kresoxim-methyl	High
12	PP (phenylpyrroles)	Scholar 230 SC	fludioxonil	Medium
13	Aza naphthalenes	Quintec	quinoxyfen	Medium
17	Hydroxyanilides	Elevate 50 WDG	fenhexamid	Low–Medium
24	Antibiotics	Kasumin 2L	kasugamycin	Medium
25	Antibiotics	Streptomycin 17	streptomycin	High
50	Benzophenones	Vivando SC	metrafenone	Medium
M1	Inorganics	Copper 53 W	tri-basic copper sulphate	Low (high for bacterial pathogens)
		Guardsman Copper Oxychloride 50	copper oxychloride	Low (high for bacterial pathogens)
		Copper Spray	copper oxychloride	Low (high for bacterial pathogens)
		Cueva	copper octanoate	Low (high for bacterial pathogens)
		Parasol Flowable	copper hydroxide	Low (high for bacterial pathogens)
M2	Inorganics	Cosavet Edge DF	sulphur	Low
		Kumulus DF	sulphur	Low
		Lime Sulphur	lime sulphur	Low
		Microscopic Sulphur WP	sulphur	Low
		Microthiol Disperss	sulphur	Low
M4	Phthalimides	Maestro 80 WSP	captan	Low
		Supra Captan 80 WSP	captan	Low
M5	Chloronitriles	Bravo ZNC	chlorothalonil	Low
		Echo NP	chlorothalonil	Low
BM1	Polypeptides	Fracture	BLAD polypeptide	Unknown
		ProBLAD Plus	BLAD polypeptide	Unknown

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC, or group not indicated on product label. P = Plant defence inducers.
U = Mode of action has not been determined.

[1] Indicates the active ingredient (a.i.) that puts it in this group.
[2] According to Fungicide Resistance Action Committee (FRAC) Visit www.frac.info and search "FRAC Code List 2020" for more information. In co-formulations, the resistance risk listed is for the combination of a.i.'s, not for the individual components.

Table 2–2. Fungicide/Bactericide Groups (cont'd)

Group	Chemical Group	Product Name	Active Ingredient	Resistance Risk[2]
BM2	Microbials	Actinovate SP	Streptomyces lydicus	Unknown
		Double Nickel LC	*Bacillus amyloliquefaciens* strain D-747	Unknown
		Serenade OPTI	*Bacillus subtilis strain* QST 713	Unknown
NC	Biologicals	Bio-Save 10 LP	*Pseudomonas syringae*	Unknown
		Blossom Protect	*Aureobasidium pullulans*	Unknown
		Botector	*Aureobasidium pullulans*	Unknown
NC	Bicarbonates	MilStop	potassium bicarbonate	Low
		Sirocco	potassium bicarbonate	Low
NC	Oils	Purespray Green Spray Oil 13 E	mineral oil	Unknown
		Suffoil-X	mineral oil	Unknown
		Vegol Crop Oil	canola oil	Unknown
NC	Not classified	Buran	garlic powder	Low
P5	Plant extracts	Regalia Maxx	*Reynoutria sachalinensis* extract	Unknown
U12	Guanidines	Equal	dodine	Low–Medium
		Syllit 400 FL	dodine	Low–Medium

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC, or group not indicated on product label. P = Plant defence inducers.
U = Mode of action has not been determined.

[1] Indicates the active ingredient (a.i.) that puts it in this group.
[2] According to Fungicide Resistance Action Committee (FRAC) Visit www.frac.info and search "FRAC Code List 2020" for more information. In co-formulations, the resistance risk listed is for the combination of a.i.'s, not for the individual components.

Managing Resistance to Insecticides and Miticides

- Know the insecticide groups. Rotate products from different groups.
- For insects with multiple, discrete generations (e.g., oriental fruit moth, codling moth, obliquebanded leafroller), manage each generation as separate units or "treatment windows". Use products from a single insecticide group to manage a given generation of a pest. If the pest emergence or activity of that generation is prolonged, apply a second application of the same product. This exposes each generation to only one group. Rotate to another insecticide group (or groups) for subsequent generations.
- For pests whose populations build quickly, with multiple, overlapping generations (e.g., aphids, mites), rotate among products in different insecticide groups for each spray.
- Avoid unnecessary or repeated applications of miticides and rotate among products in different groups. Many labels limit the number of applications of a product to one per season. Consider a multi-year rotation of miticides, so that mites are not exposed to products with a similar mode of action more frequently than once every 3–4 years.
- Consider annual delayed dormant oil or summer oils to suppress mite, aphid or psylla populations and reduce the need for miticides when numbers exceed the treatment threshold.
- Time sprays to contact the most susceptible life stage of the pest. Consider the time of day when the pest is most active and location in the crop to maximize exposure with the treatment.
- Use mixtures with caution. Tank-mixes and pre-formulated mixtures are pest management tools, not insecticide resistance management tools. Mixtures can provide a broader range of target pest control; however, their repeated use increases the probability that the target pest population(s) will develop multiple resistances. Alternating or rotating among products with one active ingredient, rather than mixing them, is the preferred strategy for insecticides and miticides in most situations.
- Consider the use of mating disruption where available and practical.
- Use regional or area-wide tactics rather than crop-by-pest management for cross-commodity pests, such as oriental fruit moth in stone and pome fruits.
- Encourage biological control by choosing pesticides less harmful to beneficial insects and by landscaping to provide flowering plants and unsprayed habitat for these natural enemies. This may reduce the need for insecticides or miticides, particularly those targeting indirect pests such as aphids and mites.
- Monitor problematic pests to detect shifts in sensitivity to a group of pesticides.

Resistance management strategies by insecticide group for Ontario tender fruit crops

Solo products have one active ingredient. Combination products have more than one active ingredient and are indicated with an asterisk (*).

Group 1A & 1B: Imidan, Lorsban, Malathion

- Resistance to these older, broad-spectrum insecticides has occurred in various fruit pest populations in Ontario. Documented cases include resistance to organophosphates in obliquebanded leafroller and pear psylla on pears, and oriental fruit moth on apricots, peaches, nectarines, plums and pears.
- Repeated use (more than once per season) is discouraged because of the potential for further resistance development and toxicity to beneficial insects and mites.

Group 3: Danitol, Decis, Labamba, Matador, Perm-UP, Poleci, Pounce, Silencer, UP-Cyde

- The present status of pear psylla resistance is unknown given that resistance in this pest has not been monitored since the early 1990s. Pear psylla resistance to pyrethroids has been documented in western North America and some pear orchards in the Niagara Peninsula. Resistance may occur in other parts of the province. Documented cases of resistance in populations of obliquebanded leafroller on apples have been found.
- Repeated use (more than once per season) is discouraged because of the potential for further resistance development and toxicity to beneficial insects and mites.

Group 4: 4A – Aceta, Assail, Calypso, Clutch, Cormoran *
4C – Closer, TwinGuard *
4D – Sivanto Prime

- Documented cases of resistance to Calypso have been found in some codling moth populations in Ontario and Quebec. Compounds from these subgroups are structurally distinct but share the same mode of action.
- The risk of cross-resistance between subgroups is considered low. However, where alternatives are available, rotate with other groups.
- If only Group 4 insecticides are registered against the pest but more than one subgroup is included, rotate among subgroups only if it is clear that cross-resistance does not exist in the target populations.

Group 5: Delegate, Entrust, GF-120, Success, TwinGuard *

- Resistance in western flower thrips to this group is known in greenhouse crops and could also be present in outdoor crops.

Group 9: Versys
Group 11: Bioprotec, Dipel, Foray, XenTari
Group 15: Rimon, Cormoran*
Group 28: Altacor, Exirel, Harvanta, Minecto Pro *, Vayego
Group 29: Beleaf

- There are no documented cases of resistance in Ontario for fruit crops to any of these insecticide groups. Use the basic principles of resistance management to ensure that insecticides in these groups work well in the future.

Group 18: Intrepid

- Documented cross-resistance between organophospate insecticides and the growth regulator, Intrepid, has been found in some codling moth populations, in Ontario.
- Where resistance is suspected for codling moth, do not use Group 18, 1A or 1B.

Resistance management strategies by miticide group for Ontario tender fruit crops

Group 6: Agri-Mek, Minecto Pro *

- There are no documented cases of resistant mite populations in Ontario to this group.
- Use resistance management principles.
- Apply this product early before threshold numbers are reached.

Group 10: Apollo

- Isolated cases of mite resistance to Apollo have been found in Ontario. Resistance has occurred where Apollo has been applied repeatedly in one season or applied too late in the season. To delay resistance to Apollo, do not use Apollo every year.
- Apply Apollo when the mite population is synchronous and in the first summer-generation egg stage.

Group 20B: Kanemite
Group 21: Nexter
Group 25: Nealta

- There are no documented cases of resistant mite populations to any of these groups. Use resistance management principles.

Group 23: Envidor, Movento

- There are no documented cases of resistant mite populations in Ontario. Use resistance management principles.
- These products work slowly, so patient and careful monitoring is needed to assess the results.

Table 2–3. Insecticide/Miticide Groups

Group	Type of Action	Chemical Sub-group or Exemplifying Active Ingredient	Product Name	Active Ingredient
1B	nerve	1B Organophosphates	Imidan WP	phosmet
			Lorsban 50 W	chlorpyrifos
			Malathion 85 E	malathion
3	nerve	3A Pyrethroids Pyrethrins	Danitol	fenpropathrin
			Decis 5 EC	deltamethrin
			Decis 100 EC	deltamethrin
			Labamba	lambda-cyhalothrin
			Matador 120 EC	lambda-cyhalothrin
			Perm-UP EC	permethrin
			Poleci	deltamethrin
			Pounce 384 EC	permethrin
			Silencer 120 EC	lambda-cyhalothrin
			UP-Cyde 2.5 EC	cypermethrin
4	nerve	4A Neonicotinoids[2]	Aceta 70 WP	acetamiprid
			Assail 70 WP	acetamiprid
			Calypso 480 SC	thiacloprid
			Clutch 50 WDG	clothianidin
			Cormoran	acetamiprid[1] + novaluron
		4C Sulfoxafimines[2]	Closer	sulfoxaflor
			TwinGuard	sulfoxaflor[1] + spinetoram
		4D Butenilides[2]	Sivanto Prime	flupyradifurone
5	nerve	Spinosyns	Delegate	spinetoram
			Entrust	spinosad
			GF-120 Fruit Fly Bait	spinosad
			Success	spinosad
			TwinGuard	sulfoxaflor + spinetoram[1]
6	nerve and muscle	Avermectins	Agri-Mek SC	abamectin
			Minecto Pro	abamectin[1] + cyantraniliprole

NC = Not classified by IRAC, or group not indicated on product label.

[1] Indicates the active ingredient (a.i.) that puts it in this group.

[2] Although compounds in Groups 4A, 4C and 4D are thought to have the same target site, current evidence suggests the risk of metabolic cross-resistance is low. If there are no other alternatives, then compounds from Groups 4A, 4C and 4D may be rotated.

Table 2–3. Insecticide/Miticide Groups (cont'd)

Group	Type of Action	Chemical Sub-group or Exemplifying Active Ingredient	Product Name	Active Ingredient
9	nerve and muscle	Pyropenes	Versys	afidopyropen
11	disrupt midgut membrane	11A B.t. microbial (and the insecticidal proteins they produce)	Bioprotec PLUS	*Bacillus thuringiensis var. kurstaki*
			Dipel 2X DF	*Bacillus thuringiensis var. kurstaki*
			Foray 48 BA	*Bacillus thuringiensis var. kurstaki*
			XenTari WG	*Bacillus thuringiensis var. aizawai*
15	growth regulation	Benzoylureas	Rimon 10 EC	novaluron
			Coromoran	acetamiprid + novaluron[1]
10	growth regulation	10A Clofentezine	Apollo SC	clofentezine
18	growth regulation	Diacylhydrazine	Intrepid 240 F	methoxyfenozide
20	energy metabolism	20B Acequinocyl	Kanemite 15 SC	acequinocyl
21	energy metabolism	21A Mitochondrial complex I electron transport inhibitors (METI)	Nexter SC, Nexter WP	pyridaben
23	lipid synthesis, growth regulation	Tetronic and tetramic acid derivatives	Envidor 240 SC	spirodiclofen
			Movento 240 SC	spirotetramat
25	energy metabolism	Beta-ketonitrile derivatives	Nealta	cyflumetofen
28	nerve and muscle	Diamides	Altacor	chlorantraniliprole
			Exirel	cyantraniliprole
			Harvanta	cyclaniliprole
			Minecto Pro	abamectin + cyantraniliprole[1]
			Vayego 200 SC	tetraniliprole
29	nerve	Chordotonal organ modulators - undefined target site	Beleaf 50 SG	flonicamid

NC = Not classified by IRAC, or group not indicated on product label.

[1] Indicates the active ingredient (a.i.) that puts it in this group.

[2] Although compounds in Groups 4A, 4C and 4D are thought to have the same target site, current evidence suggests the risk of metabolic cross-resistance is low. If there are no other alternatives, then compounds from Groups 4A, 4C and 4D may be rotated.

Handling and Mixing Pesticides

Water Volume and Coverage

When the pesticide label does not prescribe a water volume or concentration, the sprayer operator must decide the appropriate volume. There should be sufficient water to disperse or dissolve the product and create enough spray to contact all target surface(s) with minimal runoff. The degree of *contact* is called coverage, which is a combination of the percent surface area covered and the droplet density on that surface. The operator must consider the following factors when choosing a volume:

- *The level of coverage required reflects the product's mode of action.* For example, a contact product generally requires a higher droplet density than a locally systemic product (which has limited translocation in plant tissues). A miticide intended to saturate bark is a dilute application that often incurs runoff. Plant growth regulators have very specific coverage requirements and should not be generalized.
- *The location and nature of the target.* For example, if the target is a mobile insect found predominately on the upper-side of the leaf, it may be controlled with less water than a disease found deep in the plant canopy. Further, the orientation and surface texture of the target will affect how spray is retained and how it spreads.
- *The impact of environmental conditions, sprayer design and the crop size, density and developmental stage.* For example, the more plant canopy to be protected per hectare, the more water volume will be required. More volume is required when sprayer air is poorly adjusted, the weather is dry and/or windy and the distance-to-target is long or convoluted (such as tree-tops or deep in unpruned canopies).

To understand the relationship between water volume and coverage, the sprayer operator requires a feedback mechanism. Visual inspection of foliar "wetness" or spray residue is subjective and transient, and therefore insufficient. Water-sensitive papers distributed within the target canopy provide a fast, repeatable and quantifiable means for evaluating coverage. Most conventional foliar products require minimal coverage of 10–15% with a droplet density of 85 droplets/cm^2.

Smartphone apps such as the GRDC's SnapCard (https://www.agric.wa.gov.au/grains/snapcard-spray-app) quickly calculate and record spray coverage for future consideration in light of the level of protection achieved. For more information on quantifying coverage, see the Sprayers101 website (www.sprayers101.com)

General Mixing Steps

1. *Read all product labels.* Know the product formulation (which affects mixing method and order). Look for information about the influence of water pH, hardness and any requirement for adjuvants. Defer to label instructions should they differ from the following mixing steps.

2. *Shake any liquid products.* This ensures the active ingredient and inert ingredients are thoroughly mixed.

3. *Fill the tank 50% with the required water volume.*

4. *Agitate.* Agitation should continue through the mixing process. Excessive agitation may create foaming. If possible, reduce the level of agitation or use a defoamer adjuvant (50% of which should be added during step 3, and the remainder during step 7).

5. *Add products in order.* The formulation type dictates the order in which tank-mix partners should be added. See Table 2–4. *Tank-mix Order for Pesticide Compatibility Test.* If using an inductor, flush with water between additions.

6. *Wait and check.* Dry products and water-soluble packets must fully disperse and/or dissolve before adding the next product. Several factors affect the duration, but 3–5 minutes is typical.

7. *Add remaining water.*

8. *Measure pH.* This is best done after all products are added to account for their impact on pH and buffering capacity. If required, pH adjusters can be added at the end of mixing to ensure the solution is in the range required by the label.

Product Order by Formulation

1. *Dry Formulations:* These include water dispersible granules (WDG or WG), wettable powders (WP) and soluble granules (SG). Allow more time for these products to dissolve and/or disperse completely. Best practice is to premix these products with water in a slurry before adding to the tank.

2. *Anti-drift adjuvants, compatibility agents or anti-foamers:* Consult labels as these products may require multiple additions or a different order than indicated here.

3. *Liquid Formulations:* Liquid pesticide formulations mix in water to form a solution. Some pesticides may be oil-based, such as emulsifiable concentrates (EC), and form an opaque (milky) emulsion that requires moderate agitation and may be prone to foaming.

Water Soluble Packaging

Water-soluble packaging (WSP) is often used for dry formulations. The PVA (polyvinyl alcohol) packaging should dissolve completely when added directly to the tank water (not the basket filter). Protect them from moisture by leaving them in outer packing until just before use and do not handle them with wet gloves. Reseal them to protect remainder.

Do not mix WSP with any product incompatible with the PVA packaging. This includes residues from prior applications.

- Oils (e.g., Superior Oil)
- EC formulations containing mineral or vegetable oil
- Boron
- Chelated micronutrients
- Water-soluble fertilizers

Compatibility of Spray Materials

Tank-mixing is adding more than one formulated product in the tank at the same time for efficiency, resistance management and improved performance. However, the odds of incompatibility increase with the number of tank-mix partners.

Physical incompatibility can result in the solution thickening, foaming, separating or falling out of suspension, which in turn leads to poor coverage uniformity or plugged / damaged spray equipment. Chemical incompatibility (i.e. antagonism or synergy) can result in reduced pesticide efficacy or cause plant injury when sprayed on the crop.

For information on compatibility, always check the product label, product manufacturer or distributor. Do not decide on tank-mixes during loading: do so off-season. Before tank-mixing pest control products, ensure the following:

- each product is registered for use in Canada on the crop
- each product is used according to the label
- the tank-mix includes an adjuvant only when specifically required by one of the product labels
- the application timing of each product is compatible with crop and pest staging
- no product is specifically excluded on any other of the tank-mix product labels

Registered product labels can be downloaded through Health Canada's label search webpage at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Search for the following keywords:

- Do not mix
- Mix
- Hours
- Agitation
- The trade name of any intended tank-mix partner

To avoid well-known incompatibilities do the following:

- Add Maestro or other captan products before EC formulations of pyrethroids. Apply immediately with constant agitation.
- Do not mix pesticides with lime sulphur or streptomycin.

Jar Test for Pesticide Compatibility

If labels do not include comments on compatibility, or you are considering a new tank-mix, use a *Jar Test* to determine physical compatibility. Note, this will not reveal a chemical incompatibility. When performing a jar test, do so in a safe and ventilated area, away from sources of ignition, and always wear personal protective equipment (PPE).

1. Measure 500 ml of water into a 1 litre glass jar. Be sure to use the same water at the same temperature used in the sprayer.

2. Add ingredients according to Table 2–4. *Tank-Mix Order for Pesticide Compatibility Test,* stirring after each addition.

3. Let the solution stand in a ventilated area for 15 minutes and observe the results. If the mixture is giving off heat, these ingredients are not compatible. If gel or scum forms or if solids settle to the bottom (except for the wettable powders) then the mixture is likely incompatible.

4. Keep records and retain the jars for the season. They may indicate products prone to settling or separating after prolonged rest (e.g. parking the sprayer overnight). They may also indicate potential problems during re-suspension or cleanout.

If you experience a physical incompatibility issue in the sprayer, do not immediately add water, ammonia, non-ionic surfactants or detergents to the tank. This may create further problems. First, contact the manufacturer or dealer for more information. Then, perform a *Reverse Jar Test* by sampling the solution and attempting to break down a small volume before doing so in the sprayer. If you succeed in re-suspending the solution, it may no longer be viable and must be safely discarded.

Table 2–4. Tank-mix Order for Pesticide Compatibility Test

Order	Ingredient	Quantity for 500 mL or 500 g of Product Labeled for 1,000 L of Final Spray Volume
1	compatibility agents	5 mL (1 teaspoon)
2	water-soluble packets, wettable powders and dry flowables Include a ~1cm^2 cutting of the PVA packaging.	15 g (1 tablespoon)
3	liquid drift retardants	5 mL (1 teaspoon)
4	liquid concentrates, micro-emulsions and suspension concentrates	5 mL (1 teaspoon)
5	emulsifiable concentrates	5 mL (1 teaspoon)
6	water-soluble concentrates or solutions	5 mL (1 teaspoon)
7	remaining adjuvants and surfactants	5 mL (1 teaspoon)

Factors Impacting Pesticide Performance

Water quality can affect pesticide performance. The four variables are: pH (acidity & alkalinity), dissolved minerals (water hardness or softness), suspended particles (dirty water) and temperature. For more information, see sprayers101.com, OMAFRA Factsheet 09–037, *How Weather Conditions Affect Spray Applications* and OMAFRA Factsheet 09–039, *Six Elements of Effective Spraying in Orchards and Vineyards.*

Filling the Tank

Pesticide labels usually provide directions for mixing different materials, including the sequence for mixing. The order in which you add each product to the tank, or inductor, is critical. For the latest information, see sprayers101.com.

Spray drift

Do you know what pesticide drift looks like or what you can do about it? OMAFRA and CropLife Canada have created videos with innovative visual demonstrations using dyes and night-spraying to show what drift looks like. See how spray particles behave and discover what changes can be made to your spray program to greatly reduce the risk of pesticide drift. Learn more at ontario.ca/spraydrift.

For more information on pesticide handling and operator safety, consult the Ontario Pesticide Education Program (OPEP) Grower Pesticide Safety course (www.opep.ca/resources).

Adjuvants Used in Fruit Crops

Spray adjuvants are tank-mix additives used to modify and enhance the effectiveness of the pesticide. They can improve pesticide performance by modifying the spray pattern, quality, uptake and penetration into the plant or insect exoskeleton. Other benefits to adjuvants may include:

- Keeping pesticide from binding to minerals suspended in water.
- Adjusting water pH so pesticide is less likely to break down.
- Manipulating droplet size to reduce on-target and off-site movement of pesticide.
- Improving odds that a spray droplet will stay on the target by reducing factors that cause droplets to bounce and roll off.
- Modifying or reducing surface tension to enhance the ability of a droplet to be retained on or spread across the target surface.
- Minimizing spray droplet evaporation.
- Preventing spray deposit from being washed off the leaf surface.
- Protecting the active ingredient from degrading in sunlight.
- Improving pesticide's absorption and uptake by the plant or insect exoskeleton.

Unless the product label specifies an adjuvant be added to the tank, growers do not need to use them. However, if use of an adjuvant is stated on the product label, pesticide performance and efficacy can be significantly reduced if it is not included. There are many types of adjuvants which include:

- surfactants / wetter-spreaders (e.g., non-ionic surfactant, including organosilicones)
- stickers / spreader-sticker (e.g., kaolin clay)
- oil concentrates (e.g., petroleum-based crop oil, modified/methylated seed oils)
- water conditioning agents
- evaporation retardants
- anti-foaming agents
- pH adjusters (e.g., acidifiers, buffering agents)
- drift suppressing agents

A label may specify a particular name brand or generalize a category of adjuvant. In the latter case, the grower is free to use any adjuvant in that category, provided it is registered for use on the crop and in combination with the pesticide being applied. Always use adjuvants as directed on the product label. For specific adjuvants, consult your local input retailer or product registrant.

General cautions around the use of adjuvants include:

- Avoid the use of adjuvants that help with penetration into plant tissue with copper, sulphur or captan fungicides. This includes the use of oils. Penetrants should not be used with contact or surface pesticides. Consult pesticide and adjuvant labels for minimum interval for rotations including adjuvants.
- Avoid adjuvants with sticker activity that could impede movement of systemic pesticides in plant tissue.
- Avoid adjuvants with sticker activity early in the growing season when redistribution is important to protect newly emerging leaves. However, this may be a desirable characteristic during wet springs.

For more information on adjuvants, see the Sprayers 101 website at sprayers101.com.

Apricots

In this section:

The information in this chapter is provided as a guideline only. Read the product label and follow all safety precautions. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Many pesticides are in various stages of re-evaluation by PMRA and their status may change within the lifetime of this publication. Consult the PMRA website and/or the registrant to verify actual dates of last sale and last use. Updates will also be available at ONFruit.ca.

- Consult the product label for suggested water volumes. Otherwise, use enough water to ensure thorough spray coverage. Where the product rate is listed in amount per 1,000 L, and if a water volume is not provided on the label, use enough water to wet the foliage to the near drip point.
- For preharvest interval (PHI), restricted entry interval (REI), and maximum number of applications, see Table 3–2. *Products Used on Apricots.*
- **Products are listed by chemical group and in alphabetical order within each group.** The order does not reflect efficacy. See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees* for efficacy ratings.
- Where a product in the calendar is followed by a "*", it is potentially acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with your certifying body to verify the acceptability of any product prior to use.
- Not all varieties have been tested with all possible tank-mix combinations, especially with new products. Prior to tank-mixing any unfamiliar chemical combinations (fungicides, insecticides, liquid fertilizers, biological control products, adjuvants, and additives), conduct a jar test to determine if there are any physical incompatibilities. For more information, see *Compatibility of Spray Materials,* Chapter 2 and

Table 2–4. *Tank-mix Order for Pesticide Compatibility Test.* Before applying the tank-mix, also test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

Resistance Management

To delay development of resistance to insecticides, miticides and fungicides, follow resistance management guidelines outlined in *Resistance Management Strategies,* Chapter 2. The chemical group is indicated in the column labelled "Group" before the "Product" column. Products belonging to the same chemical group are grouped together in the calendar. Multi-site (M) fungicides are not prone to resistance and do not have to be rotated. Some products are not classified to mode of action (NC) and the mode of action has not been determined for others (U). Plant defence inducers (P) and biological fungicides with multiple modes of action (BM) are not known to be prone to resistance.

Fungicide resistance management

Take the following steps to avoid rapid development of fungicide resistance:

- Do not reduce rates below those specified on the label.
- Do not use products containing the same chemical group in consecutive applications.
- Do not use Bumper, Cevya, Fitness, Indar, Jade, Princeton, Quash, Cantus, Fontelis, Kenja, Sercadis, Luna Sensation, Miravis Duo or Pristine when sporulating lesions of brown rot are present.
- Do not exceed maximum number of applications on the label.

Insecticide resistance management

Take the following steps to avoid rapid development of insecticide resistance:

- For pests with discrete generations (oriental fruit moth, plum curculio, borers, and obliquebanded leafroller), do not use insecticides from the same group for more than one generation. Within a generation, if more than one spray is required, use a product from the same chemical group.
- For pests with overlapping generations (aphids, mites, spotted wing drosophila), do not use products containing the same chemical group in consecutive applications.
- Do not exceed maximum number of applications on the label.

Bee Toxicity

Some insecticides are toxic to bees and other pollinating insects. Use of insecticides on flowering crops requires careful management to avoid negative effects on pollinators. Some insecticides cannot be applied prior to bloom. **Insecticides should not be applied when fruit trees are in bloom.** Do not apply insecticides when bees are active. Before and after bloom, bees may be present on flowering cover crops and weeds—do not allow drift of insecticides onto these or other flowering crops. Always follow label precautions to avoid impacts on bees. For more information, see *Bee Poisoning,* Chapter 1, and honeybee toxicity ratings in Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*

Buffer Zones

Leave a suitable buffer zone between treatment area and adjacent sensitive areas, such as hedgerows, woodlots and freshwater habitats. Zones may vary depending on the product used, growth stage of the crop and method of application including the use of drift-reducing technology. Check the pesticide label for requirements.

Use Health Canada's online spray drift calculator to modify the buffer zone specified on the label based on weather conditions, category of spray equipment and droplet size. For more information, see the Buffer Zone Calculator at www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php. Unfortunately, this model does not account for water volume, travel speed or crop stage.

Observing buffer zones is a legal requirement. A record of the buffer zone modification, if any, must be retained for at least one year from the time of application.

Pesticide Persistence

Some products are persistent and may carry over from one year to the next. Where possible, avoid using these products used in areas treated during the previous season. Consult labels for product-specific information.

Crop Nutrition

Crop nutrition is important for plant growth and fruit quality on berry crops. Soil testing, plant tissue analysis and visual deficiency symptoms all play an important role in assessing and monitoring the crop's nutritional status. For more information, visit the *Soil Management, Fertilizer Use, Crop Nutrition and Cover Crops for Fruit Production* webpage at http://www.omafra.gov.on.ca/english/crops/hort/soil_fruit.htm and see OMAFRA Publication 611, *Soil Fertility Handbook*.

Table 3–1. Apricot Calendar

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant (in late March or early April before buds swell)						
European red mite	**General Comments:** • Apply in a high-volume spray to ensure thorough coverage. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. • Do not use within 14 days of Maestro or other captan products. • Do not apply within 48 hours of freezing temperatures or prior to rain.					
	NC	Purespray Green Spray Oil 13 E *	2% v/v	12 hours	—	In addition to precautions in general comments, do not use within 14 days of Cueva.
		Superior 70 Oil *	2% v/v	12 hours	prebloom	In addition to precautions in general comments, do not use within 14 days of Cueva.
		Vegol Crop Oil *	2% v/v	12 hours	0 days	In addition to precautions in general comments, do not use within 14 days of copper.
Bacterial canker, Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Apply in a high-volume spray to ensure thorough coverage. Do not mix with lime. Do not apply within 14 days of oils.
Scale	NC	Vegol Crop Oil *	2% v/v	12 hours	0 days	Apply in a high-volume spray to ensure thorough coverage. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not apply within 48 hours of freezing temperatures. Do not use within 14 days of Maestro, other captan products or copper.
Bloom						
DO NOT APPLY INSECTICIDES WHILE APRICOT TREES ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage)	**General Comments:** • Apricots are extremely susceptible to brown rot. Knock off fruit mummies when pruning. • Spray when first blossoms open. If wet weather occurs, reapply spray at 50% bloom and at full bloom. • Group 3, 7 and 11 fungicides are locally systemic and will penetrate petals to protect fruit from infection as bloom starts to occur. Consult labels for information on drying time required before rain.					

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE APRICOT TREES ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage) (cont'd)	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area. Do not apply within 14 days of oils.
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/29 days[2]	2 days/15 days[3]	Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products per year. When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Quash	175–245 g/ha	12 hours[1]/9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	Group 3+7	Miravis Duo	1 L/ha	12 hours	0 days/12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, coppers) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	**Suppression only.** Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
		Sercadis	333 mL/ha	12 hours	0 days/12 hours[3]	Use with a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after full bloom.**
	7+11	Pristine WG	750 g/ha	when dry[1]/10 days[2]	0 days/24 hours[3]	No product specific comments.
		Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
	BM1	Fracture or ProBLAD Plus	1.5–3.3 L/ha	12 hours	0 days/12 hours[3]	**Suppression only.** Under high disease pressure, use high rate. Do not mix with foliar fertilizers.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE APRICOT TREES ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage) (cont'd)	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.
Petal fall to Shuck						
Brown rot	• Use one of the fungicides listed for Brown rot at **Bloom**. • Quash rate is 175–280 g/ha for fruit rot. **Maximum of 1 application per year.** • **Maximum of 1 application of Maestro or other captan products per year.** • **Do not use Sercadis after full bloom.**					
Scab	**General Comments:** • Fungicides applied for brown rot may have some activity against scab. See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees.*					
	3	Quash	175-245 g/ha	12 hours[1]/9 days[2]	14 days	**Suppression only. Maximum of 1 application per year.**
	7	Fontelis	1.0–1.5 L/ha	12 hours	0 days/12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, coppers) may cause crop safety issues. See label for tank-mix restrictions. In orchards with a history of scab or under high disease pressure, use high rate and shorten intervals between applications.
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. Reapply at 7–14-day intervals if weather is wet and warm. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area. Do not apply within 14 days of oils.
Oriental fruit moth	NC	Isomate OFM TT *	125–250 dispensers/ha	0 hours	0 days	Reduces mating of oriental fruit moth. Apply dispensers in early April before flight begins. Place dispensers in lateral branches in the upper canopy uniformly across the orchard block. Use high rate for high pressure areas or initial year of treatment. Dispensers are designed to last the entire season. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.* If desired, use both an insecticide and mating disruptor for managing first-generation oriental fruit moth (see Shuck split). Apply supplemental control measures when conditions warrant.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall						
Brown rot	• Use one of the fungicides listed for Brown rot at **Bloom**. • Apricots are extremely susceptible to brown rot from bloom through pit-hardening. • Quash rate is 175–280 g/ha for fruit rot. **Maximum of 1 application per year.** • **Maximum of 1 application of Maestro or other captan products per year.** • **Do not use Sercadis after full bloom.**					
Scab	• Use one of the fungicides listed for Scab at **Petal fall to Shuck.** • Fungicides applied for brown rot may have some activity against scab. See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees.*					
Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. Reapply at 7–14-day intervals if weather is wet and warm. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
Oriental fruit moth	**General Comments:** • Where mating disruption products have been placed in the orchard, a pesticide application is generally not required at this time. • Apply insecticides within the specified degree-days (DDC, base 7.2°C) after sustained first-generation moth catch. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2. • Some of these products are toxic to bees. Do not apply when bees are active, or hives are in the orchard, or when cover crops are in bloom. Refer to label for specific bee toxicity statements.					
	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/6 days[2]	7 days	Apply at 111–139 DDC. For optimum activity, use high rate in a minimum spray volume of 1,000 L/ha. Do not apply more than once every 12 days.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/6 days[2]	7 days	Apply at 111–139 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	3 days	Apply at 194–208 DDC. Reapply 10–14 days later if trap catch is extended.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 111–139 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	18	Intrepid 240 DF	1.5 L/ha	12 hours	14 days	Apply at 111–139 DDC. **Use for first generation only.**
	28	Altacor	285 g/ha	12 hours	1 day	Apply at 194–208 DDC. Reapply 10–14 days later if trap catch is extended. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Harvanta 80 SL	1.2–1.6 L/ha	12 hours	5 days	
		Vayego 200 SC	300 mL/ha	12 hours	5 days	

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (cont'd)						
Plum curculio	**General Comments:** • Apricots are very susceptible to plum curculio injury. Adequate spray coverage is essential. • Scout edges of orchards near woodlots and wild hosts in spring. Damage often occurs only on the border of the orchard. Check small fruit for crescent-shaped egg-laying scars and reassess developing fruit for new damage 7–10 days after insecticide is applied. • Some of these products are toxic to bees. Do not apply when bees are active, or hives are in the orchard or cover crops are in bloom. Refer to label for specific bee toxicity statements.					
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours[1]/6 days[2]	7 days	Under high pressure, may provide suppression only.
	4A+15	Cormoran	2.1 L/ha	12 hours[1]/6 days[2]	7 days	Under high pressure, may provide suppression only. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	**Suppression only.**
		Vayego 200 SC	300 mL/ha	12 hours	5 days	**Suppression only.**
First cover (10–12 days after Shuck fall)						
Brown rot	• Use one of the fungicides listed for Brown rot at **Bloom**. • Rotate among fungicide groups for resistance management. • Apricots are extremely susceptible to brown rot from bloom through pit-hardening. • Quash rate is 175–280 g/ha for fruit rot. **Maximum of 1 application per year.** • **Maximum of 1 application of Maestro or other captan products per year.** • **Do not use Sercadis after full bloom.**					
Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. Reapply at 7–14-day intervals if weather is wet and warm. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area. Do not apply within 14 days of oils.
Scab	**General Comments:** • Use one of the fungicides listed for Scab at **Petal fall to shuck**. • Fungicides applied for brown rot may have activity against scab. See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees.* • Repeat applications at 7–14-day intervals.					
Plum curculio	• Use one of the insecticides listed for Plum curculio at **Shuck split to Shuck fall.**					

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need)						
Aphids	4C	Closer	100–200 mL/ha	12 hours	7 days	Rotate with products outside of Group 4. **Closer:** Use the higher rate for longer residual activity. **Twinguard:** Also controls Oriental fruit moth.
	4C+5	TwinGuard	250 g/ha	12 hours	7 days	
	4D	Sivanto Prime	750 mL/ha	12 hours	14 days	
	28	Exirel	0.75–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Vayego 200 SC	150 mL/ha	12 hours	5 days	**Suppression only.**
	29	Beleaf 50 SG	120–200 g/ha	12 hours[1]/3 days[2]	14 days	Use high rate for high pressure and/or dense foliage.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/12 hours[3]	Do not apply more than 1,650 L/ha per application. Do not apply when temperatures are greater than 32°C.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	Apply in a high-volume spray to ensure thorough coverage. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use within 48 hours of freezing temperatures, when temperatures are high (above 32°C), prior to rain or to heat- or moisture-stressed trees. Do not apply to wet foliage. **SuffOil-X:** Do not use in combination with or immediately before or after spraying with Maestro or other captan products, any product containing sulphur or any product whose label recommends against the use of oils. **Vegol:** Do not use with 14 days of Maestro or other captan products or copper.
		Vegol Crop Oil *	2% v/v	12 hours	0 days	
European red mite	**General Comments:** • European red mite is a sporadic pest in apricot orchards. • Apply when there are 10 active mites per leaf in the absence of beneficial predatory mites.					
	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Active on all life stages. Control may not be apparent for 2–3 weeks. Apply before mite populations build up.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/12 hours[3]	Do not apply more than 1,650 L of water/ha per application. Do not apply when temperatures are greater than 32°C.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	See comments on these products for European red mite at **Dormant.**
		Vegol Crop Oil *	2% v/v	12 hours	0 days/12 hours[3]	

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Oriental fruit moth	**General Comments:** • Check harvest dates of early varieties and do not spray within the PHI. • Apply insecticide within the specified degree-days (DDC, base 7.2°C) after sustained first-generation moth catch. If flight is extended beyond 10–14 days, reapply the same product used for this generation. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2. • Spotted wing drosophila (SWD) may be attracted to fruit as soon as they start to soften. Use a product for oriental fruit moth that is also active against SWD if present in the area. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/6 days[2]	7 days	Rotate with products outside of Group 4 insecticides. **Aceta, Assail:** Apply at 555–583 DDC and again at 722–750 DDC. For optimum activity, use high rate in a minimum spray volume of 1,000 L/ha. Do not apply more than once every 12 days. **TwinGuard:** Apply at 639–667 DDC and again at 805–833 DDC. **Cormoran:** Apply at 555–583 DDC and again at 722–750 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/6 days[2]	7 days	
	5	Delegate	420 g/ha	12 hours	3 days	Apply at 639–667 DDC and again at 805–833 DDC.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 555–583 DDC and again at 722–750 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Altacor	285 g/ha	12 hours	1 day	Apply at 639–667 DDC and again at 805–833 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Vayego 200 SC	300 mL/ha	12 hours	5 days	
Obliquebanded leafroller, Leafrollers	**General Comments:** • Insecticides for summer-generation larvae should be applied at 240–280 DDC (base 6.1°C) after first sustained moth catch. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2. • Reapply if larval activity is extended.					
	4C+5	TwinGuard	250–500 g/ha	12 hours	7 days	Reapply 14 days later if larval activity is extended.
	5	Delegate	420 g/ha	12 hours	3 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	No product specific comments.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Obliquebanded leafroller, Leafrollers (cont'd)	11	Bioprotec PLUS * or Dipel 2X DF * or XenTari WG *	1.8–2.5 L/ha 1.125 kg/ha 0.5–1.6 L/ha	4 hours 12 hours 12 hours	0 days	Apply in evening or on a cloudy day. Spray when and where pests are actively feeding. Apply in a high-volume spray to ensure thorough coverage on both sides of the leaf. Apply to young larvae, early in infestation. Death of insect may take several days. Reapply at 5–7-day intervals if larvae activity is extended.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Do not allow this product to drift on grapes as leaf spotting may occur
	28	Altacor	285 g/ha	12 hours	1 day	No product specific comments.
		Exirel	0.5–1.0 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
		Vayego 200 SC	225 mL/ha	12 hours	5 days	No product specific comments.
Lesser peachtree borer, Peachtree borer	**General Comments:** • Peachtree borers are sporadic pests of apricots.					
	NC	Isomate-PTB Dual *	375 dispensers/ha	0 hours	0 days	Reduces mating of peachtree and lesser peachtree borers. Apply before moth emergence begins, (i.e., typically at or before shuck split). Dispensers are designed to last the entire season. At high-pressure sites, insecticides may be needed. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.*
	5	Delegate	420 g/ha in 1,500–2,000 L water	12 hours	5 days	Use pheromone traps to monitor adult activity and begin sprays 1 week after first flight. Reapply at 3-week intervals. Direct sprays with a handgun to cover trunk and scaffold limbs to 1.5 m above ground. Thorough coverage of trunk and lower scaffolds is essential. **Delegate: Suppression only. Do not spray fruit.** **Rimon:** Do not allow this product to drift on grapes as leaf spotting may occur.
	15	Rimon 10 EC	1.4 L in 1,000 L water	12 hours	14 days	

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Brown marmorated stink bug	**General Comments:** • Breeding populations of this pest are present in Ontario. Check ontario.ca/stinkbug for updates on pest development, registered products and management strategies. • There are currently no thresholds established. Apply when insects are first detected, or when early damage is found.					
	4A	Clutch 50 WDG	210–420 g/ha	12 hours	7 days	**Suppression only.** This product is toxic to beneficial insects and should be used only when necessary. **Labeled for BMSB only. Cannot be used after April 11, 2022.**
Spotted wing drosophila	**General Comments:** • Spotted wing drosophila insert eggs into ripening fruit. Larvae develop in the fruit and may be present at harvest, contributing to premature breakdown. • Apply insecticides weekly when fruit is ripening or ripe, and flies are present. • Frequent picking, burial of grade-out fruit, and general sanitation are very important to prevent problems. • These products rely on contact in order to control spotted wing drosophila adults. Apply in a high-volume spray to ensure thorough coverage of fruit.					
	1B	Malathion 85 E	610–855 mL in 1,000 L water	12 hours[1]/3 days[2]	7 days	**Suppression only.**
	3	Danitol	0.779–1.559 L/ha	24 hours[1]/23 days[2]/ 7 days[4]	16 days	No product specific comments.
	5	Delegate	420 g/ha	12 hours	3 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	No product specific comments.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
San Jose scale	4C+5	Closer	200–400 mL/ha	12 hours	7 days	No product specific comments.
		TwinGuard	500 g/ha	12 hours	7 days	Apply when crawlers are active in orchards with a history of scale.
	Group 23	Movento 240 SC	365–595 mL/ha	12 hours	7 days	Control may not be apparent for 2–3 weeks. Apply in first 2 weeks of June in blocks where scale was observed the previous year. Tank-mix with a permitted adjuvant/additive that has sticking and penetrating properties at the suggested rate of 0.2% v/v (2.0 L in 1,000 L of water). Because of oil tank-mix, do not tank-mix with sulphur, Maestro or other captan products. Reapply if necessary after 14 days. **Do not apply before petal fall.**

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Prepick to harvest **Check preharvest interval before spraying early maturing varieties. See Table 3–2. *Products Used on Apricots*.**						
Brown rot	**General Comments:** • Apricots are extremely susceptible to brown rot just before picking.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/29 days[2]	2 days/15 days[3]	Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products per year.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	**Maximum of 2 applications of any of these fungicides in the 3 weeks prior to harvest.**
		Cevya	250–375 mL/ha	2 hours	0 days/12 hours[3]	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Quash	175–280 g/ha	12 hours[1]/9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro, other captan products, or coppers) may cause crop safety issues. See label for tank-mix restrictions.
	7+11	Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days[1]/24 hours[2]	No product specific comments.
		Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–1. Apricot Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Postharvest fruit treatment						
Blue mold, Grey mold, Brown rot, Rhizopus rot	12	Scholar 230 SC	496 mL in 378 L water	—	postharvest	Postharvest treatment may be necessary during wet harvest seasons. These treatments will prolong storage time while providing control of postharvest diseases. See label for dip and drench instructions.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. * = Potentially organic. Check with certifying body.

Table 3–2. Products Used on Apricots

Use this table as a guide but refer to product label for specific information.

The preharvest interval (PHI) is the number of days between the last spray and first harvest.

The restricted entry interval (REI) is the minimum interval that must be observed between application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume it is 12 hours. **If the REI for harvest exceeds the PHI, follow the REI.**

The maximum applications is the labelled maximum number or product amount applied for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Products listed as potentially organic may be acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with certifying body to verify the acceptability of any product prior to using it.

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression							
Aceta 70 WP	33298	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Altacor	28981	chlorantraniliprole	28	1 day	12 hours	3 (max. 645 g/ha)	—
Assail 70 WP	27128	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Beleaf 50 SG	29796	flonicamid	29	14 days	12 hours[1]/3 days[2]	3 (max. 600 g/ha)	—
Bioprotec PLUS	32425	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	4 hours	—	*
Closer	30826	sulfoxaflor	4C	7 days	12 hours	2	—
Clutch 50 WDG	29382	clothianidin	4A	7 days	12 hours	2 (max. 420 g/ha)	—
Cormoran	33353	acetamiprid + novaluron	4A+15	7 days	12 hours[1]/6 days[2]	4	—
Danitol	33817	fenpropathrin	3	16 days	24 hours[1]/23 days[2]/7 days[8]	1	—
Delegate	28778	spinetoram	5	3 days	12 hours	3/3[3]	—
Dipel 2X DF	26508	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	12 hours	—	*
Entrust	30382	spinosad	5	3 days	when dry	3	*
Envidor 240 SC	28051	spirodiclofen	23	7 days	12 hours	1	—
Exirel	30895	cyantraniliprole	28	3 days	12 hours	4 (max. 4.5 L/ha)	—
Harvanta 50 SL	32889	cyclaniliprole	28	7 days	12 hours	5	—
Intrepid	27786	methoxyfenozide	18	14 days	12 hours	1	—
Isomate OFM TT	31419	pheromone, oriental fruit moth	NC	—	—	—	*
Isomate-PTB Dual	30042	pheromone, peachtree borer, lesser peachtree borer	NC	—	—	—	*
Kopa Insecticidal Soap	31433	potassium salts of fatty acids	NC	0 days	12 hours[1,4]	—	*
Malathion 85 E	8372	malathion	1B	7 days	12 hours[1]/3 days[2]	2	—
Movento 240 SC	28953	spirotetramat	23	7 days	12 hours	max. 1.12 L/ha	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers.
— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunks and 3 applications to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] Maximum of 10 applications per season with no more than 2 dormant applications. [8] Scouting.

Table 3–2. Products Used on Apricots (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	—	12 hours	2 (dormant)	*
Rimon 10 EC	28881	novaluron	15	14 days	12 hours	3	—
Sivanto Prime	31452	flupyradifurone	4D	14 days	12 hours	max. 2 L/ha	—
Success	26835	spinosad	5	3 days	when dry	3	—
SuffOil-X	33099	mineral oil	NC	12 hours	12 hours	8	*
Superior 70 Oil	9542 14981	mineral oil	NC	prebloom only	12 hours	—	*
TwinGuard	31442	sulfoxaflor + spinetoram	4C+5	7 days	12 hours	2	—
Vayego 200 SC	33711	tetraniliprole	28	5 days	12 hours	3	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[1,4]	2/4[5]	*
XenTari WG	31557	*Bacillus thuringiensis subsp. aizawai*	11	0 days	12 hours[1,4]	—	*
Products used for disease control or suppression							
Bumper 432 EC	28017	propiconazole	3	3 days	12 hours	5[6]	—
Cantus WDG	30141	boscalid	7	0 days	12 hours[1,4]	5	—
Cevya	33405	mefentrifluconazole	3	0 days	12 hours[1,4]	max. 1.125 L/ha	—
Cueva	31825	copper octanoate	M	1 day	4 hours	15	*
Fracture	32139	BLAD polypeptide	BM1	0 days	12 hours[1,4]	3	—
Fitness	32639	propiconazole	3	3 days	3 days	5[6]	—
Fontelis	30331	penthiopyrad	7	0 days	12 hours[1,4]	max. 4.5 L/ha	—
Indar	27294	fenbuconazole	3	0 days	12 hours[1,4]	7	—
Jade	24030	propiconazole	3	3 days	3 days	5[6]	—
Kenja 400 SC	31758	isofetamid	7	1 day	12 hours	3	—
Luna Sensation	32107	fluopyram + trifloxystrobin	7+11	1 day	12 hours	max. 1.98 L/ha	—
Maestro 80 WSP	33488	captan	M	2 days	24 hours[1]/29 days[2]/15 days[4]	1	—
Miravis Duo	33206	difenoconazole + pydiflumetofen	3+7	0 days	12 hours[1,4]	max 4.0 L/ha	—
Princeton	33840	propiconazole	3	3 days	3 days	5[6]	—
Pristine WG	27985	boscalid + pyraclostrobin	7+11	0 days	when dry[1]/10 days[2]	5	—
ProBLAD Plus	31782	BLAD polypeptide	BM1	0 days	12 hours[1,4]	3	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers.
— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunks and 3 applications to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] Maximum of 10 applications per season with no more than 2 dormant applications. [8] Scouting.

Table 3–2. Products Used on Apricots (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	0 days	12 hours[1,4]	2/8[7]	*
Quash	30402	metconazole	3	14 days	12 hours[1]/9 days[2]	1	—
Regalia Maxx	30199	extract of *Reynoutria sachalinensis*	P5	0 days	when dry	—	*
Scholar 230 SC	29528	fludioxonil	12	postharvest	—	1	—
Sercadis	31697	fluxapyroxad	7	0 days	12 hours[1,4]	3	—
Serenade OPTI	31666	*Bacillus subtilis*	44	0 days	when dry	—	*
Supra Captan 80 WSP	33641	captan	M	2 days	24 hours[1]/29 days[2]/15 days[4]	1	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers.
— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunks and 3 applications to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] Maximum of 10 applications per season with no more than 2 dormant applications. [8] Scouting.

Sweet Cherries

In this section:

The information in this chapter is provided as a guideline only. Read the product label and follow all safety precautions. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Many pesticides are in various stages of re-evaluation by PMRA and their status may change within the lifetime of this publication. Consult the PMRA website and/or the registrant to verify actual dates of last sale and last use. Updates will also be available at ONFruit.ca.

- Consult the product label for suggested water volumes. Otherwise, use enough water to ensure thorough spray coverage. Where the product rate is listed in amount per 1,000 L and if a water volume is not provided on the label, use enough water to wet the foliage to the near drip point.
- For preharvest interval (PHI), restricted entry interval (REI) and maximum number of applications, see Table 3–4. *Products Used on Sweet Cherries.*
- **Products are listed by chemical group and in alphabetical order within each group. The order does not reflect efficacy.** See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees* for efficacy ratings.
- Where a product in the calendar is followed by a "*", it is potentially acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with your certifying body to verify the acceptability of any product prior to use.
- Not all varieties have been tested with all possible tank-mix combinations, especially with new products. Prior to tank-mixing any unfamiliar chemical combinations (fungicides, insecticides, liquid fertilizers, biological control products, adjuvants, and additives), conduct a jar test to determine if there are any physical incompatibilities. For more information, see *Compatibility of Spray Materials*, Chapter 2 and

Table 2–4. *Tank-mix Order for Pesticide Compatibility Test.* Before applying the tank-mix, also test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

- Information on the timing and rates of application for plant growth regulators and chemical thinners can be found in the crop calendars. For additional information on plant growth regulators and thinning, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#sweetch and the *Thinning of Tree Fruit* webpage at http://www.omafra.gov.on.ca/english/crops/hort/thinning.htm.

Resistance Management

To delay development of resistance to insecticides, miticides and fungicides, follow resistance management guidelines outlined in *Resistance Management Strategies,* Chapter 2. The chemical group is indicated in the column labelled "Group" before the "Product" column. Products belonging to the same chemical group are grouped together in the calendar. Multi-site (M) fungicides are not prone to resistance and do not have to be rotated. Some products are not classified to mode of action (NC) and the mode of action has not been determined for others (U). Plant defence inducers (P) and biological fungicides with multiple modes of action (BM) are not known to be prone to resistance.

Fungicide resistance management

Take the following steps to avoid rapid development of fungicide resistance:

- Do not reduce rates below those specified on the label.
- Do not use products containing the same chemical group in consecutive applications.
- Do not use Bumper, Cevya, Fitness, Funginex, Indar, Jade, Princeton, Quash, Cantus, Fontelis, Kenja, Sercadis, Elevate, Luna Sensation, Miravis Duo or Pristine when sporulating lesions of brown rot are present.
- Do not exceed maximum number of applications on the label.

Insecticide resistance management

Take the following steps to avoid rapid development of insecticide resistance:

- For pests with discrete generations (plum curculio and obliquebanded leafroller), do not use insecticides from the same group for more than one generation. Within a generation, if more than one spray is required, use a product from the same chemical group.
- For pests with overlapping generations (aphids, mites, spotted wing drosophila), do not use products containing the same chemical group in consecutive applications.
- Do not exceed maximum number of applications on the label.

Bee Toxicity

Some insecticides are toxic to bees and other pollinating insects. Use of insecticides on flowering crops requires careful management to avoid negative effects on pollinators. Some insecticides cannot be applied prior to bloom. **Insecticides should not be applied when fruit trees are in bloom.** Do not apply insecticides when bees are active. Before and after bloom, bees may be present on flowering cover crops and weeds — do not allow drift of insecticides onto these or other flowering crops. Always follow label precautions to avoid impacts on bees. For more information, see *Bee Poisoning,* Chapter 1, and honeybee toxicity ratings in Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees,* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*

Buffer Zones

Leave a suitable buffer zone between treatment area and adjacent sensitive areas, such as hedgerows, woodlots and freshwater habitats. Zones may vary depending on the product used, growth stage of the crop and method of application including the use of drift-reducing technology. Check the pesticide label for requirements.

Use Health Canada's online spray drift calculator to modify the buffer zone specified on the label based on weather conditions, category of spray

equipment and droplet size. For more information, see the Buffer Zone Calculator at www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php. Unfortunately, this model does not account for water volume, travel speed or crop stage.

Observing buffer zones is a legal requirement. A record of the buffer zone modification, if any, must be retained for at least one year from the time of application.

Pesticide Persistance

Some products are persistent and may carry over from one year to the next. Where possible, avoid using these products in areas treated during the previous season. Consult labels for product-specific information.

Crop Nutrition

Crop nutrition is important for plant growth, fruit quality development and the acquisition of adequate cold hardiness by tree fruit. For fruit crops, soil testing, plant tissue analysis and visual deficiency symptoms all play an important role in assessing and monitoring the crop's nutritional status. For more information, visit the *Soil Management, Fertilizer Use, Crop Nutrition and Cover Crops for Fruit Production* webpage at http://www.omafra.gov.on.ca/english/crops/hort/soil_fruit.htm and see OMAFRA Publication 611, *Soil Fertility Handbook.*

Table 3–3. Sweet Cherry Calendar

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant (before bud break)						
Bacterial canker	**General Comments:** • Apply in early spring before bud break. Later applications in the spring may cause injury. • Use low rate on small trees and high rate on large trees.					
	M	Copper Spray * or Guardsman Copper Oxychloride 50 *	6–9 kg in 1,000 L water	48 hours	2 days	No product specific comments.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	No product specific comments.
		Parasol Flowable *	8.8–13.1 L/ha	48 hours	2 days	No product specific comments.
White bud						
Brown rot (blossom blight stage)	**General Comments:** • Spray when first blossoms open. If wet weather occurs, reapply at 50% bloom and at full bloom. • Group 3, 7, 11 and 17 fungicides are locally systemic and will penetrate petals to protect fruit from infection as bloom starts to occur. Consult labels for information on drying time required before rain.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. — = Information not applicable or not indicated on product label.
* = Potentially organic. Check with certifying body.

Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
White bud (cont'd)						
Brown rot (blossom blight stage) (cont'd)	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Funginex DC	750 mL in 1,000 L water	12 hours	prebloom	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Nova	340 g/ha	12 hours[1]/ 12 days[2]	5 days	No product specific comments.
		Quash	175–245 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per season.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro, other captan products or copper) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	**Suppression only.** Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
		Sercadis	333 mL/ha	12 hours	0 days/12 hours[3]	Use with a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after full bloom.**
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days/24 hours[3]	No product specific comments.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	BM1	Fracture or ProBLAD Plus	1.5–3.3 L/ha	12 hours	0 days/12 hours[3]	**Suppression only.** Under high disease pressure, use high rate. Do not mix with foliar fertilizers.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. — = Information not applicable or not indicated on product label.
* = Potentially organic. Check with certifying body.

Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom						
DO NOT APPLY INSECTICIDES WHILE CHERRY TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage)	**General Comments:** • Blossom blight is favoured by wet, warm (above 16°C) weather, especially when large numbers of mummies are present in the trees. • Apply sprays during the bloom period if weather remains favourable for an extended blight or bloom period. • Group 3, 7, 11 and 17 fungicides are locally systemic and will penetrate petals to protect fruit from infection as bloom starts to occur. Consult labels for information on drying time required before rain.					
	M	Bravo ZNC or Echo NP	5.0–9.0 L/ha 3.5–6.3 L/ha	12 hours[1]/ 8 days[2]	40 days/ shuck split	**Maximum of 2 applications of Bravo or Echo from white bud through shuck split. Do not apply after Shuck fall to avoid fruit injury.** Use higher rate for trees greater than 6 m in height or if weather is warm (above 16°C) and wet during bloom. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/15 days[3]	Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. May cause leaf injury to Schmidt and Emperor Francis varieties in postbloom sprays. **Maximum of 1 application of Maestro or other captan products per year from bloom through harvest. When REI exceeds PHI, follow REI.**
	1	Senator 50 SC	2.45 L/ha	12 hours	1 day	No product specific comments.
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Funginex DC	750 mL in 1,000 L water	12 hours	prebloom	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Nova	340 g/ha	12 hours[1]/ 12 days[2]	5 days	No product specific comments.
		Quash	175–245 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. — = Information not applicable or not indicated on product label.
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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE CHERRY TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage) (cont'd)	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products or copper) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	**Suppression only.** Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
		Sercadis	333 mL/ha	12 hours	0 days/12 hours[3]	Use a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after full bloom.**
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days/24 hours[3]	No product specific comments.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	BM1	Fracture or ProBLAD Plus	1.5–3.3 L/ha	12 hours	0 days/12 hours[3]	**Suppression only.** Under high disease pressure, use high rate. Do not mix with foliar fertilizers.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.
Bacterial canker	24	Kasumin 2L	5 L/ha in 1,000 L water	12 hours	30 days	**Suppression only.** Begin applications at early bloom. Repeat at 7-day intervals. Also controls Blossom blast.
Terminal growth management	NC	Apogee or Kudos 27.5 WDG	450 g in 1,000 L water	12 hours	20 days	Can be used to reduce terminal growth. Two weeks are required to slow growth effectively. Make the first application when terminal shoots are no longer than 2.5–5 cm (approximately late bloom). If required, make a second application 14–21 days later. Do not tank-mix with calcium products. The use of a non-ionic surfactant and ammonium sulphate conditioner is recommended. See label for more details. Effects on fruit set, size and yield vary among cultivars. Resurgence in late-season growth may occur in some situations. For more information, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#sweetch

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall						
Black cherry aphid	**General Comments:** • Some of these products are toxic to bees. Do not apply when bees are active, or hives are in the orchard. Refer to label for specific bee toxicity statements and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	4C	Closer	100–200 mL/ha	12 hours	7 days	Rotate with products outside of Group 4. **Closer:** Use the higher rate for longer residual activity. Apply before populations reach threshold.
	4C+5	TwinGuard	250 g/ha	12 hours	7 days	
	4D	Sivanto Prime	500–750 mL/ha	12 hours	14 days	
	9D	Versys	100 mL/ha	12 hours	7 days	Apply in a high-volume spray to ensure thorough coverage (minimum 1,000 L/ha). Do not make more than 2 sequential applications.
	23	Movento 240 SC	365 mL/ha	12 hours	7 days	Most effective on young stages of aphids. Control may not be apparent for 2–3 weeks. Under high pest pressure, a second application may be necessary 2 weeks later. Tank-mix with a permitted adjuvant/additive with spreading and penetrating properties at a suggested rate of 0.2% v/v (2 L/1,000 L water). Because of oil tank-mix, do not tank-mix with sulphur, Maestro or other captan products. See label for further details.
	29	Beleaf 50 SG	120–200 g/ha	12 days[1]/ 3 days[2]	14 days	Use high rate for high pest pressure and/or dense foliage.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours[1]	0 days/12 hours[3]	Do not apply more than 950 L/ha per application. Do not apply when temperatures are greater than 32°C.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	Apply in a high-volume spray to ensure thorough coverage. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use when temperatures are high (above 32°C), prior to rain or to heat- or moisture-stressed trees. Do not apply to wet foliage. **SuffOil-X:** Do not use in combination with or immediately before or after spraying with Maestro or other captan products, Bravo, Echo or any product whose label recommends against the use of oils. **Vegol:** Do not use within 14 days of Maestro or other captan products, Bravo, Echo or copper.
		Vegol Crop Oil *	2% v/v	12 hours[1]	0 days/12 hours[3]	
Leaf spot	**General Comments:** • Necessary only where leaf spot was a problem the previous year or where sweet cherries are beside tart cherries with leaf spot. • Spray only if rain is forecast between Bloom and Shuck split sprays. • Group 3, 7, 11 and U12 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Echo 90 NP	3.5–6.3 L/ha	12 hours[1]/ 8 days[2]	40 days/ shuck split	**Maximum of 2 applications from white bud through shuck split. Do not apply after Shuck fall to avoid fruit injury.** Use higher rate for trees greater than 6 m in height. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall (cont'd)						
Leaf spot (cont'd)	M (cont'd)	Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/15 days[3]	Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. May cause leaf injury to Schmidt and Emperor Francis varieties in postbloom sprays. **Maximum of 1 application of Maestro or other captan products per year from bloom through harvest. When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	Apply in a minimum of 500 L water/ha.
		Nova	340 g/ha	12 hours[1]/ 12 days[2]	5 days	No product specific comments.
		Quash	280 g/ha	12 hours[1]/ 9 days[2]	14 days	**Suppression only. Maximum of 1 application per year.**
	7	Fontelis	1.5 L/ha	12 hours[1]	0 days/12 hours[3]	**Suppression only.** Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products) may cause crop safety issues. See label for tank-mix restrictions.
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days[1]/24 hours[3]	No product specific comments.
	11	Flint	210 g/ha	12 hours[1]/ 4 days[2]	1 day	Do not apply where spray drift may reach Concord grapes as it may cause crop injury.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other leaf spot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other leaf spot fungicides.
	U12	Equal 65 WP or Syllit 400 FL	2.25 kg/ha 2 L/ha	48 hours	7 days	No product specific comments.
Terminal growth management	Use one of the products listed for Terminal growth management at **Bloom**.					

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck fall						
Plum curculio	**General Comments:** • Spray when most of the shucks are off and plum curculio activity is observed, usually when temperatures are above 16°C. • Some of these products are toxic to bees. Do not apply when bees are active, or hives are in the orchard. Refer to label for specific bee toxicity statements and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	3	Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	Apply when fruit is the size of a pea, and 10–12 days later if oviposition scars are detected. Under high pest pressure, may provide suppression only.
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours[1]/ 6 days[2]	7 days	No product specific comments.
	4A+15	Cormoran	2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Under high pest pressure, may provide suppression only. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Bravo, Echo, Maestro or other captan products, copper, Flint, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	**Suppression only.**
		Vayego 200 SC	300 mL/ha	12 hours	3 days	**Suppression only.**
Brown rot	**General Comments:** • Group 3, 7, 11 and 17 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/15 days[3]	Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. May cause leaf injury to Schmidt and Emperor Francis varieties in postbloom sprays. **Maximum of 1 application of Maestro or other captan products from bloom through harvest. When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Quash	175–280 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/12 hours[3]	No product specific comments.

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck fall (cont'd)						
Brown rot (cont'd)	7	Cantus WDG	370 g/ha	12 hours	0 days/12 hours[3]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, copper) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	**Suppression only.** Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days[1]/24 hours[3]	No product specific comments.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.
First cover (12 days after Shuck fall)						
Plum curculio	• Use one of the insecticides listed for Plum curculio at **Shuck fall**. • Monitor 7 days after the insecticide at shuck split for new plum curculio damage. Apply insecticide if new crescent-shaped cuts are found.					
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck fall**. • Rotate among fungicide groups for resistance management. • **Maximum of 1 application of Maestro or other captan products from bloom through harvest.**					
Second cover (12 days after First cover)						
Cherry fruit fly	**General Comments:** • Cherry fruit fly and spotted wing drosophila (SWD) are attracted to fruit as soon as they turn from green to yellow. Start sprays at that point. • Use a product for cherry fruit fly that is also active against SWD if present in the area. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	3	Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	No product specific comments.
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours[1]/ 6 days[2]	7 days	**Suppression only.**
	4A+15	Cormoran	2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	**Suppression only.** Do not allow this product to drift on grapes as leaf spotting may occur.

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Second cover (12 days after First cover) (cont'd)						
Cherry fruit fly (cont'd)	5	Delegate	420 g/ha	12 hours	5 days	**Suppression only.**
		Entrust *	364 mL/ha	when dry	3 days	Apply within 6 days of first fly emergence. Allow 5–7 days between applications, shortening the application interval during rainy periods and as fruit ripens.
		GF-120 Fruit Fly Bait *	1.5 L/ha	when dry	0 days	Spray as soon as monitoring traps indicate flies are present or 2–3 weeks before ripening. Reapply every 7 days or sooner if rain or overhead irrigation washes off residue. Large droplet sizes optimize the attractiveness of the bait. Proper application techniques help ensure adequate coverage. Apply using an all-terrain vehicle fitted with an appropriate sprayer and nozzle for a large spray droplet size of 4–6 mm directed to underside of leaves and inside the canopy.
	28	Altacor	285 g/ha	12 hours	1 day	**Suppression only.**
		Exirel	0.75–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Bravo, Echo, Maestro or other captan products, copper, Flint, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
Spotted wing drosophila	**General Comments:** • Spotted wing drosophila insert eggs into ripening fruit. Larvae develop in the fruit and may be present at harvest, contributing to premature breakdown. • Apply insecticides weekly when fruit is ripening or ripe, and flies are present. • Frequent picking, burial of grade-out fruit, and general sanitation are very important to prevent problems. • These products rely on contact in order to control spotted wing drosophila adults. Apply in a high-volume spray to ensure thorough coverage of fruit.					
	1B	Malathion 85 E	610–855 mL in 1,000 L water	1 day[1]/ 3 days[2]	3 days	**Suppression only.**
	3	Danitol	0.779–1.559 L/ha	24 hours[1]/ 23 days[2]/ 7 days[4]	16 days	No product specific comments.
		UP-Cyde	245–285 mL/ha	12 hours	2 days	No product specific comments.
	5	Delegate	420 g/ha	12 hours	5 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	No product specific comments.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Bravo, Echo, Maestro or other captan products, copper, Flint, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Second cover (12 days after First cover) (cont'd)						
Plum curculio	• Use one of the insecticides listed for Plum curculio at **Shuck fall**. • Monitor 7 days after previous insecticide for new plum curculio damage. Apply insecticide if new crescent-shaped cuts are found.					
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck fall**. • Rotate among fungicide groups for resistance management. • **Maximum of 1 application of Maestro or other captan products between bloom and harvest.**					
Fruit quality	NC	Falgro Tablet	20 tablets in 1,000 L water	12 hours	21 days	Delay fruit ripening 4–5 days, extending the picking period and delaying the susceptibility of fruit to rain cracks. Also increase fruit size, firmness and resistance to postharvest disorders. Apply 21 days before normal harvest when fruit is straw coloured. Harvest when fruit are red. For additional information visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#sweetch
		ProGibb 40 SG	50 g in 1,000 L water	12 hours	21 days	
Third cover **Check preharvest interval before spraying early maturing cherries. See Table 3–4. *Products Used on Sweet Cherries.***						
Cherry fruit fly, Spotted wing drosophila	• Use one of the insecticides listed for Cherry fruit fly at **Second cover**. • In areas where spotted wing drosophila has been trapped, use a product that has activity on both pests. Refer to Table 3–14. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck fall**. • Rotate among fungicide groups for resistance management. • **Maximum of 1 application of Maestro or other captan products between bloom and harvest; REI for harvest is 15 days.** • **Maximum of 2 applications of Bumper, Fitness, Jade or Princeton in the 3 weeks prior to harvest.**					
Prepick **Check preharvest interval before spraying. See Table 3–4. *Products Used on Sweet Cherries.***						
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck fall**. • Rotate among fungicide groups for resistance management. • **Maximum of 2 applications of Bumper, Fitness, Jade or Princeton in the 3 weeks prior to harvest.** • **Maximum of 1 application of Maestro or other captan products between bloom and harvest; REI for harvest is 15 days.**					
Cherry fruit fly, Spotted wing drosophila	• Use one of the insecticides listed for Cherry fruit fly at **Second cover**. • In areas where spotted wing drosophila has been trapped, use a product that has activity on both pests. Refer to Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
Postharvest orchard treatment						
Leaf spot	**General Comments:** • Necessary only where leaf spot is a problem or where sweet cherries are beside tart cherries with leaf spot.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	postharvest	May cause leaf injury to the Schmidt and Emperor Francis varieties.

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Postharvest orchard treatment (cont'd)						
Leaf spot (cont'd)	M (cont'd)	Echo NP	4.2–6.3 L/ha	12 hours	postharvest	Apply 1–7 days after fruit is removed. **Maximum of 1 postharvest application.**
		Maestro 80 WSP	4.0 kg/ha	1 day	postharvest	**Maximum of 1 dormant spray in late fall during period of dry weather.**
	3	Fitness	300 mL/ha	3 days	postharvest	**Suppression only.**
	7+11	Pristine WG	750 g/ha	when dry	postharvest	No product specific comments.
	11	Flint	210 g/ha	12 hours	postharvest	Do not apply where spray drift may reach Concord grapes.
	U12	Equal 65 WP or Syllit 400 FL	2.25 kg/ha 2 L/ha	48 hours	postharvest	No product specific comments.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	postharvest	**Suppression only.**
Special sprays (when monitoring indicates the need)						
Japanese beetle	3	Danitol	0.779–1.559 L/ha	24 hours[1]/ 23 days[2]	16 days	No product specific comments.
	28	Altacor	285 g/ha	12 hours	1 day	**Suppression only.** Apply when feeding is first observed and repeat in 10–14 days if required.
		Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Bravo, Echo, Maestro or other captan products, copper, Flint, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
Obliquebanded leafroller	**General Comments:** • Routine monitoring is necessary to determine if obliquebanded leafroller is causing damage in sweet cherries. • Apply at 240–280 DDC (base 6.1°C) after first sustained moth catch. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2.					
	4C+5	TwinGuard	250–500 g/ha	12 hours	7 days	No product specific comments.
	5	Delegate	420 g/ha	12 hours	5 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	
	11	Bioprotec PLUS * or Dipel 2X DF * or XenTari WG *	1.8–2.5 L/ha 1.125 kg/ha 0.5–1.6 L/ha	4 hours	0 days	Spray in the evening or on a cloudy day. Spray when and where pests are actively feeding. Apply in a high-volume spray to ensure thorough coverage on both sides of the leaf. Apply to young larvae, early in infestation. Death of insect may take several days. Reapply at 5–7-day intervals if larvae activity is extended.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Do not allow this product to drift on grapes as leaf spotting may occur.

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Table 3–3. Sweet Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Obliquebanded leafroller (cont'd)	28	Altacor	285 g/ha	12 hours	1 day	Will also provide suppression of cherry fruit fly.
		Harvanta 80 SL	1.2–1.6 L/ha	12 hours	7 days	Will also control cherry fruit fly.
		Vayego 200 SC	225 mL/ha	12 hours	5 days	No product specific comments.
Peachtree borer, Lesser peachtree borer	NC	Isomate-PTB Dual *	375 dispensers/ha	—	—	Reduces mating of peachtree and lesser peachtree borers. Apply before moth emergence begins (i.e. typically at or before shuck split). Dispensers are designed to last the entire season. At high-pressure sites, insecticides may be needed. For more information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.*
	5	Delegate	420 g/ha in 1,500-2,000 L water	12 hours	5 days	Use pheromone traps to monitor adult activity and begin sprays 1 week after first flight. Reapply at 3-week intervals. Direct sprays with a handgun to cover trunk and scaffold limbs to 1.5 m above ground thoroughly. Thorough coverage of trunk and lower scaffolds is essential. **Delegate: Suppression only. Do not spray fruit.** **Rimon:** Do not allow this product to drift on grapes as leaf spotting may occur
	15	Rimon 10 EC	1.4 L in 1,000 L water	12 hours	14 days	
Brown marmorated stink bug	**General Comments:** • Breeding populations of this pest are present in Ontario. Check ontario.ca/stinkbug for updates on pest development, registered products and management strategies. • There are currently no thresholds established. Apply when insects are first detected, or early damage is found.					
	4A	Clutch 50 WDG	210–420 g/ha	12 hours	7 days	**Suppression only.** This product is toxic to beneficial insects and should be used only when necessary. **Labeled for BMSB only. Cannot be used after April 11, 2022.**
Postharvest fruit treatment						
Blue mold, Grey mold, Brown rot, Rhizopus rot	**General Comments:** • Postharvest treatment may be necessary during wet harvest seasons. These treatments will prolong storage time while providing control of postharvest diseases. • See label for dip and drench instructions.					
	12	Scholar 230 SC	496 mL in 378 L water	—	postharvest	No product specific comments.
	NC	Bio-Save 10 LP	500 g in 100 L water	—	postharvest	**Suppression only** for blue mold and grey mold.
Fall spray						
Bacterial canker	M	Copper Spray * or Guardsman Copper Oxychloride 50 *	6–9 kg in 1,000 L water	48 hours	postharvest	Apply when three-quarters of leaves have fallen.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	postharvest	Apply at 10% and 80% leaf fall.
		Parasol Flowable *	8.8–13.1 L/ha	48 hr	postharvest	Apply when three-quarters of leaves have fallen.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Scouting. — = Information not applicable or not indicated on product label.
* = Potentially organic. Check with certifying body.

Table 3–4. Products Used on Sweet Cherries

Use this table as a guide but refer to product label for specific information.

The preharvest interval (PHI) is the number of days between the last spray and first harvest.

The restricted entry interval (REI) is the minimum interval that must be observed between the application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume it is 12 hours. **If the REI for harvest exceeds the PHI, follow the REI.**

The maximum applications is the labelled maximum number or product amount applied for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Products listed as potentially organic may be acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with certifying body to verify the acceptability of any product prior to using it.

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression							
Aceta 70 WP	33298	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Altacor	28981	chlorantraniliprole	28	1 day	12 hours	3 (max. 645 g/ha)	—
Assail 70 WP	27128	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Beleaf 50 SG	29796	flonicamid	29	14 days	12 hours[1]/3 days[2]	3 (max. 600 g/ha)	—
Bioprotec PLUS	32425	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	4 hours[1,3]	—	*
Closer	30826	sulfoxaflor	4C	7 days	12 hours	2	—
Clutch 50 WDG	29382	clothianidin	4A	7 days	12 hours	2 (max. 420 g/ha)	—
Cormoran	33353	acetamiprid + novaluron	4A+15	7 days	12 hours[1]/6 days[2]	4	—
Danitol	33817	fenpropathrin	3	16 days	24 hours[1]/23 days[2]/ 7 days[9]	1	—
Delegate	28778	spinetoram	5	5 days	12 hours	3/3[4]	—
Dipel 2X DF	26508	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	12 hours[1,3]	—	*
Entrust	30382	spinosad	5	3 days	when dry	3	*
Exirel	30895	cyantraniliprole	28	3 days	12 hours	4 (max. 4.5 L/ha)	—
GF-120 Fruit Fly Bait	28336	spinosad	5	0 days	when dry	10	*
Harvanta 50 SL	32889	cyclaniliprole	28	7 days	12 hours	5	—
Isomate-PTB Dual	30042	pheromone, peachtree borer, lesser peachtree borer	NC	—	—	—	*
Kopa Insecticidal Soap	31433	potassium salts of fatty acids	NC	0 days	12 hours[1,3]	—	*
Labamba	33576	lambda-cyhalothrin	3	7 days	24 hours	3	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Maximum of 3 applications to trunk and 3 to canopy. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] No more than 2 applications during the growing season and 1 postharvest application. [8] Maximum of 1 application during the growing season and 1 postharvest application. [9] Scouting.

Table 3–4. Products Used on Sweet Cherries (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
Malathion 85 E	8372	malathion	1B	3 days	1 day[1]/3 days[2]	1	—
Matador 120 EC	24984	lambda-cyhalothrin	3	7 days	24 hours	3	—
Movento 240 SC	28953	spirotetramat	23	7 days	12 hours	max. 1.12 L/ha	—
Rimon 10 EC	28881	novaluron	15	14 days	12 hours	3	—
Silencer 120 EC	29052	lambda-cyhalothrin	3	7 days	24 hours	3	—
Sivanto Prime	31452	flupyradifurone	4D	14 days	12 hours	max. 2 L/ha	—
Success	26835	spinosad	5	3 days	when dry	3	—
SuffOil-X	33099	mineral oil	NC	12 hours	12 hours	8	*
TwinGuard	31442	sulfoxaflor + spinetoram	4C+5	7 days	12 hours	2	—
UP-Cyde 2.5 EC	28795	cypermethrin	3	2 days	12 hours	2	—
Vayego 200 SC	33711	tetraniliprole	28	5 days	12 hours	3	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[1,3]	2/4[5]	*
Versys	33266	afidopyropen	9D	7 days	12 hours	4	—
XenTari WG	31557	*Bacillus thuringiensis subsp. aizawai*	11	0 days	12 hours[1,3]	—	—
Products used for disease control or suppression							
Bio-Save 10 LP	29673	*Pseudomonas syringae*	NC	postharvest	—	—	—
Bravo ZNC	33515	chlorothalonil	M	40 days/shuck split	12 hours[1]/8 days[2]	2	—
Bumper 432 EC	28017	propiconazole	3	3 days	3 days	5[6]	—
Cantus WDG	30141	boscalid	7	0 days	12 hours[1,3]	5	—
Cevya	33405	mefentrifluconazole	3	0 days	12 hours[1,3]	max. 1.125 L/ha	—
Copper Spray	19146	copper oxychloride	M	2 days	48 hours	2	*
Cueva	31825	copper octanoate	M	1 day	4 hours	15	*
Echo NP	33479	chlorothalonil	M	40 days/shuck split	12 hours[1]/8 days[2]	2/1[7]	—
Elevate 50 WDG	25900	fenhexamid	17	1 day	4 hours	4	—
Equal 65 WP	15608	dodine	U12	7 days	48 hours	max. 5.8 kg/ha	—
Fitness	32639	propiconazole	3	3 days	3 days	5[6]	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Maximum of 3 applications to trunk and 3 to canopy. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] No more than 2 applications during the growing season and 1 postharvest application. [8] Maximum of 1 application during the growing season and 1 postharvest application. [9] Scouting.

Table 3–4. Products Used on Sweet Cherries (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Flint	30619	trifloxystrobin	11	1 day	12 hours[1]/4 days[2]	5	—
Fontelis	30331	penthiopyrad	7	0 days	12 hours[1,3]	max. 4.5 L/ha	—
Fracture	31782	BLAD polypeptide	BM1	0 days	12 hours[1,3]	3	—
Funginex DC	27686	triforine	3	prebloom	12 hours	3	—
Guardsman Copper Oxychloride 50	13245	copper oxchloride	M	2 days	48 hours	2	*
Indar	27294	fenbuconazole	3	0 days	12 hours[1,3]	7	—
Jade	24030	propiconazole	3	3 days	3 days	5[6]	—
Kasumin 2L	30591	kasugamycin	24	30 days	12 hours	4	—
Kenja 400 SC	31758	isofetamid	7	1 day	12 hours	3	—
Luna Sensation	32107	fluopyram + trifloxystrobin	7+11	1 day	12 hours	max. 1.98 L/ha	—
Maestro 80 WSP	33488	captan	M	2 days	1 day[1]/29 days[2]/ 15 days[3]	1/1[8]	—
Miravis Duo	33206	difenoconozole + pydiflumetofen	3+7	0 days	12 hours[1,3]	max. 4.0 L/ha	—
Nova	22399	myclobutanil	3	5 days	12 hours[1]/ 12 days[2]	6	—
Parasol Flowable	25901	copper hydroxide	M	2 days	48 hours	2	*
Princeton	33840	propiconazole	3	3 days	3 days	5[6]	—
Pristine WG	27985	boscalid + pyraclostrobin	7+11	0 days	when dry[1]/10 days[2]/ 24 hours[3]	5	—
ProBLAD Plus	31782	BLAD polypeptide	BM1	0 days	12 hours[1,3]	3	—
Quash	30402	metconazaole	3	14 days	12 hours[1]/9 days[2]	1	—
Regalia Maxx	30199	extract of *Reynoutria sachalinensis*	P5	0 days	when dry	—	*
Scholar 230 SC	29528	fludioxonil	12	postharvest	—	1	—
Senator 50 SC	32096	thiophanate-methyl	1	1 day	12 hours	max. 4.9 L/ha	—
Sercadis	31697	fluxapyroxad	7	0 days	12 hours[1,3]	3	—
Serenade OPTI	31666	*Bacillus subtilis*	BM2	0 days	when dry	—	*

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Maximum of 3 applications to trunk and 3 to canopy. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] No more than 2 applications during the growing season and 1 postharvest application. [8] Maximum of 1 application during the growing season and 1 postharvest application. [9] Scouting.

Table 3–4. Products Used on Sweet Cherries (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Supra Captan 80 WSP	33641	captan	M	2 days	1 day[1]/29 days[2]/ 15 days[3]	1	—
Syllit 400 FL	28351	dodine	U12	7 days	48 hours	4	—
Thinners and plant growth regulators							
Apogee	28042	prohexadione calcium	NC	20 days	12 hours	2	—
Falgro Tablet	27653	gibberellic acid	NC	21 days	12 hours	—	—
Kudos 27.5 WDG	33010	prohexadione calcium	NC	20 days	12 hours	2	—
ProGibb 40 SG	29359	gibberellin A_3	NC	21 days	12 hours	—	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. When REI exceeds PHI, follow REI. [4] Maximum of 3 applications to trunk and 3 to canopy. [5] Maximum of 6 applications per season with no more than 2 dormant applications. [6] No more than 2 applications in the 3 weeks prior to harvest. [7] No more than 2 applications during the growing season and 1 postharvest application. [8] Maximum of 1 application during the growing season and 1 postharvest application. [9] Scouting.

Tart Cherries

In this section:

The information in this chapter is provided as a guideline only. Read the product label and follow all safety precautions. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Many pesticides are in various stages of re-evaluation by PMRA and their status may change within the lifetime of this publication. Consult the PMRA website and/or the registrant to verify actual dates of last sale and last use. Updates will also be available at ONFruit.ca.

- Consult the product label for suggested water volumes. Otherwise, use enough water to ensure thorough spray coverage. Where the product rate is listed in amount per 1,000 L and if a water volume is not provided on the label, use enough water to wet the foliage to the near drip point.
- For preharvest interval (PHI), restricted entry interval (REI), and maximum number of applications, see Table 3–6. *Products Used on Tart Cherries.*
- **Products are listed by chemical group and in alphabetical order within each group. The order does not reflect efficacy.** See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees* for efficacy ratings.
- Where a product in the calendar is followed by a "*", it is potentially acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. RAP – *Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020*, or a letter of certification provided by the registrant. Check with your certifying body to verify the acceptability of any product prior to use.
- Not all varieties have been tested with all possible tank-mix combinations, especially with new products. Prior to tank-mixing any unfamiliar chemical combinations (fungicides, insecticides, liquid fertilizers, biological control products, adjuvants, and additives), conduct a jar test to determine if there are any physical incompatibilities. For more information, see *Compatibility of Spray Materials,* Chapter 2 and

Table 2–4 *Tank-mix Order for Pesticide Compatibility Test.* Before applying the tank-mix, also test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

- Information on the timing and rates of application for plant growth regulators and chemical thinners can be found in the crop calendars. For additional information on plant growth regulators and thinning, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#tartcherries and the *Thinning of Tree Fruit* webpage at http://www.omafra.gov.on.ca/english/crops/hort/thinning.htm.

Resistance Management

To delay development of resistance to insecticides, miticides and fungicides, follow resistance management guidelines outlined in *Resistance Management Strategies,* Chapter 2. The chemical group is indicated in the column labelled "Group" before the "Product" column. Products belonging to the same chemical group are grouped together in the calendar. Multi-site (M) fungicides are not prone to resistance and do not have to be rotated. Some products are not classified to mode of action (NC) and the mode of action has not been determined for others (U). Plant resistance inducers (P) and biological fungicides with multiple modes of action (BM) are not known to be prone to resistance.

Fungicide resistance management

Take the following steps to avoid rapid development of fungicide resistance:

- Do not reduce rates below those specified on the label.
- Do not use products containing the same chemical group in consecutive applications.
- Do not use Senator, Bumper, Cevya, Fitness, Jade, Funginex, Indar, Nova, Princeton, Quash, Cantus, Fontelis, Kenja, Sercadis, Luna Sensation, Miravis Duo, Pristine, Elevate, Cabrio, Flint, Quintec, Vivando, Equal or Syllit when sporulating lesions of the target disease are present.
- Do not exceed maximum number of applications on the label.

Insecticide resistance management

Take the following steps to avoid development of insecticide resistance:

- For pests with discrete generations (plum curculio, obliquebanded leafroller), do not use insecticides from the same group for more than one generation. Within a generation, if more than one spray is required, use a product from the same chemical group.
- For pests with overlapping generations (aphids, mites, cherry fruit fly, spotted wing drosophila), do not use products containing the same chemical group in consecutive applications.

Bee Toxicity

Some insecticides are toxic to bees and other pollinating insects. Use of insecticides on flowering crops requires careful management to avoid negative effects on pollinators. Some insecticides cannot be applied prior to bloom. **Insecticides should not be applied when fruit trees are in bloom.** Do not apply insecticides when bees are active. Before and after bloom, bees may be present on flowering cover crops and weeds — do not allow drift of insecticides onto these or other flowering crops. Always follow label precautions to avoid impacts on bees. For more information, see *Bee Poisoning,* Chapter 1, and honeybee toxicity ratings in Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*

Buffer Zones

Leave a suitable buffer zone between treatment area and adjacent sensitive areas, such as hedgerows, woodlots and freshwater habitats. Zones may vary depending on the product used, growth stage of the crop and method of application including the use of drift-reducing technology. Check the pesticide label for requirements.

Use Health Canada's online spray drift calculator to modify the buffer zone specified on the label based on weather conditions, category of spray equipment and droplet size. For more information, see the Buffer Zone Calculator at www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php. Unfortunately, this model does not account for water volume, travel speed or crop stage.

Observing buffer zones is a legal requirement. A record of the buffer zone modification, if any, must be retained for at least one year from the time of application.

Pesticide Persistence

Some products are persistent and may carry over from one year to the next. Where possible, avoid using these products in areas treated during the previous season. Consult labels for product-specific information.

Crop Nutrition

Crop nutrition is important for plant growth, fruit quality development and the acquisition of adequate cold hardiness by tree fruit. For fruit crops, soil testing, plant tissue analysis and visual deficiency symptoms all play an important role in assessing and monitoring the crop's nutritional status. For more information, visit the *Soil Management, Fertilizer Use, Crop Nutrition and Cover Crops for Fruit Production* webpage at http://www.omafra.gov.on.ca/english/crops/hort/soil_fruit.htm and see OMAFRA Publication 611, *Soil Fertility Handbook.*

Table 3–5. Tart Cherry Calendar

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant (before bud break)						
Bacterial canker	**General Comments:** • Apply in early spring before bud break. Later applications may cause injury. • Use low rate on small trees and high rate on large trees.					
	M	Copper Spray * or Guardsman Copper Oxychloride 50 *	6–9 kg in 1,000 L water	48 hours	2 days	No product specific comments.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	
		Parasol Flowable *	8.8–13.1 L/ha	48 hours	2 days	
Black knot	• Prune out, remove and burn all black knots from commercial orchards during dormant period before bud break. • Make cuts at least 15 cm below the swelling. • Knots left lying on the ground are a source of spores that can start new infections. • Remove any infected wild cherry hosts surrounding commercial orchards.					

[1] Machine harvest/Hand harvest. [2] Scouting.
— = Information is not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Prebloom						
European red mite	**General Comments:** • Needed only in tart cherry orchards with a history of heavy mite populations. • Spray as buds are breaking. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. • Apply in a high-volume spray to ensure thorough coverage. Mature trees require water volumes of approximately 3,000 L/ha. • Do not use within 14 days of Maestro or other captan products. • Do not apply within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees.					
	NC	Purespray Green Spray Oil 13 E *	2% v/v	12 hours	prebloom	In addition to precautions in general comments, do not use within 14 days of Bravo, Echo or sulphur.
		Superior 70 Oil *	2% v/v	12 hours	prebloom	Do not use within 30 days of sulphur.
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[1]	In addition to precautions in general comments, do not use within 14 days of copper, Bravo or Echo and 30 days of sulphur. Do not apply to wet foliage.
Bloom						
	DO NOT APPLY INSECTICIDES WHILE CHERRY TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.					
Brown rot (blossom blight stage)	**General Comments:** • Spray when first blooms open if weather conditions are expected to be wet and warm (above 16°C) during bloom. Tart cherries are less susceptible to brown rot than sweet cherries. One application during bloom should be sufficient, unless frequent wet periods occur and brown rot pressure is high. • Group 1, 3, 7, 11 and 17 fungicides are locally systemic and will penetrate petals to protect fruit from infection as bloom starts to occur. Consult labels for information on drying time required before rain.					
	M	Bravo ZNC or Echo NP	5.0–9.0 L/ha 3.5–6.3 L/ha	12 hours	40 days/ shuck split	**Maximum of 2 applications of Bravo or Echo from white bud through shuck split. Do not apply after Shuck split to avoid fruit injury.** Use higher rate for trees greater than 6 m in height or if weather is warm (above 16°C) and wet during bloom. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Kumulus DF * or Microthiol Disperss *	22.5 kg/ha	24 hours	1 day	Do not use within 14 days of Purespray Green Spray Oil or SuffOil-X and 30 days of Vegol Crop Oil or Superior Oil.
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	1 day	2 days/ 15 days[1]	Do not use within 14 days of oils or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products between bloom and harvest. When REI exceeds PHI, follow REI.**
	1	Senator 50 SC	2.45 L/ha	12 hours	1 day	No product specific comments.

[1] Machine harvest/Hand harvest. [2] Scouting.
— = Information is not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE CHERRY TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage) (cont'd)	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	Also suppress black knot.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
		Funginex DC	750 mL in 1,000 L water	12 hours	prebloom	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/ 12 hours[1]	Also controls black knot.
		Nova	340 g/ha	12 hours	1 day/ 5 days[1]	No product specific comments.
		Quash	175–245 g/ha	12 hours	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[1]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	**Suppression only.** Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
		Sercadis	333 mL/ha	12 hours	0 days/ 12 hours[1]	Use a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after full bloom.**
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry	0 days/ 24 hours[1]	No product specific comments.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	BM1	Fracture or ProBLAD Plus	1.5–3.3 L/ha	12 hours	0 days/ 12 hours[1]	**Suppression only.** Under high disease pressure, use high rate. Do not mix with foliar fertilizers.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**

[1] Machine harvest/Hand harvest. [2] Scouting.
— = Information is not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE CHERRY TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage) (cont'd)	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.
Terminal growth management	NC	Apogee or Kudos 27.5 WDG	450 g in 1,000 L water	12 hours	20 days	Can be used to reduce terminal growth. Once applied, requires two weeks to slow growth effectively. Make the first application when terminal shoots are no longer than 2.5–5 cm (approximately late bloom). If required, make a second application 14–21 days later. Do not tank-mix with calcium products. The use of a non-ionic surfactant and ammonium sulphate conditioner is recommended. See label for more details. Effects on fruit set, size and yield vary among cultivars. Resurgence in late-season growth may occur in some situations. For additional information, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#tartcherries
Petal fall						
Leaf spot	**General Comments:** • Spray only if rain is forecast between Bloom and Shuck split sprays. • Group 3, 7, 11 and U12 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Bravo ZNC or Echo 90 NP	5.0–9.0 L/ha 2.8–5.0 kg/ha	12 hours	40 days/ shuck split	**Maximum of 2 applications of Bravo or Echo from white bud through shuck split. Do not apply after shuck split to avoid fruit injury.** Use higher rate for trees greater than 6 m in height. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
		Ferbam 76 WDG	1.75–2 kg in 1,000 L water	12 hours	4 days	**Cannot be used after Dec. 14, 2021.**
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	1 day	2 days/ 15 days[1]	Do not use within 14 days of oils or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products between bloom and harvest. When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	Apply in a minimum of 500 L water/ha. Also suppress black knot.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
		Nova	340 g/ha	12 hours	1 day/5 day[1]	No product specific comments.

[1] Machine harvest/Hand harvest. [2] Scouting.
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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall (cont'd)						
Leaf spot (cont'd)	3 (cont'd)	Quash	280 g/ha	12 hours	14 days	**Maximum of 1 application per year.**
	7	Fontelis	1.5 L/ha	12 hours	0 days/ 12 hours[1]	**Suppression only.** Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry	0 days/ 24 hours[1]	No product specific comments.
	11	Flint	210 g/ha	12 hours	1 day	Do not apply where spray drift may reach Concord grapes as it may cause crop injury.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other leaf spot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other leaf spot fungicides.
	U12	Equal 65 WP or Syllit 400 FL	2.25 kg/ha 2 L/ha	48 hours	7 days	No product specific comments.
Black knot	**General Comments:** • This spray is needed only on tart cherry orchards with a history of black knot.					
	M	Bravo ZNC or Echo NP	6.0–9.0 L/ha 3.5–6.3 L/ha	12 hours	40 days/ shuck split	**Do not apply after shuck split to avoid fruit injury. Maximum of 2 applications of Bravo or Echo from white bud through shuck split.** Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	**Suppression only.** These products are locally systemic. Consult labels for information on drying time required before rain.
		Indar	140 g/ha	12 hours	0 days/ 12 hours[1]	This product is locally systemic. Consult labels for information on drying time required before rain.
Terminal growth management	Use one of the products listed for Terminal growth management at **Bloom.**					
Shuck split						
Plum curculio	**General Comments:** • Spray when most shucks are off and Plum curculio activity is observed. • Some of these products are toxic to bees. Do not apply when bees are active or hives are in the orchard. Refer to label for specific bee toxicity statements.					
	1	Imidan WP	2.68 kg/ha	3 days	7 days	No product specific comments.

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split (cont'd)						
Plum curculio (cont'd)	3	Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	Under high pest pressure, may provide suppression rather than control. Apply when fruit is the size of a pea, and 10–12 days later if oviposition scars are detected.
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours	7 days	Under high pressure, may provide suppression only.
	4A+15	Cormoran	2.1 L/ha	12 hours	7 days	Under high pest pressure may provide suppression only. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Bravo, Echo, Maestro or other captan products, Cabrio, Flint, Luna Sensation, Pristine or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	**Suppression only.**
		Vayego 200 SC	300 mL/ha	12 hours	5 days	**Suppression only.**
Brown rot	**General Comments:** • Group 3, 7, 11 and 17 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Bravo ZNC or Echo NP	5–9 L/ha 3.5–6.3 L/ha	12 hours	40 days/ shuck split	**Do not apply after Shuck split to avoid fruit injury. Maximum of 2 applications of Bravo or Echo from white bud through shuck split.** Use higher rate for trees greater than 6 m in height. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	1 day	2 days/ 15 days[1]	Do not use within 14 days of oils or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products between bloom and harvest. When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
		Quash	175–280 g/ha	12 hours	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split (cont'd)						
Brown rot (cont'd)	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days / 12 hours[1]	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[1]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	**Suppression only.** Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry	0 days/ 24 hours[1]	No product specific comments.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other brown rot fungicides.
Leaf spot	• Use one of the fungicides listed for Leaf spot at **Petal fall** with the exception of Ferbam. • **Do not use Bravo or Echo after Shuck split.** • **Maximum of 1 application of Maestro or other captan products per year. When REI exceeds PHI, follow REI.**					
Black knot	• Use one of the fungicides listed for Black knot at **Petal fall**. • This spray is needed only in orchards with a history of black knot. • Spore release may be delayed in dry springs. Under these conditions, extend fungicide coverage to First cover. • **Do not use Bravo or Echo after Shuck split.**					
Production management	NC	Falgro Tablet	10–15 tablets in 1,000 L water	12 hours	21 days	To moderate early production, apply in fourth year. This avoids heavy bloom and overproduction in year 5. Apply from shuck fall to 2 weeks after shuck fall. Use concentrations of 10–20 ppm (15 ppm is most common). Use lower rates on more vigorous trees. Do not use on stressed trees. Apply product as a mist during slow drying conditions. Rates vary with age and vigour of the tree. See label for more information. For trees infected with cherry yellows virus, apply annually to maintain and extend fruiting capacity. For additional information, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#tartcherries.
		ProGibb 40 SG	23–37.5 g in 1,000 L water	12 hours	21 days	

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
First cover (12 days after Shuck split)						
Powdery mildew	**General Comments:** • Cover sprays applied after Shuck split are critical for powdery mildew control.					
	M	Kumulus DF * or Microthiol Disperss *	12 kg/ha	24 hours	1 day	Do not use within 14 days of Purespray Green Spray Oil or SuffOil-X and 30 days of Vegol Crop Oil.
	3	Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[1]	No product specific comments.
		Nova	340 g/ha	12 hours	1 day/ 5 days[1]	No product specific comments.
		Quash	245–280 g/ha	12 hours	14 days	**Suppression only. Maximum of 1 application per year.**
	7	Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[1]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry	0 days/ 24 hours[1]	**Suppression only.**
	11	Cabrio EG	670 g/ha	12 hours	10 days	No product specific comments.
		Flint	210 g/ha	12 hours	1 day	Do not apply where spray drift may reach Concord grapes.
	13	Quintec	500 mL/ha	12 hours	7 days	**Cannot be used after June 30, 2020.**
	50	Vivando SC	0.75–1.12 L/ha	12 hours	7 days	No product specific comments.
	NC	Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[1]	**Suppression only.** Apply in a high-volume spray to ensure thorough coverage at a rate of 2% v/v (20 L/1,000 L water). Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees. Do not use within 14 days of Maestro or other captan products or copper and 30 days of sulphur. Do not apply to wet foliage.
Leaf spot	• Use one of the fungicides listed for Leaf spot at **Petal fall** with the exception of Ferbam, Bravo or Echo. • **Maximum of 1 application of Maestro or other captan products per year. When REI exceeds PHI, follow REI.**					
Obliquebanded leafroller	**General Comments:** • Routine monitoring is necessary to determine if obliquebanded leafroller is causing damage in tart cherries. Reapply 10 days later if emergence is extended. • Apply insecticide at 240–280 DDC (base 6.1C) after first sustained moth catch unless otherwise indicated. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2.					
	4C+5	TwinGuard	250–500 g/ha	12 hours	7 days	No product specific comments.
	5	Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	No product specific comments.

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
First cover (12 days after Shuck split) (cont'd)						
Obliquebanded leafroller (cont'd)	11	Bioprotec PLUS * or Dipel 2X DF * or XenTari WG *	1.8–2.5 L/ha 1.125 kg/ha 0.5–1.6 L/ha	4 hours 12 hours 12 hours	0 days/ 12 hours[1]	Product must be consumed to be effective. Spray in the evening or on a cloudy day. Spray when and where pests are actively feeding. Apply in a high-volume spray to ensure thorough coverage on both sides of the leaf. Apply to young larvae, early in infestation. Death of insect may take several days. Reapply at 5–7-day intervals if larvae activity is extended.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Do not allow this product to drift on grapes as leaf spotting may occur.
	18	Intrepid	750 mL/ha	12 hours	7 days	No product specific comments.
	28	Altacor	285 g/ha	12 hours	1 day	No product specific comments.
		Exirel	0.5–1.0 L/ha	12 hours	3 days	Apply at first egg hatch, or 170–240 DDC (base 6.1°C). Do not tank-mix or make sequential applications with Bravo, Echo, Maestro or other captan products, Cabrio, Flint, Luna Sensation, Pristine or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments
		Vayego 200 SC	225 mL/ha	12 hours	5 days	No product specific comments.
Plum curculio	• Use one of the insecticides listed for Plum curculio at **Shuck split.** • Monitor 7 days after the insecticide at Shuck split for new plum curculio damage. Reapply if new crescent-shaped cuts on fruit are found.					
Special sprays (when monitoring indicates the need)						
European red mite	**General Comments:** • Apply in a high-volume spray to ensure thorough coverage. • Treatment is needed only in heavily infested orchards.					
	21	Nexter SC or Nexter WP	500 mL/ha 300 g/ha	24 hours	7 days	Apply when immature motile stages are present.
	22	Envidor 240 SC	750 mL/ha	12 hours	7 days	Active on all life stages. Control may not be apparent for 2–3 weeks. Apply before mite populations build up.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[1]	Do not apply more than 950 L/ha per application. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C.

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
European red mite (cont'd)	NC (cont'd)	SuffOil-X *	1.3% v/v	12 hours	12 hours	Apply in a high-volume spray to ensure thorough coverage. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use when temperatures are high (above 32°C), prior to rain or to heat- or moisture-stressed trees. Do not apply to wet foliage. **SuffOil-X: Suppression only.** Do not use in combination with or immediately before or after spraying with Maestro or other captan products, any product containing sulphur or any product whose label recommends against the use of oils. **Vegol:** Do not use within 14 days of Maestro or other captan products or copper and 30 days of sulphur.
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[1]	
Second cover (12 days after First cover)						
Cherry fruit fly	**General Comments:** • On early varieties, check preharvest interval. • Spray when early varieties are beginning to colour. A second application may be required 10 days later. • Cherry fruit fly and spotted wing drosophila (SWD) are attracted to fruit as soon as they turn from green to yellow. Start sprays at that point. • Use a product for cherry fruit fly that is also active against SWD if present in the area. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	1	Imidan WP	2.68 kg/ha	3 days	7 days	No product specific comments.
	3	Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	No product specific comments.
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours	7 days	**Suppression only.**
	4A+15	Cormoran	2.1 L/ha	12 hours	7 days	**Suppression only.** Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	5 days	**Suppression only.**
		Entrust *	364 mL/ha	when dry	3 days	Apply within 6 days of first fly emergence. Allow 5–7 days between applications, shortening the application interval during rainy periods and as fruit ripens.
		GF-120 Fruit Fly Bait *	1.5 L/ha	when dry	0 days	Spray as soon as monitoring traps indicate flies are present or 2–3 weeks before ripening. Reapply every 7 days, or sooner if rain or overhead irrigation washes off residue. Large droplet sizes optimize the attractiveness of the bait. Proper application techniques help ensure adequate coverage. Apply using an all-terrain vehicle fitted with an appropriate sprayer and nozzle for a large spray droplet size of 4–6 mm directed to underside of leaves and inside the canopy.
	28	Altacor	285 g/ha	12 hours	1 day	**Suppression only.**

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Second cover (12 days after First cover) (cont'd)						
Cherry fruit fly (cont'd)	28 (cont'd)	Exirel	0.75–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Cabrio, Flint, Luna Sensation, Pristine or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
Spotted wing drosophila	**General Comments:** • Spotted wing drosophila insert eggs into ripening fruit. Larvae develop in the fruit and may be present at harvest, contributing to premature breakdown. • Apply insecticides weekly when fruit is ripening or ripe, and flies are present. • Burial of grade-out fruit and general sanitation are very important to prevent problems. • These products rely on contact in order to control spotted wing drosophila adults. Apply in a high-volume spray to ensure thorough coverage of fruit.					
	1B	Imidan WP	2.68 kg/ha	3 days	7 days	No product specific comments.
		Malathion 85 E	610–855 mL in 1,000 L water	1 day	3 days	**Suppression only.**
	3	Danitol	0.779–1.559 L/ha	24 hours/ 7 days[2]	16 days	No product specific comments.
		UP-Cyde	245–285 mL/ha	12 hours	2 days	No product specific comments.
	5	Delegate	420 g/ha	12 hours	5 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	No product specific comments.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Cabrio, Flint, Luna Sensation, Pristine or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
Plum curculio	• Use one of the insecticides listed for Plum curculio at **Shuck split**.					
Obliquebanded leafroller	• Use one of the insecticides listed for Obliquebanded leafroller at **First cover**. • Routine monitoring is necessary to determine if obliquebanded leafrollers are causing damage in tart cherries.					
Leaf spot	• Use one of the fungicides listed for Leaf spot at **Petal fall** with the exception of Ferbam, Bravo or Echo. • **Maximim of 1 application of Maestro or other captan product per year.**					
Powdery mildew	• Use one of the fungicides listed for Powdery mildew at **First cover**. • **Do not use Quintec after June 30, 2021.** • **Maximum of 1 application of Quash per year.**					
Third cover **Check preharvest interval before spraying early maturing cherries. See Table 3–6. *Products Used on Tart Cherries.***						
Cherry fruit fly, Spotted wing drosophila	• Use one of the insecticides listed for Cherry fruit fly at **Second cover**. • In areas where spotted wing drosophila has been trapped, use a product that has activity on both pests. See Table Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Third cover (cont'd) **Check preharvest interval before spraying early maturing cherries. See Table 3–6. *Products Used on Tart Cherries.***						
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck split** with the exception of Ferbam, Bravo or Echo. • For Bumper, Fitness, Jade and Princeton, make a 2nd and 3rd application at 7–10-day interval in the 3 weeks prior to harvest. Do not apply more than 2 consecutive sprays. • Rotate among fungicide groups for resistance management. • **Maximum of 1 application of Maestro or other captan products between bloom and harvest. When REI exceeds PHI, follow REI.**					
Leaf spot	• Use one of the fungicides listed for Leaf spot at **Petal fall** with the exception of Ferbam, Bravo and Echo. • For Bumper, Fitness, Jade or Princeton, make a 2nd and 3rd application at 7–10-day interval in the 3 weeks prior to harvest. Do not apply more than 2 consecutive sprays. • **Maximum of 1 application of Maestro or other captan products between bloom and harvest. When REI exceeds PHI, follow REI.**					
Special sprays (when monitoring indicates the need)						
European red mite	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Active on all life stages. Control may not be apparent for 2–3 weeks. Apply before mite populations build up.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[1]	Do not apply more than 950 L/ha per application. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	See comments on these products for European red mite in **Special Sprays, page 78.**
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[1]	
Preharvest **Check preharvest interval before spraying early maturing cherries. See Table 3–6. *Products Used on Tart Cherries.***						
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck split** with the exception of Ferbam, Bravo or Echo. • For Bumper, Fitness, Jade or Princeton, make a 2nd and 3rd application at 7–10-day interval in the 3 weeks prior to harvest. Do not apply more than 2 consecutive applications. • Rotate among fungicide groups for resistance management. • **Maximum of 1 application of Maestro or other captan products between bloom and harvest. When REI exceeds PHI, follow REI.**					
Cherry fruit fly, Spotted wing drosophila	• Use one of the insecticides listed for Cherry fruit fly at **Second cover**. • In areas where spotted wing drosophila has been trapped, use a product that has activity on both pests. Refer to Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
Fruit quality	NC	Ethrel	2.75 L in 2,400 L water/ha	48 hours	—	Loosens fruit to facilitate mechanical harvesting. Apply when fruit are enlarging rapidly, with the grass-green colour beginning to turn yellow or developing a tinge of red. This generally coincides with 7–14 days before anticipated harvest. Concentrate sprays (1,000 L of water per ha or less) achieve the same level of loosening as dilute applications. Uniform coverage is important. Efficacy depends on tree vigour, health, rate and temperature. Do not tank-mix with foliar nutrients or compounds such as fruit-cracking inhibitors. Apply only when temperature is 18–30°C. Treat only trees that are vigorous and in good health. For additional information, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#tartcherries.

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Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Postharvest						
Leaf spot	**General Comments:** • Necessary where leaf spot is a problem.					
	M	Bravo ZNC or Echo NP	5.0–7.2 L/ha 4.2–6.3 L/ha	12 hours	postharvest	Apply either Bravo or Echo once to foliage 1–7 days after fruit is removed. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
		Cueva *	1% v/v in 470–940 L water	4 hours	postharvest	Apply as a dormant spray in late fall during a period of dry weather.
		Maestro 80 WSP	4.0 kg/ha	24 hours	postharvest	**Maximum of 1 dormant spray in late fall during period of dry weather.**
	3	Nova	340 g/ha	12 hours	postharvest	No product specific comments.
	7+11	Pristine WG	750 g/ha	when dry	postharvest	No product specific comments.
	11	Flint	210 g/ha	12 hours	postharvest	Do not apply where spray drift may reach Concord grapes.
	U12	Equal 65 WP or Syllit 400 FL	2.25 kg/ha 2 L/ha	48 hours	postharvest	No product specific comments.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	postharvest	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other leaf spot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with other leaf spot fungicides.
Powdery mildew	7+11	Pristine WG	750 g/ha	when dry	postharvest	**Suppression only.**
	11	Cabrio EG	670 g/ha	12 hours	postharvest	No product specific comments.
	50	Vivando SC	0.75–1.12 L/ha	12 hours	postharvest	No product specific comments.
	NC	Vegol Crop Oil *	2% v/v	12 hours	postharvest	**Suppression only.** See comments on this product for Powdery mildew at First cover.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	postharvest	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other powdery mildew fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with powdery mildew fungicides.
Special sprays (when monitoring indicates the need)						
Aphids	**General Comments:** • These may be added to a compatible fungicide after bloom. • Thorough coverage and a calm warm day are necessary for good aphid control.					
	4C	Closer	100–200 mL/ha	12 hours	7 days	Rotate with products outside of Group 4. **Closer:** Use the higher rate for longer residual activity.
	4D	Sivanto Prime	500–750 mL/ha	12 hours	14 days	
	9D	Versys	100 mL/ha	12 hours	7 days	**Black cherry aphid only.** Do not make more than 2 sequential applications.

[1] Machine harvest/Hand harvest. [2] Scouting.
— = Information is not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Aphids (cont'd)	23	Movento 240 SC	365 mL/ha	12 hours	7 days	Most effective on young stages of aphids. Control may not be apparent for 2–3 weeks. Under high pest pressure, a second application may be necessary 2 weeks later. Tank-mix with a permitted adjuvant/additive with spreading and penetrating properties at a suggested rate of 0.2% v/v (2 L/1,000 L water). See label for further details. Do not tank-mix with sulphur.
	29	Beleaf 50 SG	120–200 g/ha	12 hours	14 days	Use high rate for high pest pressure and/or dense foliage.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[1]	Do not apply more than 950 L/ha per application. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	Apply in a high-volume spray to ensure thorough coverage. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees. **SuffOil-X:** Do not use in combination with or immediately before or after spraying with Maestro or other captan products, any product containing sulphur or any product whose label recommends against the use of oils. **Vegol:** Do not use within 14 days of Maestro or other captan products, or copper and 30 days of sulphur. Do not apply to wet foliage
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[1]	
Peachtree borer, Lesser peachtree borer	NC	Isomate-PTB Dual *	375 dispensers/ha	—	—	Reduces mating of peachtree and lesser peachtree borer. Apply before moth emergence begins (i.e., typically at or before Shuck split). Dispensers are designed to last the entire season. At high-pressure sites, insecticides may be needed. For more information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.*
	5	Delegate	420 g/ha in 1,500–2,000 L water	12 hours	5 days	Use pheromone traps to monitor adult activity. If mating disruption is not used, begin sprays 1 week after first flight. Reapply at 3-week intervals. Direct sprays with a handgun to cover trunk and scaffold limbs to 1.5 m above ground. Thorough coverage is essential. Check preharvest intervals, especially for the second and third sprays. **Delegate: Suppression only. Do not spray fruit.** **Rimon:** Do not allow this product to drift on grapes as leaf spotting may occur.
	15	Rimon 10 EC	1.4 L in 1,000 L water	12 hours	14 days	
Brown marmorated stink bug	**General Comments:** • Breeding populations of this pest are present in Ontario. Check ontario.ca/stinkbug for updates on pest development, registered products and management strategies. • There are currently no thresholds established. Apply when insects are first detected, or early damage is found.					
	4	Clutch 50 WDG	210–420 g/ha	12 hours	7 days	**Suppression only.** This product is toxic to beneficial insects and should only be used when necessary. **Labeled for BMSB only. Cannot be used after April 11, 2022.**

[1] Machine harvest/Hand harvest. [2] Scouting.
— = Information is not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–5. Tart Cherry Calendar (cont'd)

Disease or Insect	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Fall spray						
Bacterial canker	**General Comments:** • Apply when three-quarters of leaves have fallen.					
	M	Copper Spray * or Guardsman Copper Oxychloride 50 *	6–9 kg/1,000 L water	48 hours	postharvest	No product specific comments.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	postharvest	No product specific comments.
		Parasol Flowable *	8.8–13.1 L/ha	48 hours	postharvest	Use low rate on small trees, high rate for large trees.

[1] Machine harvest/Hand harvest. [2] Scouting.
— = Information is not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–6. Products Used on Tart Cherries

Use this table as a guide but refer to product label for specific information.

The preharvest interval (PHI) is the number of days between the last spray and first harvest.

The restricted entry interval (REI) is the minimum interval that must be observed between the application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume it is 12 hours. **If the REI for hand harvest exceeds the PHI, follow the REI.**

The maximum applications is the labelled maximum number or product amount applied for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Products listed as potentially organic may be acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with certifying body to verify the acceptability of any product prior to using it.

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression							
Aceta 70 WP	33298	acetamiprid	4A	7 days	12 hours	4	—
Altacor	28981	chlorantraniliprole	28	1 day	12 hours	3 (max. 645 g/ha)	—
Assail 70 WP	27128	acetamiprid	4A	7 days	12 hours	4	—
Beleaf 50 SG	29796	flonicamid	29	14 days	12 hours	3 (max. 600 g/ha)	—
Bioprotec PLUS	32425	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	12 hours	—	*
Closer	30826	sulfoxaflor	4C	7 days	12 hours	2	—
Clutch 50 WDG	29382	clothianidin	4A	7 days	12 hours	2 (max. 420 g/ha)	—
Cormoran	33353	acetamiprid + novaluron	4A+15	7 days	12 hours	4	—
Danitol	33817	fenpropathrin	3	16 days	24 hours/7 days[9]	1	—
Delegate	28778	spinetoram	5	5 days	12 hours	3/3[1]	—
Dipel 2X DF	26508	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	12 hours	—	*
Entrust	30382	spinosad	5	3 days	when dry	3	*
Envidor 240 SC	28051	spirodiclofen	23	7 days	12 hours	1	—
Exirel	30895	cyantraniliprole	28	3 days	12 hours	4 (max. 4.5 L/ha)	—
GF-120 Fruit Fly Bait	28336	spinosad	5	0 days	when dry	10	*
Harvanta 50 SL	32889	cyclaniliprole	28	7 days	12 hours	5	—
Imidan WP	29064	phosmet	1B	7 days	3 days	4	—
Intrepid	27786	methoxyfenozide	18	7 days	12 hours	2	—
Isomate-PTB Dual	30042	pheromone, peachtree borer, lesser peachtree borer	NC	—	—	—	*
Kopa Insecticidal Soap	31433	potassium salts of fatty acids	NC	12 hours	0 days	—	*

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] Maximum of 3 applications to trunk and 3 to canopy. [2] General entry. [3] REI for Hand harvest. When REI exceeds PHI, follow REI. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] No more than 2 applications during the growing season and 1 postharvest application. [6] Maximum of 3 applications for cherry leaf spot or 5 applications for all other uses. [7] Maximum of 1 application bloom through harvest, 1 application postharvest . [8] Maximum of 10 applications per season with no more than 2 dormant applications. [9] Scouting.

Table 3–6. Products Used on Tart Cherries (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
Labamba	33576	lambda-cyhalothrin	3	7 days	24 hours	3	—
Malathion 85 E	8372	malathion	1B	3 days	3 days	1	—
Matador 120 EC	24984	lambda-cyhalothrin	3	7 days	24 hours	3	—
Movento 240 SC	28953	spirotetramat	23	7 days	12 hours	max. 1.12 L/ha	—
Nexter SC	33433	pyridaben	21	7 days	24 hours	1	—
Nexter WP	25135	pyridaben	21	7 days	24 hours	1	—
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	prebloom	12 hours	2 (dormant)	*
Rimon 10 EC	28881	novaluron	15	14 days	12 hours	3	—
Silencer 120 EC	29052	lambda-cyhalothrin	3	7 days	24 hours	3	—
Sivanto Prime	31452	flupyradifurone	4D	14 days	12 hours	max. 2 L/ha	—
Success 480 SC	26835	spinosad	5	3 days	when dry	3	—
SuffOil-X	33099	mineral oil	NC	12 hours	12 hours	8	*
Superior 70 Oil	9542	mineral oil	NC	prebloom	12 hours	—	*
TwinGuard	31442	sulfoxaflor + spinetoram	4C+5	7 days	12 hours	2	—
UP-Cyde 2.5 EC	28795	cypermethrin	3	2 days	12 hours	2	—
Vayego 200 SC	33711	tetraniliprole	28	5 days	12 hours	3	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[2,3]	2/4[4]	*
Versys	33266	afidopyropen	9D	7 days	12 hours	2	—
XenTari WG	31557	*Bacillus thuringiensis subsp. aizawai*	11	0 days	12 hours[2,3]	—	—
Products used for disease control or suppression							
Bravo ZNC	33515	chlorothalonil	M	40 days/shuck split	12 hours	2/1[5]	—
Bumper 432 EC	28017	propiconazole	3	3 days	12 hours	3/5[6]	—
Cabrio EG	27323	pyraclostrobin	11	10 days	12 hours	5	—
Cantus WDG	30141	boscalid	7	0 days	12 hours	5	—
Cevya	33405	mefentrifluconazole	3	0 days	12 hours[2,3]	max. 1.125 L/ha	—
Copper Spray	19146	copper oxychloride	M	2 days	48 hours	2	*
Cueva	31825	copper octanoate	M	1 day	4 hours	15	*

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] Maximum of 3 applications to trunk and 3 to canopy. [2] General entry. [3] REI for Hand harvest. When REI exceeds PHI, follow REI. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] No more than 2 applications during the growing season and 1 postharvest application. [6] Maximum of 3 applications for cherry leaf spot or 5 applications for all other uses. [7] Maximum of 1 application bloom through harvest, 1 application postharvest . [8] Maximum of 10 applications per season with no more than 2 dormant applications. [9] Scouting.

Table 3–6. Products Used on Tart Cherries (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Echo NP	33479	chlorothalonil	M	40 days/shuck split	12 hours	2/1[5]	—
Elevate 50 WDG	25900	fenhexamid	17	1 day	4 hours	4	—
Equal 65 WP	15608	dodine	U12	7 days	48 hours	max 8.9 kg/ha	—
Ferbam 76 WDG	20136	ferbam	M	4 days	12 hours	—	—
Fitness	32639	propiconazole	3	3 days	3 days	3/5[6]	—
Flint	30619	trifloxystrobin	11	1 day	12 hours	5	—
Fontelis	30331	penthiopyrad	7	0 days	12 hours[2,3]	max. 4.5 L/ha	—
Fracture	32139	BLAD polypeptide	BM1	0 days	12 hours[2,3]	3	—
Funginex DC	27686	triforine	3	prebloom	12 hours	3 (max. 2.5 L/ha)	—
Guardsman Copper Oxychloride 50	13245	copper oxychloride	M	2 days	48 hours	2	*
Indar	27294	fenbuconazole	3	0 days	12 hours[2,3]	7	—
Jade	24030	propiconazole	3	3 days	3 days	3/5[6]	—
Kenja 400 SC	31758	isofetamid	7	1 day	12 hours	3	—
Kumulus DF	18836	sulphur	M	1 day	24 hours	8	*
Luna Sensation	32107	fluopyram + trifloxystrobin	7+11	1 day	12 hours	max. 1.98 L/ha	—
Maestro 80 WSP	33488	captan	M	5 days	1 day[2]/15 days[3]	1/1[7]	—
Microthiol Disperss	29487	sulphur	M	1 day	24 hours	8	*
Miravis Duo	33206	difenoconozole + pydiflumetofen	3+7	0 days	12 hours[2,3]	max. 4.0 L/ha	—
Nova	22399	myclobutanil	3	1 day	2 hours[2]/5 days[3]	6	—
Parasol Flowable	25901	copper hydroxide	M	2 days	48 hr	2	*
Princeton	33840	propiconazole	3	3 days	3 days	3/5[6]	—
Pristine WG	27985	boscalid + pyraclostrobin	7+11	0 days	when dry[2]/24 hours[3]	5	—
ProBLAD Plus	31782	BLAD polypeptide	BM1	0 days	12 hours[2,3]	3	—
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	prebloom	12 hours	2/8[8]	*
Quash	30402	metconazaole	3	14 days	12 hours	1	—
Quintec	29755	quinoxyfen	13	7 days	12 hours	5	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] Maximum of 3 applications to trunk and 3 to canopy. [2] General entry. [3] REI for Hand harvest. When REI exceeds PHI, follow REI. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] No more than 2 applications during the growing season and 1 postharvest application. [6] Maximum of 3 applications for cherry leaf spot or 5 applications for all other uses. [7] Maximum of 1 application bloom through harvest, 1 application postharvest . [8] Maximum of 10 applications per season with no more than 2 dormant applications. [9] Scouting.

Table 3–6. Products Used on Tart Cherries (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Regalia Maxx	30199	extract of *Reynoutria sachalinensis*	P5	0 days	when dry	—	*
Senator 50 SC	32096	thiophanate-methyl	1	1 day	12 hours	max. 4.9 L/ha	—
Sercadis	31697	fluxapyroxad	7	0 days	12 hours[2,3]	3	—
Serenade OPTI	31666	*Bacillus subtilis*	BM2	0 days	when dry	—	*
Supra Captan 80 WSP	33461	captan	M	5 days	24 hours[2]/15 days[3]	1	—
Syllit 400 FL	28351	dodine	U12	7 days	48 hours	4	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[2,3]	2/4[4]	*
Vivando SC	29765	metrafenone	50	7 days	12 hours	2	—
Thinners and plant growth regulators							
Apogee	28042	prohexadione calcium	NC	20 days	12 hours	2	—
Ethrel	11580	ethephon	NC	—	48 hours	—	—
Falgro Tablet	27653	gibberellic acid	NC	21 days	12 hours	—	—
Kudos 27.5 WDG	33010	prohexadione calcium	NC	20 days	12 hours	2	—
ProGibb 40 SG	29359	gibberellin A_3	NC	21 days	12 hours	—	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] Maximum of 3 applications to trunk and 3 to canopy. [2] General entry. [3] REI for Hand harvest. When REI exceeds PHI, follow REI. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] No more than 2 applications during the growing season and 1 postharvest application. [6] Maximum of 3 applications for cherry leaf spot or 5 applications for all other uses. [7] Maximum of 1 application bloom through harvest, 1 application postharvest . [8] Maximum of 10 applications per season with no more than 2 dormant applications. [9] Scouting.

Peaches and Nectarines

In this section:

The information in this chapter is provided as a guideline only. Read the product label and follow all safety precautions. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Many pesticides are in various stages of re-evaluation by PMRA and their status may change within the lifetime of this publication. Consult the PMRA website and/or the registrant to verify actual dates of last sale and last use. Updates will also be available at ONFruit.ca.

- All products labelled for use on peach can also be used on nectarine **except** Imidan WP, Ferbam 76 WDG, Funginex DC, Granuflo-T, Kumulus, Microscopic Sulphur, Decis and Poleci.
- Consult the product label for suggested water volumes. Otherwise, use enough water to ensure thorough spray coverage. Where the product rate is listed in amount per 1,000 L and if a water volume is not provided on the label, use enough water to wet the foliage to the near drip point.
- For preharvest interval (PHI), restricted entry interval (REI) and maximum number of applications, see Table 3–8. *Products Used on Peaches and Nectarines.*
- **Products are listed by chemical group and in alphabetical order within each group. The order does not reflect efficacy.** See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees* for efficacy ratings.
- Where a product in the calendar is followed by a "*", it is potentially acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with your certifying body to verify the acceptability of any product prior to use.

- Not all varieties have been tested with all possible tank-mix combinations, especially with new products. Prior to tank-mixing any unfamiliar chemical combinations (fungicides, insecticides, liquid fertilizers, biological control products, adjuvants, and additives), conduct a jar test to determine if there are any physical incompatibilities. For more information, see *Compatibility of Spray Materials,* Chapter 2 and Table 2–4. *Tank-mix Order for Pesticide Compatibility Test.* Before applying the tank-mix, also test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

Resistance Management

To delay development of resistance to insecticides, miticides and fungicides, follow resistance management guidelines outlined in *Resistance Management Strategies,* Chapter 2. The chemical group is indicated in the "Group" column before the "Product" column. Products belonging to the same chemical group are grouped together in the calendar. Multi-site (M) fungicides are not prone to resistance and do not have to be rotated. Some products are not classified to mode of action (NC) and the mode of action has not been determined for others (U). Biological fungicides with multiple modes of action (BM) and plant defence inducers (P) are not known to be prone to resistance.

Fungicide resistance management

Take the following steps to avoid rapid development of fungicide resistance:

- Do not reduce rates below those specified on the label.
- Do not use products containing the same chemical group in consecutive applications.
- Do not use Senator, Bumper, Cevya, Jade, Fitness, Funginex, Indar, Nova, Princeton, Quash, Fontelis, Cantus, Kenja, Sercadis, Elevate, Flint, Luna Sensation, Miravis Duo, Pristine, Vivando or Syllit when sporulating lesions of the target disease are present.
- Do not exceed maximum number of applications on the label.

Insecticide resistance management

Take the following steps to avoid development of insecticide resistance:

- For pests with discrete generations (oriental fruit moth, plum curculio, borers), do not use insecticides from the same group for more than one generation. Within a generation, if more than one spray is required, use a product from the same chemical group.
- For pests with overlapping generations (aphids, mites), do not use products containing the same chemical group in consecutive applications.

Bee Toxicity

Some insecticides are toxic to bees and other pollinating insects. Use of insecticides on flowering crops requires careful management to avoid negative effects on pollinators. Some insecticides cannot be applied prior to bloom. **Insecticides should not be applied when fruit trees are in bloom.** Do not apply insecticides when bees are active. Before and after bloom, bees may be present on flowering cover crops and weeds—do not allow drift of insecticides onto these or other flowering crops. Always follow label precautions to avoid impacts on bees. For more information, see *Bee Poisoning,* Chapter 1, and honeybee toxicity ratings in Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*

Buffer Zones

Leave a suitable buffer zone between treatment area and adjacent sensitive areas, such as hedgerows, woodlots and freshwater habitats. Zones may vary depending on the product used, growth stage of the crop and method of application including the use of drift-reducing technology. Check the pesticide label for requirements.

Use Health Canada's online spray drift calculator to modify the buffer zone specified on the label based on weather conditions, category of spray equipment and droplet size. For more information, see the Buffer Zone Calculator at www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php. Unfortunately, this model does not account for water volume, travel speed or crop stage.

Observing buffer zones is a legal requirement. A record of the buffer zone modification, if any, must be retained for at least one year from the time of application.

Pesticide Persistence

Some products are persistent and may carry over from one year to the next. Where possible, avoid using these products in areas treated during the previous season. Consult labels for product-specific information.

Crop Nutrition

Crop nutrition is important for plant growth, fruit quality development and the acquisition of adequate cold hardiness by tree fruit. For fruit crops, soil testing, plant tissue analysis and visual deficiency symptoms all play an important role in assessing and monitoring the crop's nutritional status. For more information, visit the *Soil Management, Fertilizer Use, Crop Nutrition and Cover Crops for Fruit Production* website at http://www.omafra.gov.on.ca/english/crops/hort/soil_fruit.htm and see OMAFRA Publication 611, *Soil Fertility Handbook.*

Table 3–7. Peach and Nectarine Calendar

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant (in March or early April before buds swell)						
Leaf curl	**General Comments:** • **Treatments must be applied before bud scales open.** A delay in application may result in poor control of leaf curl. • Apply in a high-volume spray to ensure thorough coverage.					
	M	Bravo ZNC or Echo NP	5.0–7.0 L/ha 3.5–4.9 kg/ha	12 hours 12 hours	dormant dormant	Make **one application of one of these products per year** in early spring **or** as a fall dormant spray at 75–100% leaf drop. Do not apply within 10 days of oil products.
		Copper Spray * or Guardsman Copper Oxychloride 50 *	2 kg in 1,000 L water	48 hours	dormant	No product specific comments.
		Copper 53W *	1.9 kg in 1,000 L water	48 hours	dormant	No product specific comments.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	No product specific comments.
		Ferbam 76 WDG	3.5 kg in 1,000 L water	12 hours	dormant	**Peaches only.** If mixing with oil, follow mixing directions on oil label carefully or poor leaf curl control will result. **Cannot be used after Dec 14, 2021.**
		Parasol Flowable *	4.5–6.7 L/ha	48 hours	dormant	No product specific comments.
	U12	Syllit 400 FL	1.8–3.5 L in 1,000 L water	48 hours	7 days	No product specific comments.
Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Apply in a high-volume spray to ensure thorough coverage.

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant (in March or early April before buds swell) (cont'd)						
San Jose scale	**General Comments:** • Apply routinely every third year. If scale is a serious or continuing problem, apply for at least 2 consecutive years. • Apply in a high-volume spray to ensure thorough coverage. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. • Do not use within 14 days of Maestro or other captan products. • Do not apply within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture- stressed trees.					
	NC	Purespray Green Spray Oil 13 E *	2% v/v	12 hours	—	Do not use within 14 days of Perm-UP, Pounce, Bravo, Echo or sulphur.
		Superior 70 Oil *	2% v/v	12 hours	prebloom	Do not use within 30 days of sulphur.
		Vegol Crop Oil *	2% v/v	12 hours	0 days	Do not use within 14 days of Bravo or Echo or 30 days of sulphur. Do not apply to wet foliage.
Prebloom (half-inch green to first pink)						
European red mite	**General Comments:** • This is the preferred timing for red mite control if overwintering populations are high. Red mite populations are more likely to be high if pyrethroid sprays were used the previous year for oriental fruit moth or tarnished plant bug. • Apply in a high-volume spray to ensure thorough coverage. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. • Do not use within 14 days of Bravo, Echo, Maestro or other captan products.					
	NC	Purespray Green Spray Oil 13 E *	2% v/v	12 hours	—	**Suppression only.** Do not apply within 48 hours of freezing temperatures, when temperatures are high (above 30°C), just prior to rain or to heat- or moisture-stressed trees. **Purespray Green Spray Oil, SuffOil-X:** In addition to precautions in general comments, do not use within 14 days of Perm-UP, Pounce or sulphur. Do not tank-mix with copper more than once per season. **Superior Oil:** In addition to precautions in general comments, do not use within 30 days of sulphur. **Vegol:** In addition to precautions in general comments, do not use within 14 days of copper and 30 days of sulphur. Do not apply to wet foliage.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	
		Superior 70 Oil *	2% v/v	12 hours	prebloom	
		Vegol Crop Oil *	2% v/v	12 hours	0 days	
Oriental fruit moth	NC	Isomate OFM TT *	125–250 dispensers/ha	0 hours	0 days	Reduces mating of oriental fruit moth. Apply dispensers before flight begins. Place dispensers in lateral branches in the upper canopy in a uniform manner across the orchard block. Use high rate for high pest pressure areas or during initial year of treatment. Dispensers are designed to last for the entire season. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests*. If desired, use both an insecticide and mating disruption for managing first-generation oriental fruit moth (see Shuck split).

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Pink						
Brown rot (blossom blight stage)	**General Comments:** • Knock off fruit mummies when pruning. • Group 1, 3, 7, 11 and 17 fungicides are locally systemic and will penetrate petals to protect fruit from infection as blossoms start to open. Consult labels for information on drying time required before rain.					
	M	Bravo ZNC or Echo NP	5.0–9.0 L/ha 3.5–6.3 L/ha	12 hours[1]/ 11 days[2]	60 days/ shuck split	**Maximum of 2 applications of either Bravo or Echo from pink through shuck. Do not apply after shuck split to avoid fruit injury.** Use higher rate for trees greater than 6 m in height or if weather is warm (above 16°C) and wet during bloom. Do not use within 14 days of Purespray Green Spray Oil, SuffOil-X or Vegol. Do not tank-mix or make sequential applications with Exirel.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Granuflo-T	1.5–2.25 kg in 1,000 L water	24 hours	7 days	**Peaches only.** For blossom blight, apply at intervals of 3–4 days during bloom. **Cannot be used after Dec 14, 2021.**
	1	Senator 50 SC	2.45 L/ha	12 hours	1 day	No product specific comments.
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Funginex DC	750 mL in 1,000 L water	12 hours	prebloom	**Peaches only. Prebloom only.**
		Indar	140 g/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Nova	340 g/ha	12 hours[1]/ 12 days[2]	5 days	No product specific comments.
		Quash	175–245 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days	No product specific comments.

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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Pink (cont'd)						
Brown rot (blossom blight stage) (cont'd)	7 (cont'd)	Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, Bravo, Echo sulphur) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
		Sercadis	333 mL/ha	12 hours	0 days/ 12 hours[3]	Use a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after full bloom.**
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]/	0 days[1]/ 24 hours[3]	No product specific comments.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	BM1	Fracture or ProBLAD Plus	1.5–3.3 L/ha	12 hours	0 days	**Suppression only.** Under high disease pressure, use high rate. Do not mix with foliar fertilizers.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with brown rot fungicides.
Bloom						
DO NOT APPLY INSECTICIDES WHILE PEACH TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage)	• Use one of the fungicides listed for Brown rot at **Pink.** • Spray when first blossoms are opening. • Reapply every 4–5 days if weather is wet. • **Do not use Funginex or Sercadis after Bloom.**					
Petal fall to Shuck						
Brown rot	• Use one of the fungicides listed for Brown rot at **Pink.** • Rotate among fungicide groups for resistance management. • Reapply every 4–5 days if weather is wet. • **Do not use Funginex or Sercadis after Bloom.** • **Do not use Bravo ZNC or Echo NP after Shuck.**					
Aphids	**General Comments:** • Apply when 30% of terminals are infested (20 colonies per tree) for peaches and 10% of terminals are infested (5–10 colonies per tree) for nectarines. • Some of these products are toxic to bees. Do not apply when bees are active or hives are in the orchard. Refer to label for specific bee toxicity statements.					

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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall to Shuck (cont'd)						
Aphids (cont'd)	4C	Closer	100–200 mL/ha	12 hours	7 days	Rotate with products outside of Group 4. **Closer:** Use the higher rate for longer residual activity. **TwinGuard:** Also controls Oriental fruit moth.
	4C+5	TwinGuard	250 g/ha	12 hours	7 days	
	4D	Sivanto Prime	750 mL/ha	12 hours	14 days	
	23	Movento 240 SC	365 mL/ha	12 hours	7 days	Most effective on young stages of aphids. Control may not be apparent for 2–3 weeks. Under high pest pressure, a second application may be necessary 2 weeks later. Tank-mix with a permitted adjuvant/additive with spreading and penetrating properties at a suggested rate of 0.2% v/v (2 L/1,000 L). See label for further details. Do not tank-mix with sulphur.
	28	Exirel	0.75–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro other captan products, Luna Sensation, Pristine, copper or sulphur. See product label for other tank-mix restrictions.
	29	Beleaf 50 SG	120–200 g/ha	12 hours[1]/ 3 days[2]	14 days	Use high rate for high pest pressure and/or dense foliage.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[3]	Do not apply more than 1,650 L/ha per application in peaches or 950 L/ha in nectarine. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C. Do not apply more than 3 consecutive applications. **Do not apply to yellow skinned nectarines.**
		Purespray Green Spray Oil 13E *	1% v/v	12 hours	—	**Suppression only.** Begin applications 2 weeks after full bloom. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Apply in a high-volume spray to ensure thorough coverage. Do not use within 48 hours of freezing temperatures, when temperatures are high (over 32°C), prior to rain or to heat- or moisture-stressed trees. Do not apply to wet foliage. **PureSpray Green, SuffOil-X:** Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce, Bravo, Echo or sulphur. **Vegol:** Do not use within 14 days of Maestro or other captan products, Bravo, Echo or copper and 30 days of sulphur.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[3]	
European red mite	**General Comments:** • If oil was applied in the spring, a miticide is likely not necessary at this time.					
	10	Apollo SC	300 mL/ha	12 hours[1]/ 2 days[2]	21 days	Most effective on eggs and newly hatched nymphs. Apply when leaf tissue is present and before there are 3 active mites per leaf. Use sufficient water volumes to obtain good coverage, but not less than 475 L/ha. Apply within 14 days after petal fall.

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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall to Shuck (cont'd)						
European red mite (cont'd)	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[3]	Do not apply more than 1650 L/ha per application in peaches or 950 L/ha in nectarines. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C. Do not apply more than 3 consecutive applications. **Do not apply to yellow skinned nectarines.**
		Purespray Green Spray Oil 13 E *	1% v/v	12 hours	—	**Suppression only.** Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. See comments on these products for European red mite at Prebloom.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[3]	
Western flower thrips	**General Comments:** • Western flower thrips is a problem primarily in nectarine. Use a high-volume spray to ensure that spray washes down into the shuck where thrips hide.					
	5	Entrust * or Success	364 mL/ha 182 mL/ha	when dry	14 days	**Suppression only.**
	28	Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	**Suppression only.**
Shuck split to Shuck fall						
Oriental fruit moth (first generation)	**General Comments:** • Where mating disruption products are being used, a pesticide application is generally not required at this time. • Apply within the specified degree-day (DDC, base 7.2°C) after sustained moth catch. Reapply 10–14 days later if catch is extended. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2. • Do not use pyrethroids (Group 3) for control of first-generation oriental fruit moth.					
	1	Lorsban 50 W	3.5 kg/ha	4 days	21 days	Apply at 200 DDC. **Use for control of first-generation larvae only.**
	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 100–140 DDC. For optimum activity, use high rate in a minimum spray volume of 1,000 L/ha. Do not apply more than once every 12 days.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 111–139 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 111–139 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	18	Intrepid	1.5 L/ha	12 hours	14 days	Apply at 100–140 DDC. **Use for control of first-generation larvae only.**
	28	Exirel	500–750 mL/ha	12 hours	3 days	Apply at 194–208 DDC. Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or sulphur. See product label for other tank-mix restrictions.

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (cont'd)						
Plum curculio	**General Comments:** • Plum curculio is a sporadic pest of peaches and nectarines. • Scout edges of orchards near woodlots and wild hosts in spring. Check small fruit for crescent-shaped egg-laying scars. Reassess developing fruit for new damage 7–10 days later. • A border spray of 4–6 rows may provide sufficient control.					
	3	Perm-UP EC or Pounce 384 EC	520 mL/ha 520 mL/ha	12 hours	7 days	Under high pest pressure, may provide suppression only.
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours[1]/ 6 days[2]	7 days	Under high pest pressure, may provide suppression only.
	4A+15	Cormoran	2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Under high pest pressure may provide suppression only. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine, copper or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	**Suppression only.**
		Vayego 200 SC	300 mL/ha	12 hours	5 days	**Suppression only.**
Peachtree borer, Lesser peachtree borer	**General Comments:** • Peachtree borers are sporadic pests. Populations are generally reduced over time where mating disruption is used for several seasons.					
	NC	Isomate-PTB Dual *	375–675 dispensers/ha	0 hours	0 days	Reduces mating of peachtree and lesser peachtree borers. Apply pheromone dispensers before borer flight begins in the spring, i.e., typically apply at or before Shuck split. Use high rate for high pest pressure areas or during initial year of treatment. Dispensers are designed to last the entire season. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests*. Under high pest pressure, insecticides may be needed.
	5	Delegate	420 g/ha in 1,500–2,000 L water	12 hours	5 days	Spray in areas with high borer populations. Use pheromone traps to monitor adult activity and begin sprays 1 week after first flight. Reapply at 3-week intervals. Direct sprays with a handgun to cover trunk and scaffold limbs to 1.5 m above ground. Thorough coverage is essential. Check preharvest intervals, especially for the second and third sprays. **Delegate: Suppression only. Do not spray fruit.** **Rimon:** Do not allow this product to drift on grapes as leaf spotting may occur.
	15	Rimon 10 EC	1.4 L in 1,000 L water	12 hours	14 days	
Western flower thrips	• Use one of the insecticides listed for Western flower thrips at **Petal fall.**					

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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (cont'd)						
Brown rot	**General Comments:** • This is a critical period for infection as the fungus can grow from the dying shuck into the susceptible fruit. This results in latent infections that are not expressed until the fruit starts to mature. • Reapply in 7 days if wet weather persists. • Group 3, 7, 11 and 17 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. May cause some defoliation. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Granuflo-T	1.5–2.25 kg in 1,000 L water	24 hours	7 days	**Peaches only.** For fruit rot, apply at Petal fall and 2 weeks later. **Cannot be used after Dec 14, 2021.**
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/ 15 days[3]	Do not use within 14 days of oils or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products per year. When REI exceeds PHI, follow REI.**
		Microscopic Sulphur WP *	6.3 kg in 1,000 L water	24 hours	1 day	**Peaches only.** May lead to mite outbreaks. Do not use within 14 days of Purespray Green Spray Oil a or SuffOil-X and 30 days of Vegol Crop Oil or Superior Oil.
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	No product specific comments.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Quash	175–280 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (cont'd)						
Brown rot (cont'd)	7+11 (cont'd)	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days[1]/ 24 hours[3]	Do not apply where spray drift may reach Concord grapes as it may cause crop injury. Do not tank-mix or make sequential applications with Exirel.
	17	Elevate 50 WDG	1.7 kg/ha	4 hours	1 day	No product specific comments.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with brown rot fungicides.
Scab	**General Comments:** • Fruit are susceptible to peach scab infections from shuck fall to about 4–6 weeks before harvest. For nectarine, the susceptible period begins earlier (at Shuck split) due to the lack of protective hairy fruit covering. This period marks the greatest scab risk, given the presence of large spore numbers and the increased susceptibility of the developing fruit. • Apply closely spaced applications of effective fungicides, particularly for the shuck fall application and during rainy weather. • See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees,* for products that control scab.					
	M	Granuflo-T	1.5–2.25 kg in 1,000 L water	24 hours	7 days	**Peaches only. Cannot be used after Dec 14, 2021.**
	M	Kumulus DF * or Microscopic Sulphur WP * or Microthiol Disperss *	22.5 kg/ha 6.5 kg in 1,000 L water 22.5 kg/ha	24 hours	1 day	Do not use within 14 days of Purespray Green Spray Oil or SuffOil-X and 30 days of Vegol Crop Oil. **Kumulus, Microscopic Sulphur: Peaches only**
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/ 15 days[3]	Do not use within 14 days of oils or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan products per year. When REI exceeds PHI, follow REI.**
	3	Quash	175–245 g/ha	12 hours[1]/ 9 days[2]	14 days	**Suppression only. Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	2 hours	0 days/ 12 hours[3]	**No product specific comments.**
	7	Fontelis	1.5 L/ha	12 hours	0 days/ 12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
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Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (cont'd)						
Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Fruit are susceptible to infection when they are exposed after shucks fall. Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
Powdery mildew	**General Comments:** • Group 3, 7, 11 and U8 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	3	Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Quash	280 g/ha	12 hours[1]/ 9 days[2]	14 days	**Suppression only. Maximum of 1 application per year.**
	7	Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
	11	Flint	140–280 g/ha	12 hours[1]/ 7 days[2]	1 day	**Suppression only.** Do not tank-mix or make sequential applications with Exirel.
	50	Vivando SC	0.75–1.12 L/ha	12 hours	7 days	No product specific comments.
	NC	MilStop * or Sirocco *	2.8–5.6 kg/ha	4 hours	0 days	Work as eradicants and have little protective activity. Use the lower rate in 500 L of water and the higher rate in 1,000 L of water. Create a mildly alkaline solution. Do not tank-mix with pH adjusters, oil or products not compatible with mild alkaline solutions.
		Purespray Green Spray Oil 13 E *	1% v/v	12 hours	—	**Suppression only.** Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Apply in a high-volume spray to ensure thorough coverage. Do not use within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce, Bravo, Echo or sulphur.

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (cont'd)						
Powdery mildew (cont'd)	NC (cont'd)	Vegol Crop Oil *	2% v/v	12 hours	0 days	Apply in a high-volume spray to ensure thorough coverage at a rate of 2% v/v (20 L/1,000 L water). Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees. Do not use within 14 days of Maestro or other captan products, Bravo, Echo, or copper and 30 days of sulphur. Do not apply to wet foliage.
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other powdery mildew fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with powdery mildew fungicides.
Special sprays (when monitoring indicates the need during early green fruit stage to pit hardening)						
Tarnished plant bug	**General Comments:** • General timing is mid-June if 2% or more fruit damage is observed. Where plant bug pressure is high and significant new damage is detected, repeat spray in 5–7 days. • Plant bug pressure is lower in orchards with managed sod. Other cultural techniques can reduce damage from this pest.					
	3	Pounce 384 EC	520 mL/ha	when dry	7 days	No product specific comments.
		UP-Cyde 2.5 EC	280 mL/ha	12 hours	7 days	Use in 550 L water/ha. Also controls oak bug.
		Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	No product specific comments.
	29	Beleaf 50 SG	200 g/ha	12 hours[1]/ 3 days[2]	14 days	**Suppression only.**
Second-generation oriental fruit moth (OFM) spray						
Oriental fruit moth (second generation)	**General Comments:** • If mating disruption is being used effectively, a pesticide application is not required for second-generation larvae. • Spray all varieties. This generation may require 2 insecticide sprays. • Apply insecticides within the specified degree-day (DDC, base 7.2°C) after sustained first-generation moth catch. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2. Reapply 10–14 days later if catch is extended. • Check the harvest dates of early varieties and do not spray within the preharvest interval. • Spotted wing drosophila (SWD) may be attracted to fruit as soon as they turn from green to yellow. Use a product for oriental fruit moth that is also active against SWD if present in the area. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Second-generation oriental fruit moth (OFM) spray (cont'd)						
Oriental fruit moth (second generation) (cont'd)	3	Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	Apply at 639–667 and again at 805–833 DDC. **UP-Cyde:** Apply in 550 L water/ha.
		Perm-UP EC or Pounce 384 EC	200–400 mL/ha 275 mL/ha 275 mL/ha	when dry	7 days	
		UP-Cyde 2.5 EC	280 mL/ha	12 hours	7 days	
	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 583–611 DDC and again at 750–778 DDC. For optimum activity, use high rate in a minimum spray volume of 1,000 L/ha. Do not apply more than once every 12 days.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 583–611 DDC and again at 750–778 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	1 day	Apply at 639–667 DDC and again at 805–833 DDC.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 555–583 DDC and again at 722–750 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Altacor	285 g/ha	12 hours	1 day	Apply at 639–667 DDC and again at 805–833 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine, copper or sulphur. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	
		Vayego 200 SC	300 mL/ha	12 hours	5 days	
Brown rot (early varieties only – Harrow Diamond through Sunhaven)	• Use one of the fungicides listed for Brown rot at **Shuck split to Shuck fall.** • Check product labels and Table 3–8. *Products Used on Peaches and Nectarines* for preharvest intervals. • **Maximum of 2 applications of Bumper, Jade, Fitness or Princeton in the 3 weeks prior to harvest.** • **Maximum of 1 application of Maestro or other captan products per year; 15-day REI for harvest.**					
Powdery mildew	• Use one of the fungicides listed for Powdery mildew at **Shuck split to Shuck fall.**					
Scab	• Use one of the fungicides listed for Scab at **Shuck split to Shuck fall.** • **Maximum of 1 application of Maestro or other captan products per year; 15-day REI for harvest.**					
Bacterial spot	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
Special sprays (when monitoring indicates the need)						
European red mite, Two-spotted spider mite	**General Comments:** • Check product labels and Table 3–8. *Products Used on Peaches and Nectarines,* for preharvest intervals. • Apply this spray around the second oriental fruit moth spray (early July) if needed. On cultivars Harbrite and later, examine for mites again 3 weeks before harvest. • Spray if 5–10 active pest mites per leaf are present in July and few beneficial mites are present. Monitor carefully because populations of pest mites can build rapidly. • Miticides are best used alone. Use a minimum water volume of 1,000 L/ha for effective control.					

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
European red mite, Two-spotted spider mite (cont'd)	21	Nexter SC or Nexter WP	500 mL/ha 300 g/ha	24 hours	14 days	Most effective when applied to nymphs. Use 600 g/ha for two-spotted spider mites.
	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Active on all life stages. Control may not be apparent for 2–3 weeks. Apply before mite populations build up.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[3]	See comments on these products for European red mite at Prebloom.
		Purespray Green Spray Oil 13 E *	1% v/v	12 hours	—	
		SuffOil-X *	1.3% v/v	12 hours	12 hours	
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[3]	
Japanese beetle	1	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2†]	14 days	**Peaches only.**
	28	Altacor	285 g/ha	12 hours	1 day	**Suppression only.**
		Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine, copper or sulphur. See product label for other tank-mix restrictions.
Brown marmorated stink bug	**General Comments:** • Breeding populations of this pest are present in Ontario. Check ontario.ca/stinkbug for updates on pest development, registered products and management strategies. • There are currently no thresholds established. Apply when insects are first detected, or early damage is found.					
	4A	Clutch 50 WDG	210–420 g/ha	12 hours	7 days	**Suppression only.** This product is toxic to beneficial insects and should be used only when necessary. **Labeled for BMSB only. Cannot be used after April 11, 2022.**
Spotted wing drosophila	**General Comments:** • Spotted wing drosophila insert eggs into ripening fruit. Larvae develop in the fruit and may be present at harvest, contributing to premature breakdown. • Apply insecticides weekly when fruit is ripening or ripe, and flies are present. • Frequent picking, burial of grade-out fruit, and general sanitation are very important to prevent problems. • Applications should be based on the presence of adult pests (flies) as determined by local monitoring. • These products rely on contact in order to control spotted wing drosophila adults. Apply in a high-volume spray to ensure thorough coverage of fruit.					
	1B	Imidan	2.68 kg/ha	7 days	14 days	**Peaches only.**
		Malathion 85 E	610–855 mL in 1,000 L water	12 hours[1]/ 72 hours[2]	7 days	**Suppression only.**
	3	Danitol	0.779–1.559 L/ha	24 hours[1]/ 23 days[2]/ 7 days[4]	16 days	No product specific comments.

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Spotted wing drosophila (cont'd)	5	Delegate	420 mL/ha	12 hours	1 day	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	1 day	No product specific comments.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine, copper or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
San Jose scale	4C	Closer	200–400 mL/ha	12 hours	7 days	Apply when crawlers are active in orchards with a history of scale. Reapply, if necessary, after 14 days
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	
	19	Movento	365–585 mL/ha	12 hours	7 days	Control may not be apparent for 2–3 weeks. Apply in first 2 weeks of June in blocks where scale was observed the previous year. Tank-mix with a permitted adjuvant/additive that has sticking and penetrating properties at a suggested rate of 0.2 % v/v. Because of oil tank-mix, do not tank-mix with sulphur, Maestro or other captan products. Reapply if necessary after 14 days.
Third-generation oriental fruit moth (OFM) spray (late varieties) **Check preharvest interval before spraying early maturing peaches. See Table 3–8. *Products Used on Peaches and Nectarines*.**						
Oriental fruit moth	**General Comments:** • If mating disruption is being used effectively, a pesticide application is not required for third-generation oriental fruit moth. • This spray is usually required for all varieties from Vivid season and later. Check product labels and Table 3–8. *Products Used on Peaches and Nectarines* for preharvest intervals. • Apply within the specified degree-day (DDC, base 7.2°C) after sustained moth catch. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2. • Spotted wing drosophila may be attracted to fruit as soon as they turn from green to yellow. Use a product for oriental fruit moth that is also active against SWD if present in the area. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	3	Decis 5 EC or Decis 100 EC or Poleci 2.5 EC	200 mL/ha 100 mL/ha 400 mL/ha	12 hours	1 day	Apply at 1,167–1,222 DDC and again at 1,361–1,389 DDC. **Up-Cyde:** apply in 550 L water/ha. **Decis 5 EC, Decis 100 EC, Poleci: Peaches only.**
		Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	
		Perm-UP EC or Pounce 384 EC	200–400 mL/ha 275 mL/ha 275 mL/ha	when dry	7 days	
		UP-Cyde 2.5 EC	280 mL/ha	12 hours	7 days	

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Third-generation oriental fruit moth (OFM) spray (late varieties) (cont'd) **Check preharvest interval before spraying early maturing peaches. See Table 3–8. *Products Used on Peaches and Nectarines*.**						
Oriental fruit moth (cont'd)	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/ 6 days[3]	7 days	Apply at 1,111–1,167 DDC and again at 1,305–1,389 DDC. For optimum activity, use high rate in a minimum spray volume of 1,000 L/ha. Do not apply more than once every 12 days.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 1,111–1,167 DDC and again at 1,305–1,389 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	1 day	Apply at 1,167–1,222 DDC and again at 1,361–1,389 DDC.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 1,083–1,139 DDC and again at 1,277–1,305 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Altacor	285 g/ha	12 hours	1 day	Apply at 1,167–1,222 DDC and again at 1,361–1,389 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine, copper and sulphur. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
		Vayego 200 SC	300 mL/ha	12 hours	5 days	No product specific comments.
Brown rot	• Use one of the fungicides listed for **Brown rot at Shuck split to Shuck fall.** • Check product labels and Table 3–8. *Products Used on Peaches and Nectarines* for preharvest intervals. • **Maximum of 2 applications of Bumper, Jade, Fitness or Princeton in the 3 weeks prior to harvest.** • **Maximum of 1 application of Maestro or other captan products per year; 15-day REI for harvest.**					
Prepick spray **Check preharvest interval before spraying early maturing peaches. See Table 3–8. *Products Used on Peaches and Nectarines*.**						
Oriental fruit moth	• Use one of the insecticides listed for Oriental fruit moth at **Third-generation oriental fruit moth (OFM) spray.** • Spray each variety when first colour shows, 7–14 days before first harvest. • If mating disruption is being used effectively, a prepick spray is not necessary unless local populations have historically been high or in cases where late-season peaches are the only remaining fruit in an area. • Spotted wing drosophila (SWD) may be attracted to fruit as they ripen. Use a product for oriental fruit moth that is also active against SWD if present in the area. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck split to Shuck fall.** • Check product labels and Table 3–8. *Products Used on Peaches and Nectarines* for preharvest intervals. • **Maximum of 2 applications of Bumper, Jade, Fitness or Princeton in the 3 weeks prior to harvest.** • **Maximum of 1 application of Maestro or other captan products per year; 15-day REI for harvest.**					

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–7. Peach and Nectarine Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Postharvest fruit treatment						
Blue mold, Grey mold, Brown rot, Rhizopus rot	12	Scholar 230 SC	496 mL in 378 L water	—	postharvest	Postharvest treatment may be necessary during wet harvest seasons. These treatments will prolong storage time while providing control of postharvest diseases. See label for dip and drench instructions.
Fall spray						
Leaf curl	**General Comments:** • Apply any time after leaves are off in fall or winter when temperature in shade is above freezing and conditions favour rapid drying.					
	M	Bravo ZNC or Echo NP	5.0–7.0 L/ha 3.5 L/ha	48 hours	postharvest	Make **one application of one of these products** per year in early spring or as a fall dormant spray at 75–100% leaf drop. **Maximum of 1 postharvest application.**
		Copper Spray * or Guardsman Copper Oxychloride 50 *	2 kg in 1,000 L water	48 hours	postharvest	No product specific comments.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	postharvest	No product specific comments.
		Parasol Flowable *	4.5-8.9 L/ha	48 hours	postharvest	No product specific comments.

[1] General re-entry. [2] Hand thinning. [3] REI for harvest. When the REI exceeds the PHI, follow the REI. [4] Scouting. † Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–8. Products Used on Peaches and Nectarines

Use this table as a guide but refer to product label for specific information.

The preharvest interval (PHI) is the number of days between the last spray and first harvest.

The restricted entry interval (REI) is the minimum interval that must be observed between application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume it is 12 hours. **If the REI for harvest exceeds the PHI, follow the REI.**

The maximum applications is the labelled maximum number or product amount applied for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Products listed as potentially organic may be acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with the certifying body to verify the acceptability of any product prior to using it.

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression							
Aceta 70 WP	33298	acetamiprid	4A	7 days	12 hours[1]/6 day[2]	3	—
Altacor	28981	chlorantraniliprole	28	1 day	12 hours	3 (max. 645 g/ha)	—
Apollo SC	21035	clofentezine	10	21 days	12 hours[1]/2 days[2]	1	—
Assail 70 WP	27128	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Beleaf 50 SG	29796	flonicamid	29	14 days	12 hours[1]/3 days[2]	3 (max. 600 g/ha)	—
Closer	30826	sulfoxaflor	4C	7 days	12 hours	2	—
Clutch 50 WDG	29382	clothianidin	4A	7 days	12 hours	2 (max. 420 g/ha)	—
Cormoran	33353	acetamiprid + novaluron	4A+15	7 days	12 hours[1]/6 days[2]	4	—
Danitol	33817	fenpropathrin	3	16 days	24 hours[1]/23 days[2]/7 days[10]	1	—
Decis 5 EC	22478	deltamethrin	3	1 day	12 hours	1	—
Decis 100 EC	33700	deltamethrin	3	1 day	12 hours	1	—
Delegate	28778	spinetoram	5	1 day	12 hours	3/3[3]	—
Entrust	30382	spinosad	5	1 day	when dry	3	*
Envidor 240 SC	28051	spirodiclofen	23	7 days	12 hours	1	—
Exirel	30895	cyantraniliprole	28	3 days	12 hours	4 (max. 4.5 L/ha)	—
Harvanta 50 SL	32889	cyclaniliprole	28	7 days	12 hours	5	—
Imidan 50 WP	29064	phosmet	1B	14 days	7 days[1†] /30 days[2†]	4	—
Intrepid	27786	methoxyfenozide	18	14 days	12 hours	1	—
Isomate OFM TT	31419	pheromone, oriental fruit moth	NC	0 days	0 hours	—	*

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI.
[5] Maximum of 9 applications per season with no more than 1 dormant application. [6] Maximum of 5 applications per season with no more than 1 dormant application.
[7] Maximum of 2 applications before shuck split and one fall application. [8] No more than 2 applications of this group in the 3 weeks prior to harvest.
[9] Maximum of 5 applications per year for peach or 10 applications per year for nectarine. [10] Scouting. * Personal protective equipment required for some activities. See label.

Table 3–8. Products Used on Peaches and Nectarines (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
Isomate-PTB Dual	30042	pheromone, peachtree borer, lesser peachtree borer	NC	0 days	0 hours	—	*
Kopa Insecticidal Soap	31433	potassium salts of fatty acids	NC	0 days	12 hours[1,4]	—	*
Labamba	33576	lambda-cyhalothrin	3	7 days	24 hours	3	—
Lorsban 50 W	20944	chlorpyrifos	1B	21 days	4 days	2	—
Malathion 85 E	8372	malathion	1B	7 days	24 hours[1]/72 hours[2]	1	—
Matador 120 EC	24984	lambda-cyhalothrin	3	7 days	24 hours	3	—
Movento 240 SC	28953	spirotetramat	23	7 days	12 hours	max. 1.12 L/ha	—
Nexter SC	33433	pyridaben	21	14 days	24 hours	1	—
Nexter WP	25135	pyridaben	21	14 days	24 hours	1	—
Perm-UP EC	28877	permethrin	3	7 days	12 hours	—	—
Poleci 2.5 EC	32446	deltamethrin	3	1 day	24 hours	1	—
Pounce 384 EC	16688	permethrin	3	7 days	when dry	—	—
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	—	12 hours	1/8[5]	*
Rimon 10 EC	28881	novaluron	15	14 days	12 hours	3	—
Silencer 120 EC	29052	lambda-cyhalothrin	3	7 days	24 hours	3	—
Sivanto Prime	31452	flupyradifurone	4D	14 days	12 hours	max. 2 L/ha	—
Success	26835	spinosad	5	14 days	when dry	3	—
SuffOil-X	33099	mineral oil	NC	12 hours	12 hours	8	*
Superior 70 Oil	9542 14981	mineral oil	NC	prebloom	12 hours	1 (dormant)	*
TwinGuard	31442	sulfoxaflor + spinetoram	4C+5	7 days	12 hours	2	—
UP-Cyde 2.5 EC	28795	cypermethrin	3	7 days	12 hours	2	—
Vayego 200 SC	33711	tetraniliprole	28	5 days	12 hours	3	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[1,4]	1/4[6]	*
Products used for disease control or suppression							
Bravo ZNC	33515	chlorothalonil	M	60 days/shuck split	12 hours[1]/11 days[2]	2/1[7]	—
Bumper 432 EC	28017	propiconazole	3	3 days	12 hours	5[8]	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI.
[5] Maximum of 9 applications per season with no more than 1 dormant application. [6] Maximum of 5 applications per season with no more than 1 dormant application.
[7] Maximum of 2 applications before shuck split and one fall application. [8] No more than 2 applications of this group in the 3 weeks prior to harvest.
[9] Maximum of 5 applications per year for peach or 10 applications per year for nectarine. [10] Scouting. * Personal protective equipment required for some activities. See label.

Table 3–8. Products Used on Peaches and Nectarines (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Cantus WDG	30141	boscalid	7	0 days	12 hours[1,4]	5	—
Cevya	33405	mefentrifluconazole	3	0 days	12 hours[1,4]	max. 1.125 L/ha	—
Copper 53 W	9934	tri-basic copper sulphate	M	2 days	48 hours	2	*
Copper Spray	19146	copper oxychloride	M	2 days	48 hours	2	*
Cueva	31825	copper octanoate	M	1 day	4 hours	5/10[9]	*
Echo NP	33479	chlorothalonil	M	60 days/shuck split	12 hours[1]/11 days[2]	2/1[7]	—
Elevate 50 WG	25900	fenhexamid	17	1 day	4 hours	4	—
Ferbam 76 WDG	20136	ferbam	M	21 days	12 hours	—	—
Fitness	32639	propiconazole	3	3 days	3 days	5[8]	—
Flint	30619	trifloxystrobin	11	1 day	12 hours[1]/7 days[2]	4	—
Fontelis	30331	penthiopyrad	7	0 days	12 hours[1,4]	max. 4.5 L/ha	—
Fracture	32139	BLAD polypeptide	BM1	0 days	12 hours[1,4]	3	—
Funginex DC	27686	triforine	3	prebloom	12 hours	3 (max. 2.5 L/ha)	—
Granuflo-T	30548	thiram	M	7 days	24 hours	7	—
Guardsman Copper Oxychloride 50	13245	copper oxychloride	M	2 days	48 hours	2	*
Indar	27294	fenbuconazole	3	0 days	12 hours[1,4]	7	—
Jade	24030	propiconazole	3	3 days	3 days	5[8]	—
Kenja 400 SC	31758	isofetamid	7	1 day	12 hours	3	—
Kumulus DF	18836	sulphur	M	1 day	24 hours	8	*
Luna Sensation	32107	fluopyram + trifloxystrobin	7+11	1 day	12 hours	max. 1.98 L/ha	—
Maestro 80 WSP	33488	captan	M	2 days	24 hours[1]/29 days[2]/15 days[3]	1	—
Microscopic Sulphur WP	14653	sulphur	M	1 day	24 hours	8	*
Microthiol Disperss	29487	sulphur	M	1 day	24 hours	8	*
MilStop	28095	potassium bicarbonate	NC	0 days	4 hours[1,4]	10	*
Miravis Duo	33206	difenoconazole + pydiflumetofen	3+7	0 days	12 hours[1,4]	max. 4 L/ha	—
Nova	22399	myclobutanil	3	5 days	12 hours[1]/12 days[2]	6	—
Parasol Flowable	25901	copper hydroxide	M	dormant and postharvest	48 hr	2	*

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI.
[5] Maximum of 9 applications per season with no more than 1 dormant application. [6] Maximum of 5 applications per season with no more than 1 dormant application.
[7] Maximum of 2 applications before shuck split and one fall application. [8] No more than 2 applications of this group in the 3 weeks prior to harvest.
[9] Maximum of 5 applications per year for peach or 10 applications per year for nectarine. [10] Scouting. * Personal protective equipment required for some activities. See label.

Table 3–8. Products Used on Peaches and Nectarines (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Princeton	33840	propiconazole	3	3 days	3 days	5[6]	—
Pristine WG	27985	boscalid + pyraclostrobin	7+11	0 days	when dry[1]/10 days[2]	5	—
ProBLAD Plus	31782	BLAD polypeptide	BM1	0 days	12 hours[1,4]	3	—
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	dormant	12 hours	1/8[5]	*
Quash	30402	metconazaole	3	14 days	12 hours[1]/9 days[2]	1	—
Regalia Maxx	30199	extract of *Reynoutria sachalinensis*	P5	0 days	when dry	—	*
Scholar 230 SC	29528	fludioxonil	12	postharvest	—	1	—
Senator 50 SC	32096	thiophanate-methyl	1	1 day	12 hours	max. 4.9 L/ha	—
Sercadis	31697	fluxapyroxad	7	0 days	12 hours[1,4]	3	—
Serenade OPTI	31666	*Bacillus subtilis*	BM2	0 days	when dry	—	*
Sirocco	31091	potassium bicarbonate	NC	0 days	4 hours[1,4]	10	*
Supra Captan 80 SP	33461	captan	M	2 days	24 hours[1]/29 days[2]/15 days[3]	1	—
Syllit 400 FL	28351	dodine	U12	7 days	48 hours	2	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[1,4]	1/4[6]	*
Vivando SC	29765	metrafenone	50	7 days	12 hours	2	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI.
[5] Maximum of 9 applications per season with no more than 1 dormant application. [6] Maximum of 5 applications per season with no more than 1 dormant application.
[7] Maximum of 2 applications before shuck split and one fall application. [8] No more than 2 applications of this group in the 3 weeks prior to harvest.
[9] Maximum of 5 applications per year for peach or 10 applications per year for nectarine. [10] Scouting. * Personal protective equipment required for some activities. See label.

Pears

In this section:

The information in this chapter is provided as a guideline only. Read the product label and follow all safety precautions. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Many pesticides are in various stages of re-evaluation by PMRA and their status may change within the lifetime of this publication. Consult the PMRA website and/or the registrant to verify actual dates of last sale and last use. Updates will also be available at ONFruit.ca.

- Consult the product label for suggested water volumes. Otherwise, use enough water to ensure thorough spray coverage. Where the product rate is listed in amount per 1,000 L, and if a water volume is not provided on the label, use enough water to wet the foliage to the near drip point.
- For preharvest interval (PHI), restricted entry interval (REI) and maximum number of applications, see Table 3–10. *Products Used on Pears.*
- **Products are listed by chemical group and in alphabetical order within each group. The order does not reflect efficacy.** See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees* for efficacy ratings.
- Where a product in the calendar is followed by a "*", it is potentially acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires. 2020. RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with your certifying body to verify the acceptability of any product prior to use.
- Not all varieties have been tested with all possible tank-mix combinations, especially with new products. Prior to tank-mixing any unfamiliar chemical combinations (fungicides, insecticides, liquid fertilizers, biological control products, adjuvants, and additives), conduct a jar test to determine if there are any physical incompatibilities. For more information, see

Compatibility of Spray Materials, Chapter 2 and Table 2–4. *Tank-mix Order for Pesticide Compatibility Test.* Before applying the tank-mix, also test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

- Information on the timing and rates of application for plant growth regulators and chemical thinners can be found in the crop calendars. For additional information on plant growth regulators and thinning, visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#pears and the *Thinning of Tree Fruit* webpage at http://www.omafra.gov.on.ca/english/crops/hort/thinning.htm.

Resistance Management

To delay development of resistance to insecticides, miticides and fungicides, follow resistance management guidelines outlined in *Resistance Management Strategies,* Chapter 2. The chemical group is indicated in the "Group" column before the "Product" column. Products belonging to the same chemical group are grouped together in the calendar. Multi-site (M) fungicides are not prone to resistance and do not have to be rotated. Some products are not classified to mode of action (NC) and the mode of action has not been determined for others (U). Plant defence inducers (P) and biological fungicides with mulitple modes of action (BM) are not known to be prone to resistance.

Fungicide resistance management

Take the following steps to avoid rapid development of fungicide resistance:

- Do not reduce rates below those specified on the label.
- Do not use products containing the same chemical group in consecutive applications.
- Do not use Senator, Nova, Inspire Super, Scala, Aprovia Top, Fontelis, Sercadis, Luna Tranquility, Flint, Sovran, Pristine or Syllit when sporulating scab lesions are present.
- Do not exceed maximum number of applications on the label.

Insecticide resistance management

Take the following steps to avoid development of insecticide resistance:

- For pests with discrete generations (pear psylla, oriental fruit moth, codling moth, obliquebanded leafroller) do not use insecticides from the same group for more than one generation. Within a generation, if more than one spray is required, use a product from the same chemical group.
- For pests with overlapping generations (mites), do not use products containing the same chemical group in consecutive applications.

Bee Toxicity

Some insecticides are toxic to bees and other pollinating insects. Use of insecticides on flowering crops requires careful management to avoid negative effects on pollinators. Some insecticides cannot be applied prior to bloom. **Insecticides should not be applied when fruit trees are in bloom.** Do not apply insecticides when bees are active. Before and after bloom, bees may be present on flowering cover crops and weeds — do not allow drift of insecticides onto these or other flowering crops. Always follow label precautions to avoid impacts on bees. For more information, see *Bee Poisoning*, Chapter 1, and honeybee toxicity ratings in Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*

Buffer Zones

Leave a suitable buffer zone between treatment area and adjacent sensitive areas, such as hedgerows, woodlots and freshwater habitats. Zones may vary depending on the product used, growth stage of the crop and method of application including the use of drift-reducing technology. Check the pesticide label for requirements.

Use Health Canada's online spray drift calculator to modify the buffer zone specified on the label based on weather conditions, category of spray equipment and droplet size. For more information, see the Buffer Zone Calculator at www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php. Unfortunately, this model does not account for water volume, travel speed or crop stage.

Observing buffer zones is a legal requirement. A record of the buffer zone modification, if any, must be retained for at least one year from the time of application.

Pesticide Persistence

Some products are persistent and may carry over from one year to the next. Where possible, avoid using these products in areas treated during the previous season. Consult labels for product-specific information.

Crop Nutrition

Crop nutrition is important for plant growth, fruit quality development and the acquisition of adequate cold hardiness by tree fruit. For fruit crops, soil testing, plant tissue analysis and visual deficiency symptoms all play an important role in assessing and monitoring the crop's nutritional status. For more information, visit the *Soil Management, Fertilizer Use Crop Nutrition and Cover Crops for Fruit Production* webpage at http://www.omafra.gov.on.ca/english/crops/hort/soil_fruit.htm and see OMAFRA Publication 611, *Soil Fertility Handbook.*

Table 3–9. Pear Calendar

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant						
Scale insects, Pear psylla	**General Comments:** • Apply in a high-volume spray to ensure thorough coverage. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. • Do not use within 14 days of Maestro or other captan products. • Do not use within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees. • May also reduce populations of blister mite and rust mite.					
	NC	Purespray Green Spray Oil 13 E *	2% v/v	12 hours	—	In addition to precautions in general comments, do not use within 14 days of Perm-UP, Pounce or sulphur.
		Superior 70 Oil *	2% v/v	12 hours	prebloom	In addition to precautions in general comments, do not apply after green tip. Do not use within 30 days of sulphur.
		Vegol Crop Oil *	2% v/v	12 hours	0 days	In addition to precautions in general comments, do not use within 14 days of copper or 30 days of sulphur. Do not apply to wet foliage.
Blister mite	M	Lime Sulphur *	7.3 L in 100 L water	48 hours	120 days	Dormant application only. Apply in a high-volume spray to ensure thorough coverage.
Fire blight	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Copper is a contact bactericide only and does not have activity on the fire blight pathogen within the plant tissue. Apply when overwintering cankers begin to ooze as tree breaks dormancy. Thorough coverage of limbs and trunk is essential for good control. This spray does not eliminate the need for blossom blight management. **Cueva:** Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Parasol Flowable *	4.7 L/ha	48 hours	2 days	

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Green tip						
Scab	**General Comments:** • Start scab control early and reapply if weather remains wet. • Group 1, 3, 7, 9 and U12 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Maestro 80 WSP or Supra Captan 80 WSP	3.0 kg/ha	High density: 48 hours[1]/ 15 days[2]/ 6 days[3] Standard: 48 hours[1]/ 24 days[2]/ 4 days[3]	High density: 7 days/ 15 days[4] Standard: 7 days/ 19 days[4]	Do not use on d'Anjou pears. Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. **High density:** canopy width no greater than 2 m. **Maximum of 10 applications of Maestro or other captan products per year.** **Standard:** canopy width greater than 2 m. **Maximum of 2 applications of Maestro or other captan products per year.** Use 1 application before fruit thinning by hand and 1 after. **When REI exceeds PHI, follow REI.**
	1	Senator 50 SC plus 1/2 to full rate Group M	875 mL/ha See Group M above	12 hours	1 day	Tank-mix with a compatible protectant Group M fungicide. See label for suggested tank-mix products.
	3+7	Aprovia Top 195 EC	386–643 mL/ha	12 hours	30 days	Maximum of 2 sequential applications before rotating to a different fungicide group. Use high rate and shorten interval between applications under high disease pressure.
	3+9	Inspire Super	560–836 mL/ha	12 hours	14 days	This product does not provide good control of fruit scab. Use during primary scab period only. Use high rate and shorten interval between applications under high disease pressure.
	7	Fontelis	1.0–1.5 L/ha	12 hours	28 days	Reapply as needed on a 7–10-day interval. **Fontelis:** contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions. Use high rate and shorten interval between applications under high disease pressure. **Sercadis:** use with a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Maximum of 2 applications per season. Do not use after full bloom.**
		Sercadis	333 mL/ha	12 hours	0 days/ 12 hours[4]	
	7+9	Luna Tranquility	800 mL/ha	12 hours[1]/ 24 hours[2]	72 days	Shorten interval between applications under high disease pressure.
	9	Scala SC	1 L/ha	12 hours[1]/ 24 hours[2]	72 days	**Do not apply postbloom.**

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Green tip (cont'd)						
Scab (cont'd)	BM2	Serenade OPTI *	1.7–3.3 kg/ha	when dry	0 days	**Suppression only.** Apply preventatively at 7–10-day intervals. Use in conjunction with other cultural or chemical controls.
	NC	Buran *	1.8 % v/v (9 L in 500 L water/ha)	when dry	0 days	**Suppression only.** Do not use more than 18 L/ha per application. This product should be used only as a post-infection treatment. Reapply 7–14 days when conditions are conductive to disease development. This is a new product in Ontario and little evidence of its efficacy is available. Do not apply if rain is forecast within 48 hours.
	U12	Syllit 400 FL plus 1/2 to full rate Group M	5.28 L/ha See Group M above	48 hours	7 days	Tank-mix with a compatible protectant Group M fungicide. See label for suggested tank-mix products.
European red mite, Pear psylla	**General Comments:** • Best applied at or near Green tip for mites. Oil does not control rust mites. • Apply in a high-volume spray to ensure thorough coverage. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block.					
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days	Do not apply tank-mix with or apply within in 3 days of sulphur. Do not make more than 3 consecutive applications.
		Purespray Green Spray Oil 13 E *	2% v/v	12 hours	—	**Suppression only.** Apply in a high-volume spray to ensure thorough coverage. Do not apply within 48 hours of freezing temperatures, when temperatures are high (above 30°C), Immediately before rain or to heat- or to moisture-stressed trees. **Purespray Green Spray Oil, SuffOil-X:** Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not tank-mix with copper more than once per season. **SuffOil-X: Mites only.** **Superior Oil:** Do not use within 30 days of sulphur. **Do not apply after green tip.** **Vegol:** Do not use within 14 days of Maestro or other captan products or copper and 30 days of sulphur. Do not apply to wet foliage.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	
		Superior 70 Oil *	2% v/v	12 hours	prebloom	
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[4]	
Pear psylla	4D	Sivanto Prime	0.75–1.0 L/ha + horticultural oil (0.25% v/v)	12 hours	14 days	Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain. **Sivanto Prime: Suppression only.**
	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25-1 % v/v)	12 hours	28 days	

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Green tip (cont'd)						
Pear psylla (cont'd)	NC	Surround WP *	50 kg/ha	12 hours	0 days	Make 2 applications at 50 kg/ha, 7 days apart, to establish a base layer. Continue at 7–14-day intervals, using a reduced rate of 25 kg/ha, to maintain even coverage of new growth. Surround may interfere with optimum bee activity. Do not apply from tight cluster to petal fall. Light to moderate rain will help distribute product. Reapply after heavy rain, strong wind or overhead irrigation. Do not use with anti-foaming agents, spreader/ stickers or oil.
Oriental fruit moth	NC	Isomate OFM TT *	125–250 dispensers/ha	0 hours	0 days	Reduces mating for oriental fruit moth. Apply dispensers before flight begins. Place dispensers in lateral branches in the upper canopy in a uniform manner across the orchard block. Use high rate for high-pressure areas or initial year of treatment. Dispensers are designed to last for the entire season. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.* If desired, use both an insecticide and mating disruption for managing first-generation larvae (see Petal fall).
San Jose scale, Oystershell scale	**General Comments:** • Apply in a high-volume spray to ensure thorough coverage. • Use in orchards with high populations of scale in combination with dormant oil application.					
	4C	Closer	200–400 mL/ha	12 hours	7 days	No product specific comments
	4C+5	TwinGuard	250–500 g/ha	12 hours	7 days	No product specific comments.
	4D	Sivanto Prime	0.75–1.0 L/ha + horticultural oil (0.25% v/v)	12 hours	14 days	Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur product. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
White bud (white petals showing on flowers)						
Scab	• Use one of the fungicides listed for Scab at **Green tip.** • Start scab control early and continue at 7–10-day intervals if weather remains wet. • **Maximum of 2 applications of Sercadis. Do not use after full bloom.** • **Maximum of 2 applications of Maestro or other captan products to standard trees.** • **Maximum of 10 applications of Maestro or other captan products to high density trees.**					
Pear psylla	**General Comments:** • To avoid resistance problems, do not use pyrethroids at this stage. Refer to comments at First cover.					
	4A	Aceta 70 WP or Assail 70 WP	120 g/ha	12 hours[1]/ 6 days[2] 48 hours[5]/	7 days	Rotate with products outside of Group 4. **Calypso:** Apply high rate under high pest pressure. Apply when populations have reached economic thresholds and the majority of the population is in early instar stages. Reapply at 7–10-day intervals if needed.
		Calypso 480 SC	290–440 mL/ha	12 hours	30 days	

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
White bud (white petals showing on flowers) (cont'd)						
Pear psylla (cont'd)	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	21	Nexter SC or Nexter WP	1.0–1.2 L/ha 600 g/ha	24 hours	25 days	There is little commercial experience with these products for psylla.
Codling moth, Oriental fruit moth	NC	Isomate-CM/OFM TT *	200–500 dispensers/ha	—	—	Reduces mating of codling moth and oriental fruit moth. Apply prior to flight of codling moth, no later than petal fall. Place dispensers in lateral branches in the upper canopy in a uniform manner across the orchard block. Use the high rate for high-pressure areas or initial year of treatment. Dispensers are designed to last for the entire season. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests*. Most orchards will require insecticides applied for one or both codling moth generations to avoid unacceptable levels of damage.
Bloom						
DO NOT APPLY INSECTICIDES WHILE PEARS ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Fire blight	**General Comments:** • Models to time fire blight sprays (e.g., Maryblyt, Cougar Blight) are available. For more information, see ontario.ca/cropipm. Ontario prediction maps are also available at ONFruit.ca. • Otherwise, apply sprays if temperatures over 18ºC are accompanied by high humidity (over 69%), heavy dews or rainfall. • Products are most effective when applied dilute (high volumes of water) prior to an infection period. Use alone for best results. • Alternate row spraying will not provide adequate protection from fire blight. • Spray susceptible cultivars beginning at first bloom until petal fall including rat-tail bloom.					
	M	Copper 53 W *	1 kg/ha plus 6 kg lime in 1,000 L water	48 hours	2 days	Pre-mix hydrated lime in a pail with enough water to make a slurry. Pour through a 0.3 mm screen into spray tank partly filled with water and with mechanical agitator running. Allow 15 minutes of mixing before spraying. Maintain agitation throughout application. Incompatible with all other insecticides and fungicides.
		Copper Spray *	2.2 kg in 1,000 L water	48 hours	2 days	Do not apply on Anjou. In case of hail damage, apply within 24 hours of event.
		Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
	24	Kasumin 2 L	5 L in 1,000 L water	12 hours	90 days	Apply at 20–30% bloom or when conditions favour disease development. Do not make more than 2 consecutive applications. Do not apply after Petal fall. If using lower water volumes, refer to water volume chart on label for rate recommendations.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE PEARS ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Fire blight (cont'd)	25	Streptomycin 17	600 g in 1,000 L water	24 hours[1]/ 14 days[2]/ 7 days[3]/	30 days	Apply at 20–30% bloom or when conditions favour disease development. UV light-sensitive, so is effective for only 2–3 days. If warm, wet conditions (above 20°C) prevail, 2–3 sprays during bloom may be required. Degrades rapidly in UV. May provide some curative or kick-back activity if applied within 24 hours following aninfection event. For resistance management, rotate with a different fungicide group. Do not use after Copper 53 W.
	BM2	Double Nickel LC *	5.0–7.5 L/ha	when dry	0 days	**Suppression only.** Apply at 1–5% bloom and reapply every 3–7 days if conditions favour disease development. Can be mixed with copper fungicides to improve control.
		Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.** Apply at 1–5% bloom and reapply as needed if conditions favour disease development. Under high disease pressure, follow with Streptomycin 2–3 days later.
	NC	Blossom Protect *	See comments	when dry	0 days	For every 1 m of tree height, dilute 5.25 kg Component A in 500 L/ha water and add dilution to 0.75 kg Component B. If a forecast system (e.g., Maryblyt, Cougar Blight) is available, apply 1–2 days before an infection date. Repeat after 2 days and up to 5 times if infection continues. If no forecast system is available, apply at 10, 40, 70 and 90% open blossoms. This product is sensitive to fungicides and may have reduced efficacy if tank-mixed or applied within 2 days of certain products. See label for further details. Russeting may occur on sensitive varieties.
Scab	**General Comments:** • Group 3, 7, 9, 11 and U12 fungicides are locally systemic. Consult labels for information on drying time required before rain.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
		Maestro 80 WSP or Supra Captan 80 WSP	3.0 kg/ha	**High density:** 48 hours[1]/ 15 days[2]/ 6 days[3] **Standard:** 48 hours[1]/ 24 days[2]/ 4 days[3]	**High density:** 7 days/ 15 days[4] **Standard:** 7 days/ 19 days[4]	Do not use on d'Anjou pears. Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. **High density:** canopy width no greater than 2 m. **Maximum of 10 applications of Maestro or other captan products per year.** **Standard:** canopy width greater than 2 m. **Maximum of 2 applications of Maestro or other captan products per year.** Use 1 application before fruit thinning and 1 after. **When REI exceeds PHI, follow REI.**
	3	Nova	340 g/ha	12 hours	14 days	Apply in 500–1,000 L water. For improved fruit scab control, tank-mix with a compatible protectant Group M fungicide.
	3+7	Aprovia Top 195 EC	386–643 mL/ha	12 hours	30 days	For improved fruit scab control, tank-mix with a compatible protectant Group M fungicide.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE PEARS ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Scab (cont'd)	3+9	Inspire Super	560–836 mL/ha	12 hours	14 days	For improved fruit scab control, tank-mix with a compatible protectant Group M fungicide.
	7	Fontelis	1.0–1.5 L/ha	12 hours	28 days	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions. Under high disease pressure, use high rate.
		Sercadis	333 mL/ha	12 hours	0 days/ 12 hours[4]	Use with a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after bloom.**
	7+9	Luna Tranquility	800 mL/ha	12 hours[1]/ 24 hours[2]	72 days	No product specific comments.
	7+11	Pristine WG	1.0–1.2 kg/ha	when dry[1]/ 12 days[2]	5 days	Do not tank-mix or make sequential applications with Exirel.
	9	Scala SC	1 L/ha	12 hours[1]/ 24 hours[2]	72 days	**Do not use after bloom.**
	11	Flint	140 g/ha	12 hours[1]/ 4 days[2]	14 days	Do not tank-mix or make sequential applications with Exirel.
		Sovran	240 g/ha	48 hours	30 days	Where disease pressure is high, use up to 360 g/ha. Do not tank-mix or make sequential applications with Exirel.
	BM2	Serenade OPTI *	1.7–3.3 kg/ha	when dry	0 days	**Suppression only.** Apply preventatively at 7–10-day intervals. Use in conjunction with other cultural or chemical controls.
	NC	Buran *	1.8 % v/v (9 L in 500 L water/ha)	when dry	0 days	**Suppression only.** See comments on this product for Scab at Green tip.
	U12	Syllit 400 FL plus 1/2 to full rate Group M	5.28 L/ha See Group M above	48 hours	7 days	Tank-mix with a compatible protectant Group M fungicide. See label for suggested tank-mix products.
Tree growth modification	NC	Promalin SL	127–526 mL in 10 L water	12 hours	28 days	Used to stimulate lateral bud break and additional branch growth on young non-bearing trees, providing better tree structure for early cropping. Apply when new terminal growth is 2.5–8 cm long (approximately king bloom to 1 week after petal fall). Thoroughly soak the area of the tree with a hand sprayer where branching is desired. Do not use when temperatures are below freezing or above 32°C. For additional information, see Table 3–11 *Suggested Rates of MaxCel or Cilis Plus* and visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#pears

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Bloom (cont'd)						
DO NOT APPLY INSECTICIDES WHILE PEARS ARE IN BLOOM. SEE BEE *POISONING*, CHAPTER 1.						
Increase fruit set	NC	Promalin SL	250 mL/ha	12 hours	28 days	Maximum of two applications. Make first application between 10 and 30% open flowers and the second application between full bloom and petal fall. Do not use when temperatures are below freezing or above 32°C. For more information visit the *Plant Growth Regulators for Fruit Crops* webpage at http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm#pears
Petal fall						
Plum curculio	**General Comments:** • These products are toxic to bees. Do not apply when bees are active or hives are in the orchard. Refer to label for specific bee toxicity statements. • Monitor trees along the edge of the orchard for the first sign of feeding damage after bloom.					
	4A	Calypso 480 SC	440 mL/ha	12 hours	30 days	Optimal timing is petal fall plus 3 days. However, if monitoring indicates plum curculio is in the orchard prior to this timing, then insecticides should be applied at Petal fall.
	6+28	Minecto Pro	741–919 mL/ha + horticultural oil (0.25–1% v/v)	12 hours	28 days	Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain. Also controls pear psylla and obliquebanded leafroller.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Pristine, Flint, Sovran, copper or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	**Suppression only.**
		Vayego 200 SC	300 mL/ha	12 hours	7 days	**Suppression only.**
Pear psylla	**General Comments:** • These products are toxic to bees. Do not apply when bees are active or hives are in the orchard. Refer to label for specific bee toxicity statements.					
	4A	Aceta 70 WP or Assail 70 WP	120 g/ha	12 hours[1]/ 6 days[2]/ 48 hours[5]	7 days	Rotate with products outside of Group 4. **Calypso:** Apply high rate under high pest pressure. Apply when populations have reached economic thresholds and the majority of the population is in early instar stages. Reapply at 7–10-day intervals if needed. **Sivanto Prime: Suppression only.** See comments on this product for Pear psylla at Green tip.
		Calypso 480 SC	290–440 mL/ha	12 hours	30 days	
	4D	Sivanto Prime	0.75–1.0 L/ha + horticultural oil (0.25% v/v)	12 hours	14 days	

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall (cont'd)						
Pear psylla (cont'd)	6	Agri-Mek SC	170 mL/ha	12 hours	28 days	Apply no later than 21 days after petal fall for best results. Apply with 10 L oil and a minimum of 1,000 L of water per ha, when most mites are in the nymph stage. Do not use within 14 days of Maestro or other captan products. May cause russeting to d'Anjou and other sensitive varieties. **Maximum of 1 application per season.** Alternate yearly with other insecticides.
	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25–1% v/v)	12 hours	28 days	Because of the oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain. Also controls plum curculio and obliquebanded leafroller.
	21	Nexter SC or Nexter WP	1.0–1.2 L/ha 600 g/ha	24 hours	25 days	There is little commercial experience with these products for psylla. May also control pear rust mite and blister mite.
	23	Movento 240 SC	365 mL/ha	12 hours	7 days	Control may not be apparent for 2–3 weeks. Tank-mix with a permitted adjuvant/additive with spreading and penetrating properties at a suggested rate of 0.2% v/v (2 L/1,000 L water). See label for further details. Do not tank-mix with sulphur, Maestro or other captan products. Do not use when fruit is present due to the possibility of injury. If psylla pressure is high, use the higher labelled rate of 435 mL/ha.
Obliquebanded leafroller	**General Comments:** • Spray in orchards with historical pest problems or high pest pressure (1–2% of the terminals or buds have larvae or damage). • For overwintering generation, apply at Petal fall. Place pheromone traps in orchards at petal fall to monitor summer generation. • Resistance to organophosphate insecticides is present in some commercial orchards. Cross-resistance between pyrethroids and Intrepid is possible. See *Pest Resistance to Fungicides, Insecticides and Miticides,* Chapter 2. • Some of these products are toxic to bees. Do not apply when bees are active or hives are in the orchard. Refer to label for specific bee toxicity statements.					
	1	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2†]	14 days	No product specific comments.
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	Reapply 14 days later if larvae activity is extended.
	5	Delegate	420 g/ha	12 hours	7 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	7 days	
	6+28	Minecto Pro	496–741 mL/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	If using oil, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties, when used alone or when other products are applied sequentially. Do not use oil within 14 days of Maestro or other captan products, Perm-UP, Pounce. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain. Also controls psylla and plum curculio.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.

† Personal protective equipment required for some activities. See label.

— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall (cont'd)						
Obliquebanded leafroller (cont'd)	11	Bioprotec PLUS * or Dipel 2X DF * or Foray 48 BA or XenTari WG *	1.8–2.5 L/ha 1.125 kg/ha 2.8 L/ha 0.5–1.6 L/ha	4 hours 12 hours 12 hours 12 hours	0 days	Apply in the evening or on a cloudy day. Spray when and where pests are actively feeding. Acidify spray mix to below pH 7.0 and apply on cloudy days or in the evening. Apply in a high-volume spray to ensure thorough coverage on both sides of the leaf. Apply to young larvae, early in infestation. Death of insect may take several days. Reapply at 5–7-day intervals if larvae activity is extended.
	18	Intrepid	750 mL/ha	12 hours	14 days	No product specific comments.
	28	Altacor	285 g/ha	12 hours	5 days	No product specific comments.
		Exirel	0.5–1.0 L/ha	12 hours	3 days	Reapply 10 days later if larvae activity is extended. Do not tank-mix or make sequential applications with Maestro or other captan products, Pristine, Flint, Sovran, copper or sulphur. See product label for other tank-mix restrictions.
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	No product specific comments.
		Vayego 300 SC	225 mL/ha	12 hours	7 days	No product specific comments.
Green fruitworm	**General Comments:** • Green fruitworm is a sporadic pest in pear. Larval size and damage are very similar to obliquebanded leafroller but green fruitworm is active earlier in the season (throughout bloom and early fruit set).					
	1B	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2†]	14 days	No product specific comments.
	3	Danitol	0.779–1.559 L/ha	24 hours[1]/ 23 days[2]/ 7 days[3,5]	16 days	No product specific comments.
	11	Bioprotec PLUS * or Dipel 2X DF *	1.8–2.5 L/ha 1.125 kg/ha	4 hours 12 hours	0 days	Product must be consumed to be effective. Apply in evening or on a cloudy day. Spray when and where pests are actively feeding. Acidify spray mix to below pH 7.0 and apply on cloudy days or in the evening. Apply in a high-volume spray to ensure thorough coverage on both sides of the leaves. Apply to young larvae, early in infestation. Death of insect may take several days. Reapply at 5–7-day intervals if larvae activity is extended
	28	Altacor	215 g/ha	12 hours	5 days	No product specific comments.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
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Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall (cont'd)						
Pear rust mite	**General Comments:** • Apply before mite populations build up. • Miticides are best applied alone. Thorough spray coverage is essential for good control. • For resistance management, do not use more than once per season.					
	6	Agri-Mek SC	170 mL/ha	12 hours	28 days	Apply no later than 21 days after Petal fall for best results. Apply with 10 L oil and a minimum of 1,000 L of water/ha, when most mites are in the nymph stage. Do not use within 14 days of Maestro or other captan products. May cause russeting to d'Anjou and other sensitive varieties. To prevent russeting fruit, apply at prebloom or petal fall.
	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	Because of the oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	21	Nexter SC or Nexter WP	500 mL/ha 300 g/ha	24 hours	25 days	May also control blister mite and pear psylla.
	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Control may not be apparent for 2–3 weeks. May also control blister mite.
European red mite, Two-spotted spider mite	**General Comments:** • Apply before mite populations build up. • Thorough spray coverage is essential for good control. • For resistance management, do not use any miticide more than once per season.					
	6	Agri-Mek SC	170 mL/ha	12 hours	28 days	Apply no later than 21 days after petal fall for best results. Apply with 10 L oil and a minimum of 1,000 L of water per ha, when most mites are in the nymph stage. Do not use within 14 days of Maestro or other captan products. May cause russeting to d'Anjou and other sensitive varieties.
	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25-1 % v/v)	12 hours	28 days	Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	10	Apollo SC	300 mL/ha	12 hours[1]/ 2 days[2]	21 days	No product specific comments.
	20	Kanemite 15 SC	2.1 L/ha	12 hours	14 days	No product specific comments.
	21	Nexter SC or Nexter WP	500 mL/ha 300 g/ha	24 hours	25 days	Control all motile stages, not eggs.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
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Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Petal fall (cont'd)						
European red mite, Two-spotted spider mite (con't)	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Active on all life stages. Control may not be apparent for 2–3 weeks. Apply before mite populations build up.
	25	Nealta	1 L/ha	12 hours	7 days	Apply as mite populations begin to build, before mite damage is observed Active on all life stages. The addition of an adjuvant registered on the crop may improve activity.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days	Do not tank-mix with or within 3 days of sulphur. Do not apply when temperature is greater than 32°C. Do not make more than 3 consecutive applications. Apply in 700 to 1,900L/ha.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	See comments on these products for European red mite at **Green tip.**
		Vegol Crop Oil *	2% v/v	12 hours	0 days	
Scab	• Use one of the fungicides listed for Scab at **Bloom.** • Rotate among fungicide groups for resistance management. • If wet weather persists, additional sprays will be needed for scab control before first cover. Where there is a problem, spray at Petal fall and First cover. • **Do not apply Scala or Sercadis after Bloom.** • **See comments at Bloom for Maestro and other captan products regarding number of applications and REI.**					
Tree growth modification	• Use one of the products listed for Tree growth modification at **Bloom.**					
Fruit size	NC	Cilis Plus	0.5–2.5 L in 1,000 L water	12 hours	28 days	Make 2–4 applications at 3–10-day intervals. May cause thinning in easy-to-thin varieties. Apply in a high-volume spray to ensure thorough coverage. Apply when temperatures are greater than 20°C during and after application. For additional information, visit the *Thinning of Tree Fruit* webpage at http://www.omafra.gov.on.ca/english/crops/hort/thinning.htm.
Special spray (when monitoring indicates the need at Petal fall)						
Codling moth (first generation)	**General Comments:** • Timing is critical for effective control. Use pheromone traps to time sprays. • Apply insecticides within specified degree-days (DDC, base 10°C) after first sustained moth catch. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2.					
	1B	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2†]	14 days	Apply at 138 DDC.
	4A	Aceta 70 WP or Assail 70 WP	170 g/ha	12 hours[1]/ 6 days[2]/ 48 hours[5]	7 days	Apply at 111–138 DDC. Residues last 10–14 days. Do not apply as a border spray.
		Calypso 480 SC	440 mL/ha	12 hours	30 days	
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	Apply at 138 DDC. Residues last 10–14 days. Do not apply as a border spray.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
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Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special spray (when monitoring indicates the need at Petal fall) (cont'd)						
Codling moth (first generation) (cont'd)	5	Delegate	420 g/ha	12 hours	7 days	Apply at 138 DDC. Residues last 10–14 days. Do not apply as a border spray.
	6+28	Minecto Pro	556 mL/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	Apply at 111–138 DDC. Residues last 10–14 days. Do not apply as a border spray. Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	28	Altacor	215 g/ha	12 hours	5 days	Apply at 138 DDC. Residues last 10–14 days. Do not apply as a border spray. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Pristine, Flint, Sovran, copper or sulphur. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	
		Vayego 200 SC	225 mL/ha	12 hours	7 days	
San Jose scale	4C	Closer	200–400 mL/ha	12 hours	7 days	Apply when crawlers are active in orchards with a history of scale. Reapply, if necessary, after 14 days.
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	
First cover (7–14 days after Petal fall)						
Pear psylla	**General Comments:** • Apply when the majority of the population is in early instar stages. • Where plum curculio is also a later-season problem, use a product that has efficacy on both pests. See Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*					
	3	Perm-UP EC or Pounce 384 EC	520 mL/ha 520 mL/ha	when dry	7 days	Resistance to pyrethroid insecticides was widespread in the past and may still be present.
		Decis 5 EC or Decis 100 EC or Poleci 2.5 EC	350 mL/ha 175 mL/ha 700 mL/ha	12 hours	7 days	
		UP-Cyde 2.5 EC	280 mL/ha	12 hours	7 days	
		Labamba or Matador 120 EC or Silencer 120 EC	83 mL/ha	24 hours	7 days	
	4A	Aceta 70 WP or Assail 70 WP	120 g/ha	12 hours[1]/ 6 days[2]/ 48 hours[5]	7 days	Rotate outside of Group 4 products. **Calypso:** Apply high rate under high pest pressure. Apply when populations have reached economic thresholds. Reapply at 7–10-day intervals if needed.
		Calypso 480 SC	290–440 mL/ha	12 hours	30 days	

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
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Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
First cover (7–14 days after Petal fall) (cont'd)						
Pear psylla (cont'd)	6	Agri-Mek SC	170 mL/ha	12 hours	28 days	Apply no later than 21 days after Petal fall. Apply with 10 L oil and a minimum of 1,000 L of water per ha. May cause russeting to d'Anjou and other sensitive varieties. Do not use oil within 14 days of Maestro or other captan products.
	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	See comments on this product for Pear psylla at **Green tip.**
	21	Nexter SC or Nexter WP	1.0–1.2 L/ha 600 g/ha	24 hours	25 days	There is little commercial experience with these products for psylla.
	NC	Surround WP *	50 kg/ha	when dry	0 days	Must be applied before pest is present. Make 2 initial applications at 50 kg/ha, 7 days apart, to establish a base layer. Continue at 7–14-day intervals, using a reduced rate of 25 kg/ha, to maintain even coverage of developing fruits. Do not use as a border spray. Light to moderate rain will help distribute product. Reapply after heavy rain, strong wind or overhead irrigation. White film will remain on fruit if applied near harvest unless crop will be washed and waxed. Do not use with anti-foaming agents, spreader/stickers or summer oils.
San Jose scale	**General Comments:** • Apply when crawlers are active.					
	4C	Closer	200–400 mL/ha	12 hours	7 days	Reapply, if necessary, after 14 days.
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	
Scab	• Use one of the fungicides listed for Scab at **Bloom.** • Reduce rate of Sylitt to 3.65 L/ha in cover sprays. • For additional fruit protection, tank-mix Nova or Inspire Super with the full rate of a protectant fungicide. • **Do not use Scala or Sercadis after bloom.** • **See comments at Bloom for Maestro and other captan products regarding number of applications and REI.**					
Tree growth modification	• Use one of the products listed for Tree growth modification at **Bloom.**					
Fruitlet thinning	NC	Cilis Plus	2.5–10.1 L	12 hours	28 days	Apply when fruitlets are 5–14 mm in diameter. For mild thinning on easy-to-thin varieties use the lower rate. For aggressive thinning on hard-to-thin varieties use the higher rate. See Table 3–11. *Suggested Rates of MaxCel or Cilis Plus.* Efficacy is highly dependent on weather conditions and rates may need to be adjusted accordingly. Maximum of 2 applications per season for thinning. Apply when temperatures are greater than 20°C during and after application. For additional information, visit the *Thinning of Tree Fruit* webpage at http://www.omafra.gov.on.ca/english/crops/hort/thinning.htm.
		MaxCel	2.65–10.65 L	12 hours	86 days	

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Summer sprays						
Pear psylla	• Use one of the insecticides listed for Pear psylla at **First cover.** • Apply when majority of the population is in early instar stages. • Do not exceed maximum number of applications for any product. See Table 3–10. *Products Used on Pears.*					
Obliquebanded leafroller	• Use one of the insecticides listed for Obliquebanded leafroller at **Petal fall.** • Place pheromone traps in orchards by June to monitor adult populations. • Insecticides for summer-generation larvae should be applied at 240–280 DDC (base 6.1°C) after first sustained moth catch. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2. • When applied for leafroller control, these products also control other leaf-feeding caterpillars. • Resistance to organophosphate insecticides is present in some commercial apple orchards. Cross-resistance to pyrethroids and Intrepid is possible. See *Pest Resistance to Fungicides, Insecticides and Miticides, Chapter 2.*					
Pear rust mite	**General Comments:** • Apply before mite populations build up. • Thorough spray coverage is essential for good control. • For resistance management, do not use any miticide more than once per season. • Examine orchards for mite injury about July 15–20, or 10–15 days after using a pyrethroid.					
	NC	Cosavet DF Edge * or Kumulus DG * or Microthiol Disperss *	6 kg/ha	24 hours	1 day	Do not apply within 14 days of PureSpray Green Spray oil, SuffOil-X or Vegol.
	6+28	Minecto Pro	0.496–1.0 L/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro and other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	21	Nexter SC or Nexter WP	500 mL/ha 300 g/ha	24 hours	25 days	May also control blister mite.
	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Control may not be apparent for 2–3 weeks. May also control blister mite.
San Jose scale	• Use one of the products listed for San Jose scale at **First cover.** Apply when crawlers are active.					
Tree growth modification	• Use one of the products listed for Tree growth modification at **Bloom.**					
Second cover						
Scab	• Use one of the fungicides listed for Scab at **Bloom.** • Reduce rate of Sylitt to 3.65 L/ha in cover sprays. • Check preharvest intervals in Table 3–10. *Products Used on Pears,* before spraying early maturing pears. • **Do not use Scala or Sercadis after bloom.** • **See comments at Bloom for Maestro and other captan products regarding number of applications and REI.**					

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need about mid-August and early September) Check preharvest interval before spraying early maturing pears. See Table 3–10. *Products Used on Pears.*						
Codling moth (second generation)	**General Comments:** • Timing is critical for effective control. Use pheromone traps to time sprays. • For second-generation codling moth, spray at specified degree-days (DDC, base 10°C) after first-generation sustained moth catch. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2. • Codling moth can infest pear as maturation and ripening begins. Bosc pears can be heavily infested and may require 2 preharvest sprays about 2 weeks apart.					
	1	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2†]	14 days	Apply at 667–694 DDC. Residues last 18–21 days.
	4A	Aceta 70 WP or Assail 70 WP	170 g/ha	12 hours[1]/ 6 days[2]/ 48 hours[5]/	7 days	Apply at 639–667 DDC. Residues last 10–14 days. Do not apply as a border spray.
	5	Delegate	420 g/ha	12 hours	7 days	Apply at 667–694 DDC. Residues last 10–14 days. Do not apply as a border spray.
	6+28	Minecto Pro	556 mL/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	Apply at 667–694 DDC. If using oil, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties, when used alone or when other products are applied sequentially. Do not use oil within 14 days of Maestro and other captan products, Perm-UP, Pounce or sulphur product. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	28	Altacor	215 g/ha	12 hours	5 days	Apply at 667–694 DDC. Residues last 10–14 days. **Exirel:** Do not apply as a border spray. Do not tank-mix or make sequential applications with Maestro and other captan products, Pristine, Flint, Sovran, copper and sulphur. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Harvanta 50 SL	1.2–1.6 L/ha	12 hours	7 days	
		Vayego 200 SC	225 mL/ha	12 hours	7 days	
Oriental fruit moth	**General Comments:** • Apply within the appropriate degree-days (DDC, base 7.2°C) after sustained first-generation moth catch. Monitor populations and reapply 10–14 days later if required. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2. • Spray 7–10 days prior to harvest in orchards with a history of oriental fruit moth damage or adjacent to or near peaches.					
	3	Danitol	0.779–1.559 L/ha	24 hours[1]/ 23 days[2]/ 7 days[3,5]	16 days	Apply at first egg hatch, or 1,361–1,389 DDC.
		Decis 5 EC or Decis 100 EC or Poleci 2.5	250 mL/ha 100–125 mL/ha 400–500 mL/ha	12 hours	7 days	Apply at first egg hatch, or 1,361–1,389 DDC.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–9. Pear Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need about mid-August and early September) (cont'd) Check preharvest interval before spraying early maturing pears. See Table 3–10. *Products Used on Pears.*						
Oriental fruit moth (cont'd)	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours[1]/ 6 days[2]/ 48 hours[5]/	7 days	Apply before first egg hatch, or 1,305–1,333 DDC.
	5	Delegate	420 g/ha	12 hours	7 days	Apply at first egg hatch, or 1,361–1,389 DDC.
	6+28	Minecto Pro	556 mL/ha + horticultural oil (0.25–1 % v/v)	12 hours	28 days	Apply at first egg hatch, or 1,361–1,389 DDC. Because of oil tank-mix, may cause fruit injury to certain varieties of pears, particularly d'Anjou and other sensitive varieties. Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. Do not apply when temperatures exceed 30°C, to crops under moisture stress or immediately before rain.
	28	Altacor	215 g/ha	12 hours	5 days	Apply at first egg hatch, or 1,361–1,389 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Pristine, Flint, Sovran, copper or sulphur. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Harvanta	1.2–1.6 L/ha	12 hours	7 days	
		Vayego 200 SC	300 mL/ha	12 hours	7 days	
Brown marmorated stink bug	**General Comments:** • Breeding populations are of this pest are present in Ontario. Check ontario.ca/stinkbug for updates on pest development, registered products and management strategies. • There are currently no thresholds established. Apply when insects are first detected, or early damage is found. • These products are toxic to beneficial insects and should be used only when necessary.					
	4A	Clutch 50 WDG	210–420 g/ha	12 hours	7 days	**Suppression only. Labeled for BMSB only. Cannot be used after April 11, 2022.**
Postharvest fruit treatment						
Blue mold	**General Comments:** • Postharvest treatment may be necessary during wet harvest seasons. These treatments will prolong storage time while providing control of postharvest diseases.					
	1	Mertect SC	500 mL in 500 L water	—	post-harvest	For use in dip tank or drencher. Continuous agitation required. Follow label instructions. Does not control any blue mold (Penicillium) or grey mold (Botrytis), which is resistant to Group 1 fungicides.
	2	Scholar 230 SC	496 mL in 378 L water	—	post-harvest	Also controls grey mold. See label for dip and drench instructions.
	NC	Bio-Save 10 LP	500 g in 300 L water	—	post-harvest	**Suppression only.** See label for dip and drench instructions.

[1] General re-entry. [2] Hand thinning. [3] Summer pruning. [4] REI for harvest. When REI exceeds PHI, follow REI. [5] Hand labour or scouting.
† Personal protective equipment required for some activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–10. Products Used on Pears

Use this table as a guide but refer to product label for specific information.

The preharvest interval (PHI) is the number of days between the last spray and first harvest.

The restricted entry interval (REI) is the minimum interval that must be observed between the application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume it is 12 hours. **When the REI for harvest exceeds the PHI, follow the REI.**

The maximum applications is the labelled maximum number or product amount applied for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Products listed as potentially organic may be acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with certifying body to verify the acceptability of any product prior to using it.

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression							
Aceta 70 WP	33298	acetamiprid	4A	7 days	12 hours[1]/6 days[2]/48 hours[3]	4	—
Agri-Mek SC	31607	abamectin	6	28 days	12 hours	max. 340 mL/ha	—
Altacor	28981	chlorantraniliprole	28	5 days	12 hours	3 (max. 645 g/ha)	—
Apollo SC	21035	clofenetezine	10	21 days	12 hours[1]/2 days[2]	1	—
Assail 70 WP	27128	acetamiprid	4A	7 days	12 hours[1]/6 days[2]/48 hours[3]	4	—
Bioprotec PLUS	32425	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	4 hours[1,6]	—	*
Calypso 480 SC	28429	thiacloprid	4A	30 days	12 hours	3 (max. 875 mL/ha)	—
Closer	30826	sulfoxaflor	4C	7 days	12 hours	2	—
Clutch 50 WDG	29382	clothianidin	4A	7 days	12 hours	2 (max. 420 g/ha)	—
Cosavet DF Edge	31869	sulphur	NC	1 day	24 hours	8	*
Danitol	33817	fenpropathrin	3	16 days	24 hours[1]/23 days[2]/7 days[3,5]	1	—
Decis 5 EC	22478	deltamethrin	3	7 days	12 hours	3	—
Decis 100 EC	33700	deltamethrin	3	7 days	12 hours	3	—
Delegate	28778	spinetoram	5	7 days	12 hours	3	—
Dipel 2X DF	26508	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	12 hours[1,6]	—	*
Entrust	30382	spinosad	5	7 days	when dry	3	*
Envidor 240 SC	28051	spirodiclofen	23	7 days	12 hours	1	—
Exirel	30895	cyantraniliprole	28	3 days	12 hours	4 (max. 4.5 L/ha)	—
Foray 48 BA	24978	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	12 hours	—	*
Harvanta 50 SL	32889	cyclaniliprole	28	7 days	12 hours	5	—
Imidan WP	29064	phosmet	1B	14 days	7 days[1†] /30 days[2†]	5	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. U = Mode of action has not been determined.
— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Hand labour or scouting activities. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] Summer pruning. [6] REI for harvest. When REI exceeds PHI, follow REI. [7] Maximum of 10 applications per season for high density and 2 applications per season for standard trees. * Personal protective equipment required for certain activities. See label.

Table 3–10. Products Used on Pears (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
Intrepid	27786	methoxyfenozide	18	14 days	12 hours	2	—
Isomate CM/OFM TT	29352	pheromone, oriental fruit moth and codling moth	NC	—	—	—	*
Isomate OFM TT	31419	pheromone, oriental fruit moth	NC	—	—	—	*
Kanemite 15 SC	28641	acequinocyl	20B	14 days	12 hours	2	—
Kopa Insecticidal Soap	31433	potassium salts of fatty acids	NC	12 hours	0 days	—	*
Kumulus	18836	sulphur	NC	1 day	24 hours	8	*
Labamba	33576	lambda-cyhalothrin	3	24 hours	3 days	1	—
Lime Sulphur	16465	calcium polysulphide	NC	120 days (dormant)	48 hours	1	*
Malathion 85 E	8372	malathion	1B	3 days	12 hours[1]/3 days[2]	2	—
Matador 120 EC	24984	lambda-cyhalothrin	3	7 days	24 hours	1	—
Microthiol Disperss	29487	sulphur	NC	1 day	24 hours	8	*
Minecto Pro	33023	abamectin + cyantraniliprole	6+28	28 days	12 hours	1	—
Movento 240 SC	28953	spirotetramat	23	7 days	12 hours	max. 1.83 L/ha	—
Nealta	31284	cyflumetofen	25	7 days	12 hours	2	—
Nexter SC	33433	pyridaben	21	25 days	24 hours	2	—
Nexter WP	25135	pyridaben	21	25 days	24 hours	2	—
Perm-UP EC	28877	permethrin	3	7 days	12 hours	—	—
Poleci 2.5 EC	32446	deltamethrin	3	7 days	12 hours	1	—
Pounce 384 EC	16688	permethrin	3	7 days	when dry	—	—
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	—	12 hours	2 (dormant)	*
Silencer 120 EC	29052	lambda-cyhalothrin	3	7 days	24 hours	1	—
Sivanto Prime	31452	flupyradifurone	4D	14 days	12 hours	max. 2 L/ha	—
Success	26835	spinosad	5	7 days	when dry	3	—
SuffOil-X	33099	mineral oil	NC	12 hours	12 hours	8	*
Superior 70 Oil	9542 14981	mineral oil	NC	prebloom	12 hours	—	*
Surround WP	27469	kaolin	NC	0 days	12 hours[1,6]	—	*
TwinGuard	31442	sulfoxaflor + spinetoram	4C+5	7 days	12 hours	2	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. U = Mode of action has not been determined.
— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Hand labour or scouting activities. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] Summer pruning. [6] REI for harvest. When REI exceeds PHI, follow REI. [7] Maximum of 10 applications per season for high density and 2 applications per season for standard trees. * Personal protective equipment required for certain activities. See label.

Table 3–10. Products Used on Pears (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
UP-Cyde 2.5 EC	28795	cypermethrin	3	7 days	12 hours	3	—
Vayego 200 SC	33711	tetraniliprole	28	7 days	12 hours	3	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[1,6]	2/4[4]	*
XenTari WG	31557	*Bacilllus thuringiensis subsp. aizawai*	11	0 days	12 hours	—	*
Products used for disease control or suppression							
Aprovia Top 195 EC	31526	benzovindiflupyr	3+7	30 days	12 hours	max. 2.57 L/ha	—
Bio-Save 10 LP	29673	*Pseudomonas syringae*	NC	postharvest	—	—	—
Blossom Protect	30552	*Aureobasidium pullulans*	NC	—	when dry	5	*
Buran	30601	garlic powder	NC	0 days	when dry	—	*
Copper 53 W	9934	tri-basic copper sulphate	M	2 days	48 hours	10	*
Copper Spray	19146	copper oxychloride	M	2 days	48 hours	10	*
Cueva	31825	copper octanoate	M	1 day	4 hours	10	*
Double Nickel LC	31887	*Bacillus amyloliquefaciens*	BM2	0 days	when dry	—	*
Flint	30619	trifloxystrobin	11	14 days	12 hours[1]/4 days[2]	4	—
Fontelis	30331	penthiopyrad	7	28 days	12 hours	max. 4.5 L/ha	—
Inspire Super	30827	difenoconazole + cyprodinil	3+9	14 days	12 hours	4	—
Kasumin 2 L	20591	kasugamycin	24	90 days	12 hours	4	—
Luna Tranquility	30510	fluopyram + pyrimethanil	7+9	72 days	12 hours[1]/24 hours[2]	4 (max. 3.2 L/ha)	—
Maestro 80 WSP	33488	captan	M	7 days	**High density:** 48 hours[1]/ 15 days[2]/6 days[5]/15 days[6] **Standard:** 48 hours[1]/24 days[2]/ 4 days[5]/19 days[6]	10/2[7]	—
Mertect SC	13975	thiabendazole	1	postharvest	—	—	—
Nova	22399	myclobutanil	3	14 days	12 hours	6	—
Pristine WG	27985	boscalid + pyraclostrobin	7+11	5 days	when dry[1]/12 days[2]	4	—
Scala SC	28011	pyrimethanil	9	72 days	12 hours[1]/24 hours[2]	4	—
Scholar 230 SC	29528	fludioxonil	12	postharvest	—	1	—
Senator 50 SC	32096	thiophanate-methyl	1	1 day	12 hours	max. 1.75 L/ha	—

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— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Hand labour or scouting activities. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] Summer pruning. [6] REI for harvest. When REI exceeds PHI, follow REI. [7] Maximum of 10 applications per season for high density and 2 applications per season for standard trees. * Personal protective equipment required for certain activities. See label.

Table 3–10. Products Used on Pears (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Sercadis	31697	fluxpyroxad	7	0 days	12 hours[1,6]	4	—
Serenade OPTI	31666	*Bacillus subtilis*	BM2	0 days	when dry	—	*
Sovran	26257	kresoxim-methyl	11	30 days	48 hours	4	—
Streptomycin 17	10305	streptomycin	25	30 days	24 hours[1]/ 14 days[2]/7 days[3]	3	—
Supra Captan 80 WSP	33641	captan	M	7 days	**High density:** 48 hours[1]/ 15 days[2]/6 days[5]/15 days[6] **Standard:** 48 hours[1]/ 24 days[2]/4 days[5]/19 days[6]	10/2[7]	—
Syllit 400 FL	28351	dodine	U12	7 days	48 hours	max 25 L/ha	—
Thinners and plant growth regulators							
Cilis Plus	29210	6-benzylaminopurine	NC	28 days	12 hours	max. 21.3 L/ha	—
MaxCel	28851	6-benzyladenine	NC	86 days	12 hours	max. 22.5 L/ha	—
Promalin SL	16636	6-benzyladenine, gibberellins A_4A_7	NC	28 days	12 hours	—	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. U = Mode of action has not been determined.
— = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Hand labour or scouting activities. [4] Maximum of 6 applications per season with no more than 2 dormant applications. [5] Summer pruning. [6] REI for harvest. When REI exceeds PHI, follow REI. [7] Maximum of 10 applications per season for high density and 2 applications per season for standard trees. * Personal protective equipment required for certain activities. See label.

Table 3–11. Suggested Rates of MaxCel or Cilis Plus

Desired response[1]	Concentration of 6-BA (ppm)[2]	Number of Applications	Amount of MaxCel or Cilis Plus in 1,000 L water/ha	
			MaxCel	Cilis Plus
Enhance size only[3,4]	10—50	2—4	—	0.5—2.5
Mild thinning and sizing	50—75	1—2	2.65—3.95	2.5—3.75
Moderate thinning and sizing	75—100	1—2	3.95—5.3	3.75—5.05
Aggressive thinning and sizing	100—150	1—2	5.3—7.95	5.05—7.55
Very aggressive thinning and sizing	150—200	1—2	7.95—10.65	7.55—10.1

— Not registered for this use

[1] There are several factors that influence the chemical thinning outcome. Rates are generally chosen on the degree of cultivar sensitivity to chemical thinners.
[2] 1 ppm is equivalent to 1 mg/L.
[3] Mild thinning may occur under some conditions (weak trees, young trees, sensitive cultivars, and environmental conditions that favour the thinning response).
[4] While 6-BA has the potential to increase cell division and enhance fruit size beyond the thinning (crop load) effect alone, this is not observed in all years because the response can be affected by spray concentration, coverage, cultivar, tree health, time of application, tree stress, and environmental conditions during and following spray application.

Plums

In this section:

The information in this chapter is provided as a guideline only. Read the product label and follow all safety precautions. Labels for registered pest control products are available at the Pest Management Regulatory Agency (PMRA) website at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php. Many pesticides are in various stages of re-evaluation by PMRA and their status may change within the lifetime of this publication. Consult the PMRA website and/or the registrant to verify actual dates of last sale and last use. Updates will also be available at ONFruit.ca.

- Consult the product label for suggested water volumes. Otherwise, use enough water to ensure thorough spray coverage. Where the product rate is listed in amount per 1,000 L, and if a water volume is not provided on the label, use enough water to wet the foliage to the near drip point.
- For preharvest interval (PHI), restricted entry interval (REI) and maximum number of applications, see Table 3–13. *Products Used on Plums.*
- **Products are listed by chemical group and in alphabetical order within each group. The order does not reflect efficacy.** See Table 3–14. *Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees* and Table 3–15. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees,* for efficacy ratings.
- Where a product in the calendar is followed by a "*", it is potentially acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with your certifying body to verify the acceptability of any product prior to use.

- Not all varieties have been tested with all possible tank-mix combinations, especially with new products. Prior to tank-mixing any unfamiliar chemical combinations (fungicides, insecticides, liquid fertilizers, biological control products, adjuvants, and additives), conduct a jar test to determine if there are any physical incompatibilities. For more information, see *Compatibility of Spray Materials,* Chapter 2 and Table 2–4. *Tank-mix Order for Pesticide Compatibility Test.* Before applying the tank-mix, also test the combination on a small portion of the crop to be treated to ensure that a phytotoxic response will not occur as a result of application.

Resistance Management

To delay development of resistance to insecticides, miticides and fungicides, follow resistance management guidelines outlined in *Resistance Management Strategies,* Chapter 2. The chemical group is indicated in the "Group" column before the "Product" column. Products belonging to the same chemical group are grouped together in the calendar. Multi-site (M) fungicides are not prone to resistance and do not have to be rotated. Some products are not classified to mode of action (NC) and the mode of action has not been determined for others (U). Plant defence inducers (P) and biological fungicides with multiple modes of action (BM) are not known to be prone to resistance.

Fungicide resistance management

Take the following steps to avoid rapid development of fungicide resistance:

- Do not reduce rates below those specified on the label.
- Do not use products containing the same chemical group in consecutive applications.
- Do not use Senator, Bumper, Cevya, Jade, Fitness, Funginex, Indar, Princeton, Quash, Cantus, Fontelis, Kenja, Sercadis, Miravis Duo, Luna Sensation or Pristine when sporulating lesions of target disease are present.
- Do not exceed maximum number of applications on the label.

Insecticide resistance management

Take the following steps to avoid development of insecticide resistance:

- For pests with discrete generations (oriental fruit moth, borers, obliquebanded leafroller), do not use insecticides from the same group for more than one generation. Within a generation, if more than one spray is required, use a product from the same chemical group.
- For pests with overlapping generations (aphids, mites), do not use products containing the same chemical group in consecutive applications.

Bee Toxicity

Some insecticides are toxic to bees and other pollinating insects. Use of insecticides on flowering crops requires careful management to avoid negative effects on pollinators. Some insecticides cannot be applied prior to bloom. **Insecticides should not be applied when fruit trees are in bloom.** Do not apply insecticides when bees are active. Before and after bloom, bees may be present on flowering cover crops and weeds — do not allow drift of insecticides onto these or other flowering crops. Always follow label precautions to avoid impacts on bees. For more information, see *Bee Poisoning,* Chapter 1, and honeybee toxicity ratings in Table 3–13. *Activity of Fungicides on Tender Fruit Diseases* and Impact on Honeybees and Table 3–14. *Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees.*

Buffer Zones

Leave a suitable buffer zone between treatment area and adjacent sensitive areas, such as hedgerows, woodlots and freshwater habitats. Zones may vary depending on the product used, growth stage of the crop and method of application including the use of drift-reducing technology. Check the pesticide label for requirements.

Use Health Canada's online spray drift calculator to modify the buffer zone specified on the label based on weather conditions, category of spray equipment and droplet size. For more information, see the Buffer Zone Calculator at www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php. Unfortunately, this model does not account for water volume, travel speed or crop stage.

Observing buffer zones is a legal requirement. A record of the buffer zone modification, if any, must be retained for at least one year from the time of application.

Pesticide Persistence

Some products are persistent and may carry over from one year to the next. Where possible, avoid using these products areas treated during the previous season. Consult labels for product-specific information.

Crop Nutrition

Crop nutrition is important for plant growth, fruit quality development and the acquisition of adequate cold hardiness by tree fruit. For fruit crops, soil testing, plant tissue analysis and visual deficiency symptoms all play an important role in assessing and monitoring the crop's nutritional status. For more information, visit the *Soil Management, Fertilizer Use, Crop Nutrition and Cover Crops for Fruit Production* webpage at http://www.omafra.gov.on.ca/english/crops/hort/soil_fruit.htm and see OMAFRA Publication 611, *Soil Fertility Handbook.*

Table 3–12. Plum Calendar

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Dormant (before bud break)						
Black knot	• Prune out all black knots from commercial orchards during the dormant period before bud break. • Make the cuts at least 15 cm below the swelling. • Collect and burn all prunings with knots. Knots left lying on the ground are a source of spores that start new infections. • Destroy infected wild and neglected plums near the orchard.					
Green tip (just as buds are bursting)						
European red mite, Scale, Plum rust mite	**General Comments:** • Apply in a high-volume spray to ensure thorough coverage. • Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block.					
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days	Do not apply more than 950 L/ha. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C.
		Purespray Green Spray Oil 13 E *	2% v/v	12 hours	—	Do not use within 48 hours of freezing temperatures or prior to rain. **PureSpray Green:** Do not use within 14 days of Perm-UP, Pounce or sulphur. **Superior Oil:** do not use within 30 days of sulphur. **Vegol:** do not use within 14 days of copper or 30 days of sulphur. Do not apply to wet foliage.
		Superior 70 Oil *	2% v/v	12 hours	prebloom	
		Vegol Crop Oil *	2% v/v	12 hours	0 days	
Oriental fruit moth	NC	Isomate OFM TT *	125–250 dispensers/ha	—	—	Reduces mating of oriental fruit moth. Apply dispensers before flight begins. Place dispensers in lateral branches in the upper canopy in a uniform manner across the orchard block. Use high rate for high pest pressure areas or during initial year of treatment. Dispensers are designed to last for the entire season. For information on mating disruption, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.* Apply supplemental control measures when conditions warrant.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Popcorn (when blossoms show white)						
Brown rot (blossom blight stage)	**General Comments:** • Knock off fruit mummies when pruning. • Make 2–3 fungicide applications from early to full bloom. • Group 1, 3, 7 and 11 fungicides are locally systemic and will penetrate petals to protect fruit from infection as blossoms start to open. Consult labels for information on drying time required before rain.					
	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about tree sensitivity, test first on a small area.
	1	Senator 50 SC	2.45 L/ha	12 hours	1 day	No product specific comments.
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	Also suppress black knot.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Funginex DC	750 mL/1,000 L water	12 hours	prebloom	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Quash	175–245 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. Maximum of 1 application per year.
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
		Sercadis	333 mL/ha	12 hours	0 days/ 12 hours[3]	Use a non-ionic surfactant at a rate of 0.125% v/v (1.25 L in 1,000 L water). **Do not use after full bloom.**
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	0 days[1]/ 24 hours[3]	Do not tank-mix or make sequential applications with Exirel.
	BM1	Fracture or ProBLAD Plus	1.5–3.3 L/ha	12 hours	0 days	**Suppression only.** Under high disease pressure, use high rate. Do not mix with foliar fertilizers.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Popcorn (when blossoms show white) (cont'd)						
Brown rot (blossom blight stage) (cont'd)	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with brown rot fungicides.
Black knot	**General Comments:** • Fungicides will not provide adequate control of black knot without proper orchard sanitation (pruning, removal and burning of black knots). Inspect all plums in early summer. Cut out and burn new knots and those missed. • Apply fungicide sprays to protect the developing shoots between Popcorn (prebloom) and First cover every 3–5 days in wet weather. Spore release may be delayed in dry springs. Under these conditions extend fungicide coverage to Second cover.					
	M	Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/ 15 days[3]	May cause leaf injury and spotting of the fruit on Stanley and Japanese plums under slow drying conditions. Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan product per year.** **When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	**Suppression only.**
		Indar	149 g/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
Bloom						
DO NOT APPLY INSECTICIDES WHILE PLUM TREES ARE IN BLOOM. SEE *BEE POISONING*, CHAPTER 1.						
Brown rot (blossom blight stage)	• Use one of the fungicides listed for Blossom blight/brown rot at **Popcorn.** • **Maximum of 1 application of Maestro or other captan product per year.** • **Do not use Sercadis after full bloom.**					
Black knot	• Use one of the fungicides listed for Black knot at **Popcorn.** • **Maximum of 1 application of Maestro or other captan product per year.**					
Petal fall to Shuck						
Brown rot (blossom blight stage)	• Use one of the fungicides listed for Blossom blight/brown rot at **Popcorn.** • **Maximum of 1 application of Maestro or other captan product per year.** • **Do not use Sercadis after full bloom.**					
Black knot	• Use one of the fungicides listed for Black knot at **Popcorn.** • **Maximum of 1 application of Maestro or other captan product per year.**					
Shuck split to Shuck fall (when most of the shucks are off)						
Brown rot	**General Comments:** • Group 3, 7 and 11 fungicides are locally systemic. Consult labels for information on drying time required before rain.					

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (when most of the shucks are off) (cont'd)						
Brown rot (cont'd)	M	Cueva *	1% v/v in 470–940 L water/ha	4 hours	1 day	Do not mix with lime. During excessive moisture and cold, leaf spots can appear on copper-sensitive crops. If concerned about sensitivity of trees, test first on a small area.
		Kumulus DF * or Microscopic Sulphur WP * or Microthiol Disperss *	22.5 kg/ha 6.5 kg in 1,000 L water 22.5 kg/ha	24 hours	1 day	Do not use within 14 days of Purespray Green Spray Oil or SuffOil-X and 30 days of Vegol Crop Oil or Superior Oil.
		Maestro 80 WSP or Supra Captan 80 WSP	4.0 kg/ha	24 hours[1]/ 29 days[2]	2 days/ 15 days[3]	May cause leaf injury and spotting of the fruit on Stanley and Japanese plums under slow drying conditions. Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Fontelis or Exirel. **Maximum of 1 application of Maestro or other captan product per year. When REI exceeds PHI, follow REI.**
	3	Bumper 432 EC or Fitness or Jade or Princeton	300 mL/ha 300 mL/ha 500 mL/ha 300 mL/ha	12 hours 3 days 3 days 3 days	3 days	Also suppress black knot.
		Cevya	250–375 mL/ha	12 hours	0 days/ 12 hours[2]	No product specific comments.
		Indar	140 g/ha	12 hours	0 days/ 12 hours[3]	No product specific comments.
		Quash	175–280 g/ha	12 hours[1]/ 9 days[2]	14 days	Under high disease pressure, use high rate. **Maximum of 1 application per year.**
	3+7	Miravis Duo	1.0 L/ha	12 hours	0 days/ 12 hours[2]	No product specific comments.
	7	Cantus WDG	370 g/ha	12 hours	0 days	No product specific comments.
		Fontelis	1.0–1.75 L/ha	12 hours	0 days/ 12 hours[3]	Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., Maestro or other captan products, sulphur) may cause crop safety issues. See label for tank-mix restrictions.
		Kenja 400 SC	913 mL/ha	12 hours	1 day	Use with a silicone surfactant at a rate of 0.1% v/v (1.0 L in 1,000 L water).
	7+11	Luna Sensation	300–400 mL/ha	12 hours	1 day	Apply in minimum 500 L water/ha.
		Pristine WG	750 g/ha	when dry[1]/ 10 days[2]	1 day	Do not tank-mix or make sequential applications with Exirel.
	BM2	Serenade OPTI *	1.1–1.7 kg/ha	when dry	0 days	**Suppression only.**
	P5	Regalia Maxx *	0.125–0.25% v/v in 500–1,000 L water/ha	when dry	0 days	**Suppression only.** Apply before symptoms develop. Use 0.125% (1.25 L in 1,000 L water) in a tank-mix with other brown rot fungicides or 0.25% (2.5 L in 1,000 L water) in rotation with brown rot fungicides.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
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Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (when most of the shucks are off) (cont'd)						
Black knot	• Use one of the fungicides listed for Black knot at **Popcorn**. • Maestro and other captan products may cause leaf injury and spotting of the fruit on Stanley and Japanese plums under slow drying conditions.					
Oriental fruit moth	**General Comments:** • Where mating disruption is being used effectively, a pesticide application is generally not required at this time. • Apply within the specified degree-day (DDC, base 7.2°C) after sustained moth catch. Reapply 10–14 days later if catch is extended. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2.					
	3	UP-Cyde 2.5 EC	289 mL/ha	12 hours	7 days	Apply at 194–208 DDC.
	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 100–140 DDC. For optimum activity, use high rate in a minimum of 1,000 L water/ha. Do not apply more than once every 12 days.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 111–139 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	3 days	Apply at 194–208 DDC.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 111–139 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	18	Intrepid	1.5 L/ha	12 hours	14 days	Apply at 100–140 DDC.
	28	Altacor	285 g/ha	12 hours	1 day	Apply at 194–208 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or copper. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Vayego 200 SC	300 mL/ha	12 hours	7 days	
Plum curculio	**General Comments:** • These products are toxic to bees. Do not apply when bees are active, or hives are in the orchard. Refer to label for specific bee toxicity statements.					
	1	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2]	14 days	No product specific comments.
	3	Labamba or Matador 120 EC or Silencer 120 EC	104 mL/ha	24 hours	7 days	Under high pest pressure, may provide suppression only.
		Perm-UP EC or Pounce 384 EC	520 mL/ha 520 mL/ha	when dry	7 days	
		UP-Cyde 2.5 EC	400 mL/ha	12 hours	7 days	
	4A	Aceta 70 WP or Assail 70 WP	240 g/ha	12 hours[1]/ 6 days[2]	7 days	Under high pest pressure, may provide suppression only.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Shuck split to Shuck fall (when most of the shucks are off) (cont'd)						
Plum curculio (cont'd)	4A+15	Cormoran	2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Under high pest pressure may provide suppression only. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or copper. See product label for other tank-mix restrictions.
		Vayego 200 SC	300 mL/ha	12 hours	7 days	**Suppression only.**
Peachtree borer, Lesser peachtree borer	NC	Isomate-PTB Dual *	375–675 dispensers/ha	—	—	Reduces mating of peachtree and lesser peachtree borers. Apply dispensers before borer flight begins in the spring, i.e., typically apply at or before shuck split. Use high rate for high pest pressure areas or during initial year of treatment. Dispensers are designed to last the entire season. Under high pest pressure, insecticides for peachtree borer may be needed. Populations are generally reduced over time where mating disruption is used for several seasons. For more information, see OMAFRA Factsheet 03–079, *Mating Disruption for Management of Insect Pests.*
First cover (12 days after Shuck fall)						
Brown rot, Black knot	• Use one of the fungicides listed for Brown rot and black knot at **Shuck split to Shuck fall.** • Rotate among fungicide groups for resistance management. • Maestro and other captan products may cause leaf injury and spotting on the fruit of Stanley and Japanese plums. • Black knot spore release may be delayed in dry springs. Under these conditions extend fungicide coverage for black knot to Second cover.					
Plum curculio	• Use one of the insecticides listed for Plum curculio at **Shuck split to Shuck fall.**					
Second cover **Check preharvest interval before spraying early maturing plums. See Table 3–13. *Products Used on Plums.***						
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck split to Shuck fall.** • Rotate among fungicide groups for resistance management. • During wet weather, repeat applications between pickings. • Comply with preharvest intervals in Table 3–13. *Products Used on Plums.* • **Do not make more than 2 applications of Bumper, Fitness, Jade or Princeton in the 3 weeks prior to harvest.** • **Maximum of 1 application of Maestro or other captan product per year; REI for harvest is 15 days.**					
Black knot	• Use one of the fungicides listed for black knot at **Shuck split to Shuck fall.** • Black knot spore release may be delayed in dry springs. Under these conditions extend fungicide coverage for black knot to Second cover. • Maestro and other captan products may cause leaf injury and spotting on the fruit of Stanley and Japanese plums. • **Maximum of 1 application of Maestro or other captan product per year; REI for harvest is 15 days.**					
Oriental fruit moth	**General Comments:** • If mating disruption is being used effectively, a pesticide application is not required for the second generation. • For second-generation larvae, apply insecticides within the specified degree-day (DDC, base 7.2°C) after sustained first-generation moth catch. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2. • Spray all varieties. This generation may require 2 insecticide sprays. Check the harvest dates of early varieties and do not spray within the preharvest interval.					
	3	UP-Cyde 2.5 EC	289 mL/ha	12 hours	7 days	Apply at 639–667 DDC and again at 805–833 DDC.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Second cover (cont'd) **Check preharvest interval before spraying early maturing plums. See Table 3–13. *Products Used on Plums.***						
Oriental fruit moth (cont'd)	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 583–611 DDC and again at 750–778 DDC. For optimum activity, use high rate in a minimum spray volume of 1,000 L/ha. Do not apply more than once every 12 days.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 583–611 DDC and again at 750–778 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	3 days	Apply at 639–667 DDC and again at 805–833 DDC.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 555–583 DDC and again at 722–750 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Altacor	215–285 g/ha	12 hours	1 day	Apply at 639–667 DDC and again at 805–833 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or copper. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Vayego 200 SC	300 mL/ha	12 hours	5 days	
Prepick **Check preharvest interval before spraying early maturing plums. See Table 3–13. *Products Used on Plums.***						
Brown rot	• Use one of the fungicides listed for Brown rot at **Shuck split to Shuck fall.** • Rotate among fungicide groups for resistance management. • **Do not make more than 2 applications of Bumper, Fitness, Jade or Princeton in the 3 weeks prior to harvest.** • Maestro and other captan products may cause leaf injury and spotting of the fruit on Stanley and Japanese plums under slow drying conditions. • **Maximum of 1 application of Maestro or other captan product per year; REI for harvest is 15 days.**					
Oriental fruit moth	**General Comments:** • Between generations, rotate among insecticide groups for resistance management. See *Pest Resistance to Fungicides, Insecticides and Miticides,* Chapter 2. • For third-generation larvae, apply insecticides within the specified degree-day (DDC, base 7.2°C) after sustained first-generation moth catch. For information on calculating degree days, see: *Degree-Day Modeling,* Chapter 2.					
	3	UP-Cyde 2.5 EC	289 mL/ha	12 hours	7 days	Apply at 1,167–1,222 DDC and again at 1,361–1,389 DDC.
	4A	Aceta 70 WP or Assail 70 WP	120–240 g/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 1,111–1,167 DDC and again at 1,305–1,389 DDC.
	4A+15	Cormoran	1.45–2.1 L/ha	12 hours[1]/ 6 days[2]	7 days	Apply at 1,111–1,167 DDC and again at 1,305–1,389 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	5	Delegate	420 g/ha	12 hours	3 days	Apply at 1,167–1,222 DDC and again at 1,361–1,389 DDC.
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Apply at 1,083–1,139 DDC and again at 1,277–1,305 DDC. Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Altacor	215–285 g/ha	12 hours	1 day	Apply at 1,167–1,222 DDC and again at 1,361–1,389 DDC. **Exirel:** Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine and copper. See product label for other tank-mix restrictions.
		Exirel	500–750 mL/ha	12 hours	3 days	
		Vayego 200 SC	300 mL/ha	12 hours	5 days	

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— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need)						
Aphids	**General Comments:** • Apply only if aphids are a problem. • Thorough coverage and calm warm conditions are needed for good control.					
	4C	Closer	100–200 mL/ha	12 hours	7 days	Rotate with products outside of Group 4. **Closer, TwinGuard:** Registered for green peach aphid. **TwinGuard:** Also controls oriental fruit moth.
	4C+5	TwinGuard	250 g/ha	12 hours	7 days	
	4D	Sivanto Prime	750 mL/ha	12 hours	14 days	No product specific comments.
	9D	Versys	100 mL/ha	12 hours	7 days	**Black cherry aphid only.** Do not make more than 2 sequential applications.
	23	Movento 240 SC	365 mL/ha	12 hours	7 days	Most effective on young stages of aphids. Control may not be apparent for 2–3 weeks. Under high pest pressure, a second application may be necessary 2 weeks later. Tank-mix with a permitted adjuvant/additive with spreading and penetrating properties at a suggested rate of 0.2% v/v (2 L/1,000 L water). See label for further details. Do not tank-mix with sulphur.
	28	Exirel	0.75–1.0 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or copper. See product label for other tank-mix restrictions.
	29	Beleaf 50 SG	120–200 g/ha	12 hours[1]/ 3 days[2]	14 days	Use high rate for high pest pressure and/or dense foliage.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[3]	Do not apply more than 950 L/ha. Do not tank-mix with sulphur or apply when temperatures are greater than 32°C.
		Purespray Green Spray Oil 13 E *	1% v/v	12 hours	—	**Suppression only.** Apply in a high-volume spray to ensure thorough coverage. Tolerance has not been determined for all varieties. Test a small area of each variety prior to spraying the whole block. Do not use within 48 hours of freezing temperatures, when temperatures are high (over 30°C), prior to rain or to heat- or moisture-stressed trees. **Purespray Green, SuffOil-X:** Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce or sulphur. **Vegol:** Do not use within 14 days of Maestro or other captan products, Bravo, Echo or copper and 30 days of sulphur.
		SuffOil-X *	1.3% v/v	12 hours	12 hours	
		Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[3]	
Obliquebanded leafroller	**General Comments:** • For summer generations, apply at 240–280 DDC (base 6.1°C) after first sustained moth catch. • If larval activity is extended, reapply after 10–14 days. For information on calculating degree days, see *Degree-Day Modeling,* Chapter 2.					
	4C+5	TwinGuard	250–500 g/ha	12 hours	7 days	No product specific comments.
	5	Delegate	420 g/ha	12 hours	3 days	
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Obliquebanded leafroller (cont'd)	11	Bioprotec PLUS *	1.8–2.5 L/ha	4 hours	0 days/ 4 hours[3]	Apply in evening or on a cloudy day. Spray when and where pests are actively feeding. Acidify spray mix to below pH 7.0 and apply on cloudy days or in the evening. Apply in a high-volume spray to ensure thorough coverage on both sides of the leaf. Apply to young larvae, early in infestation. Death of insect may take several days. Reapply at 5–7-day intervals if larvae activity is extended.
		XenTari WG *	0.5–1.6 L/ha	12 hours	0 days/ 12 hours[3]	
	15	Rimon 10 EC	1.35–3.35 L/ha	12 hours	14 days	Do not allow this product to drift on grapes as leaf spotting may occur.
	28	Altacor	285 g/ha	12 hours	1 day	No product specific comments.
		Exirel	0.5–1.0 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or copper. See product label for other tank-mix restrictions.
		Vayego 200 SC	225 mL/ha	12 hours/ 7 days	5 days	No product specific comments.
Japanese beetle	1	Imidan WP	2.68 kg/ha	7 days[1†]/ 30 days[2]	14 days	No product specific comments.
	3	Danitol	0.779–1.559 L/ha	24 hours[1]/ 23 days[2]/ 7 days[4]	16 days	No product specific comments.
	28	Altacor	285 g/ha	12 hours	1 day	**Suppression only.**
		Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro or other captan products, Luna Sensation, Pristine or copper. See product label for other tank-mix restrictions
Brown marmorated stink bug	**General Comments:** • Breeding populations of this pest are present in Ontario. Check ontario.ca/stinkbug for updates on pest development, registered products and management strategies. • There are currently no thresholds established. Apply when insects first detected or early damage found.					
	4A	Clutch 50 WDG	210–420 g/ha	12 hours	7 days	**Suppression only. Labeled for BMSB only. Cannot be used after April 11, 2022.**
Spotted wing drosophila	**General Comments:** • Spotted wing drosophila insert eggs into ripening fruit. Larvae develop in the fruit and may be present at harvest, contributing to premature breakdown. • Spray insecticides weekly when fruit is ripening or ripe, and flies are present. • Frequent picking, burial of grade-out fruit, and general sanitation are very important to prevent problems. • Applications should be based on the presence of adult pests (flies) as determined by local monitoring. • These products rely on contact in order to control spotted wing drosophila adults. Apply in a high-volume spray to ensure thorough coverage of fruit.					
	1B	Imidan WP	2.68 kg/ha	3 days	7 days	No product specific comments.
		Malathion 85 E	610–855 mL in 1,000 L water	1 day[1]/ 3 days[2]	3 days	**Suppression only.**

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Special sprays (when monitoring indicates the need) (cont'd)						
Spotted wing drosophila (cont'd)	3	Danitol	0.779–1.559 L/ha	3 days[2]/ 7 days[4]	16 days	No product specific comments.
	5	Delegate	420 g/ha	12 hours	5 days	No product specific comments.
		Entrust * or Success	364 mL/ha 182 mL/ha	when dry	3 days	No product specific comments.
	28	Exirel	1.0–1.5 L/ha	12 hours	3 days	Do not tank-mix or make sequential applications with Maestro, or other captan products, copper, Luna Sensation or Pristine. See product label for other tank-mix restrictions.
		Harvanta	1.2–1.6 L/ha	12 hours	7 day	No product specific comments.
Two spotted spider mite, Plum rust mite	**General Comments:** • Mites tend to be more of a problem during hot, dry, dusty summers, especially in blocks where pyrethroid insecticides have been used. • Apply before mite populations build up. • Thorough spray coverage is essential for good control. • For resistance management, do not use any miticide more than once per season.					
	20	Acramite 50 WS	851 g/ha	12 hours	7 days	**Two spotted spider mite only.**
	23	Envidor 240 SC	750 mL/ha	12 hours	7 days	Active on all life stages. Control may not be apparent for 2–3 weeks. Apply before mite populations build up.
	NC	Kopa Insecticidal Soap *	2% v/v	12 hours	0 days/ 12 hours[3]	No product specific comments.
		PureSpray Green Spray Oil 13E *	2% v/v	12 hours	0 days/ 12 hours[3]	**Oil may remove waxy bloom on fruit. Do not apply to oil sensitive varieties.** **PureSpray Green, SuffOil-X:** Do not use within 14 days of Maestro or other captan products, Perm-UP, Pounce, Bravo, Echo or sulphur. **Vegol:** Do not use within 14 days of Maestro or other captan products or copper and 30 days of sulphur.
		SuffOil-X *	1.3% v/v	12 hours	0 days/ 12 hours[3]	
		Vegol Crop Oil	2.0% v/v	12 hours	0 days/ 12 hours[3]	
San Jose scale	4C	Closer	200–400 mL/ha	12 hours	7 days	Apply when crawlers are active in orchards with a history of scale. Reapply, if necessary, after 14 days.
	4C+5	TwinGuard	500 g/ha	12 hours	7 days	
	19	Movento	365–585 mL/ha	12 hours	7 days	Control may not be apparent for 2–3 weeks. Apply the first 2 weeks of June in blocks where adult scale was present the previous year. Tank-mix with a permitted adjuvant with spreading and penetrating properties at a suggested rate of 0.2% v/v/. Because of oil tank-mix, do not tank-mix with Maestro or other captan products or sulphur. Reapply if necessary after 14 days.
	NC	Vegol Crop Oil *	2% v/v	12 hours	0 days/ 12 hours[3]	**Oil may remove waxy bloom on fruit. Do not apply to oil sensitive varieties.** See comments on this product for San Jose scale at **Green tip.**

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–12. Plum Calendar (cont'd)

Disease, Insect or Other	Group	Product	Rate	Restricted Entry Interval	Preharvest Interval	Product Specific Comments
Postharvest fruit treatment						
Blue mold, Grey mold, Brown rot, Rhizopus rot	12	Scholar 230 SC	496 mL in 378 L water	—	post-harvest	Postharvest treatment may be necessary during wet harvest seasons. These treatments will prolong storage time while providing control of postharvest diseases. See label for dip and drench instructions. Should not be used on plums intended for processing into prunes.

[1] General re-entry. [2] Hand thinning. [3] REI for Harvest. If REI exceeds PHI, follow REI. [4] Scouting. † Personal protective equipment required for certain activities. See label.
— = Information not applicable or not specified on product label. * = Potentially organic. Check with certifying body.

Table 3–13. Products Used on Plums

Use this table as a guide but refer to product label for specific information.

The preharvest interval (PHI) is the number of days between the last spray and first harvest.

The restricted entry interval (REI) is the minimum interval that must be observed between the application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume it is 12 hours. **If REI for harvest exceeds the PHI, follow the REI.**

The maximum applications is the labelled maximum number or product amount applied for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Products listed as potentially organic may be acceptable for organic use based on MAPAQ. *Réseau d'avertissements phytosanitaires.* 2020. *RAP – Réseau Général. Bulletin d'information N° 1, Spécial phytoprotection bio. 18 juin 2020,* or a letter of certification provided by the registrant. Check with certifying body to verify the acceptability of any product prior to using it.

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression							
Aceta 70 WP	33298	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Acramite 50 WS	27925	bifenazate	20	7 days	12 hours	1	—
Altacor	28981	chlorantraniliprole	28	1 day	12 hours	3 (max. 645 g/ha)	—
Assail 70 WP	27128	acetamiprid	4A	7 days	12 hours[1]/6 days[2]	4	—
Beleaf 50 SG	29796	flonicamid	29	14 days	12 hours[1]/3 days[2]	3 (max. 600 g/ha)	—
Bioprotec PLUS	32425	*Bacillus thuringiensis subsp. kurstaki*	11	0 days	4 hours[1,4]	—	—
Closer	30826	sulfoxaflor	4C	7 days	12 hours	2	—
Clutch 50 WDG	29382	clothianidin	4A	7 days	12 hours	2 (max. 420 g/ha)	—
Cormoran	33353	acetamiprid + novaluron	4A+15	7 days	12 hours[1]/6 days[2]	4	—
Danitol	33817	fenpropathrin	3	3 days	24 hours[1]/23 days[2]/ 16 days[4]/7 days[8]	1	—
Delegate	28778	spinetoram	5	3 days	12 hours	3/3[3]	—
Entrust	30382	spinosad	5	3 days	when dry	3	*
Envidor 240 SC	28051	spirodiclofen	23	7 days	12 hours	1	—
Exirel	30895	cyantraniliprole	28	3 days	12 hours	4 (max. 4.5 L/ha)	—
Imidan WP	29064	phosmet	1B	14 days	7 days[1*]/30 days[2]	3	—
Intrepid	27786	methoxyfenozide	18	14 days	12 hours	1	—
Isomate OFM TT	31419	pheromone, oriental fruit moth	NC	—	—	—	*
Isomate-PTB Dual	30042	pheromone, peachtree borer, lesser peachtree borer	NC	—	—	—	*
Kopa Insecticidal Soap	31433	potassium salts of fatty acids	NC	12 hours[1,4]	0 days	—	*

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI. [5] Maximum of 10 applications per season with no more than 2 dormant applications. [6] Maximum of 6 applications per season with no more than 2 dormant applications. [7] No more than 2 applications in the 3 weeks prior to harvest. [8] Scouting * Personal protective equipment required for certain activities. See label.

Table 3–13. Products Used on Plums (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for insect and mite control or suppression (cont'd)							
Movento 240 SC	28953	spirotetramat	23	7 days	12 hours	max. 1.12 L/ha	—
Perm-UP EC	28877	permethrin	3	7 days	12 hours	—	—
Pounce 384 EC	16688	permethrin	3	7 days	when dry	—	—
Purespray Green Spray Oil 13 E	27666	mineral oil	NC	—	12 hours	2/8[5]	*
Rimon 10 EC	28881	novaluron	15	14 days	12 hours	3	—
Silencer 120 EC	29052	lambda-cyhalothrin	3	7 days	24 hours	3	—
Sivanto Prime	31452	flupyradifurone	4D	14 days	12 hours	max. 2 L/ha	—
Success	26835	spinosad	5	3 days	when dry	3	—
SuffOil-X	33099	mineral oil	NC	12 hours	12 hours	8	*
Superior 70 Oil	9542 14981	mineral oil	NC	prebloom	12 hours	—	*
TwinGuard	31442	sulfoxaflor + spinetoram	4C+5	7 days	12 hours	2	—
UP-Cyde 2.5 EC	28795	cypermethrin	3	7 days	12 hours	3	—
Vayego 200 SC	33711	tetraniliprole	28	5 days	12 hours	3	—
Vegol Crop Oil	32408	canola oil	NC	0 days	12 hours[1,4]	2/4[6]	*
Versys	33266	afidopyropen	9D	7 days	12 hours	4	—
XenTari WG	31557	*Bacillus thuringiensis subsp. aizawai*	11	0 days	12 hours[1,4]	—	*
Products used for disease control or suppression							
Bumper 432 EC	28017	propiconazole	3	3 days	12 hours	5[7]	—
Cantus WDG	30141	boscalid	7	0 days	12 hours[1,4]	5	—
Cevya	33405	mefentriflluconazole	3	0 days	12 hours[1,4]	max. 1.125 L/ha	—
Cueva	31825	copper octanoate	M	1 day	4 hours	15	*
Fitness	32639	propiconazole	3	3 days	3 days	5[7]	—
Fontelis	30331	penthiopyrad	7	0 days	12 hours[1,4]	max. 4.5 L/ha	—
Fracture	32139	BLAD polypeptide	BM1	0 days	12 hours[1,4]	3	—
Funginex DC	27686	triforine	3	prebloom	12 hours	3 (max. 2.5 L/ha)	—
Indar	27294	fenbuconazole	3	0 days	12 hours[1,4]	7	—
Jade	24030	propiconazole	3	3 days	3 days	5[7]	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI. [5] Maximum of 10 applications per season with no more than 2 dormant applications. [6] Maximum of 6 applications per season with no more than 2 dormant applications. [7] No more than 2 applications in the 3 weeks prior to harvest. [8] Scouting * Personal protective equipment required for certain activities. See label.

Table 3–13. Products Used on Plums (cont'd)

Product Name	Registration Number	Common Name	Group	Preharvest Interval	Restricted Entry Interval	Maximum Applications	Potentially Organic
Products used for disease control or suppression (cont'd)							
Kenja 400 SC	31758	isofetamid	7	1 day	12 hours	3	—
Kumulus DF	18836	sulphur	M	1 day	24 hours	8	*
Luna Sensation	32107	fluopyram + trifloxystrobin	7+11	1 day	12 hours	max. 1.98 L/ha	—
Maestro 80 WSP	33488	captan	M	2 days	24 hours[1]/29 days[2]/ 15 days[4]	1	—
Microscopic Sulphur WP	14653	sulphur	M	1 day	24 hours	8	*
Microthiol Disperss	29487	sulphur	M	1 day	24 hours	8	*
Princeton	33840	propiconazole	3	3 days	3 days	5[7]	—
Pristine WG	27985	boscalid + pyraclostrobin	7+11	0 days	when dry[1]/10 days[2]/ 24 hours[4]	5	—
ProBLAD Plus	31782	BLAD polypeptide	BM1	0 days	12 hours[1,4]	3	—
Quash	30402	metconazaole	3	14 days	12 hours[1]/9 days[2]	1	—
Regalia Maxx	30199	extract of *Reynoutria sachalinensis*	P5	0 days	when dry	—	*
Scholar 230 SC	29528	fludioxonil	12	postharvest	—	1	—
Senator 50 SC	32096	thiophanate-methyl	1	1 day	12 hours	max. 4.9 L/ha	—
Sercadis	31697	fluxapyroxad	7	0 days	12 hours[1,4]	3	—
Serenade OPTI	31666	*Bacillus subtilis*	BM2	0 days	when dry	—	*
Supra Captan 80 WSP	33641	captan	M	2 days	24 hours[1]/29 days[2]/ 15 days[4]	1	—

M = Multi-site fungicides. BM = Biologicals with multiple modes of action. NC = Not classified by FRAC/IRAC, or group not indicated on product label. P = Plant defence inducers. U = Mode of action has not been determined. — = Information is not specified on the product label. * = Potentially organic. Check with certifying body.

[1] General re-entry. [2] Hand thinning. [3] Maximum of 3 applications to trunk and 3 to canopy. [4] REI for Harvest. When REI exceeds PHI, follow REI. [5] Maximum of 10 applications per season with no more than 2 dormant applications. [6] Maximum of 6 applications per season with no more than 2 dormant applications. [7] No more than 2 applications in the 3 weeks prior to harvest. [8] Scouting * Personal protective equipment required for certain activities. See label.

Notes on Fungicides, Insecticides and Miticides for Tender Fruit

Use the information in the following tables to assist with choosing the best product for the pest complex present. Consider the life stage present, history

of the pest, weather and resistance management strategies, as well as the activity of each product to pests and beneficial insects.

In this section:

Table 3–14. Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees

Use fungicides only for diseases listed on the product label for the crop. The information provided in this table is based on information from other areas. It is intended to assist the grower in choosing the best fungicide for control of diseases listed on the product label, while managing resistance and avoiding unnecessary sprays. Efficacy can be affected by rate of the product.

Group	Fungicide	Honeybee Toxicity[1]	Brown rot blossom blight	Brown rot fruit phase	Peach scab	Peach leaf curl	Bacterial canker/spot	Powdery mildew	Rhizopusrot	Cherry leaf spot	Black knot	Pear scab	Registered for use on:					
													Apricots	Cherries	Peaches	Nectarines	Plums	Pears
M	Bravo ZNC	NT	3 *	NA	3	4 *	0	0	0	4 *	4 *	NA	NR	✓	✓	✓	NR	NR
M	Copper 53W	NT	1 *	1 *	NA	2 *	2 *	NA	0	1 *	0	NA	NR	t✓	✓	✓	NR	✓
M	Copper Spray	NT	1 *	1 *	0	2 *	2 *	0	0	1 *	0	NA	✓	✓	✓	✓	NR	✓
M	Cueva	NT	2 *	2 *	—	2 *	2 *	2	0	—	0	2 *	✓	✓	✓	✓	✓	✓
M	Echo NP	NT	3 *	NA	4	4 *	0	0	0	4 *	4 *	NA	NR	✓	✓	✓	NR	NR
M	Ferbam 76 WDG	NT	3 *	—	—	4 *	0	0	NA	2 *	0	1 *	✓	✓	✓	NR	✓	✓
M	Fracture	NT	1 *	1 *	—	—	—	1	—	—	—	NA	✓	✓	✓	✓	✓	NR
M	Granuflo-T	NT	3 *	3 *	3 *	3	0	0	0	—	3	NA	NR	NR	✓	NR	✓	NR
M	Guardsman Copper Oxychloride 50	NT	1 *	0	0	2 *	2 *	0	0	1 *	0	NA	NR	✓	✓	✓	NR	NR
M	Kumulus DF	NT	2 *	1 *	3 *	0	0	2 *	0	1	1	1 *	NR	✓	✓	NR	✓	✓
M	Maestro 80 WSP	MT	3 *	3 *	3 *	2	0	0	1	3 *	2 *	3 *	✓	✓	✓	✓	✓	✓
M	Microscopic Sulphur WP	NT	2 *	1 *	3 *	0	0	2 *	0	1	1 *	1 *	NR	✓	✓	NR	✓	✓
M	Microthiol Disperss	NT	2 *	1 *	3 *	0	0	2 *	0	1	1	1 *	NR	✓	✓	✓	✓	✓
M	Parasol Flowable	NT	0	0	0	2 *	2 *	0	0	0	0	NA	✓	✓	✓	✓	NR	✓
M	Supra Captan 80 WSP	MT	3 *	3 *	3 *	2	0	0	1	3 *	2 *	3 *	✓	✓	✓	✓	✓	✓
1	Senator 50 SC	NT	3 *	3 *	3	2	0	3	—	3	3	2	NR	✓	✓	✓	✓	✓
3	Bumper 432 EC	NT	4 *	4 *	3	0	0	3	4	3 *	1 *	NA	✓	✓	✓	✓	✓	NR
3	Cevya	NT	4 *	4 *	2	0	0	0	0	0	0	NA	✓	✓	✓	✓	✓	NR
3	Fitness	NT	4 *	4 *	3	0	0	3	4	3 *	1 *	NA	✓	✓	✓	✓	✓	NR
3	Funginex DC	NT	3 *	0	0	0	0	3	—	3	0	NA	NR	✓	✓	NR	✓	NR
3	Indar	NT	4 *	4 *	3	0	0	2	0	3	3 *	NA	✓	✓	✓	✓	✓	NR

M = Multi-site fungicides. NC = Not classified by FRAC/IRAC, or group not indicated on product label. U = Mode of action has not been determined.
MT = Moderately toxic to bees. Can be used around bees if dosage, timing and method of application are correct, but do not apply them directly on bees, in the field or at the colonies.
NT = Relatively non-toxic to bees. [1] Source: PMRA Environmental Assessment Division. For more detailed information on the toxicity of specific pesticides to honeybees, refer to the pesticide label.

0 = Not effective. 1 = Slightly effective/suppression. 2 = Fair. 3 = Good. 4 = Very good. NA = Not used at this timing for this pest. — = No information is available.
* (shaded area) = Pest is listed on the product label for control or suppression. t = Tart cherries only. ph = Post harvest.

✓ = Registered on the crop, but not necessarily for all diseases. NR = Not registered for use on this crop.
Source: Various U.S. extension publications, scientific journal articles, Canadian Pest Management Research Reports and Plant Disease Management Reports (APS).

Table 3–14. Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees (cont'd)

Use fungicides only for diseases listed on the product label for the crop. The information provided in this table is based on information from other areas. It is intended to assist the grower in choosing the best fungicide for control of diseases listed on the product label, while managing resistance and avoiding unnecessary sprays. Efficacy can be affected by rate of the product.

Group	Fungicide	Honeybee Toxicity[1]	Brown rot blossom blight	Brown rot fruit phase	Peach scab	Peach leaf curl	Bacterial canker/spot	Powdery mildew	Rhizopusrot	Cherry leaf spot	Black knot	Pear scab	Registered for use on:					
													Apricots	Cherries	Peaches	Nectarines	Plums	Pears
3	Jade	NT	4 *	4 *	3	0	0	2	4	3 *	1 *	NA	✓	✓	✓	✓	✓	NR
3	Nova	NT	3 *	0	3	0	0	2 *	0	3 *	0	3	NR	✓	✓	✓	NR	✓
3	Princeton	NT	4 *	4 *	3	0	0	2	0	3 *	1 *	NA	✓	✓	✓	✓	✓	NR
3	Quash	NT	4 *	4 *	1 *	0	0	1 *	0	1 *	0	0	✓	✓	✓	✓	✓	NR
3+7	Aprovia Top 195 EC	NT	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 *	NR	NR	NR	NR	NR	✓
3+7	Miravis Duo	NT	4 *	4 *	4 *	0	0	0	0	0	0	NA	✓	✓	✓	✓	✓	NR
3+9	Inspire Super	NT	NA	NA	NA	NA	NA	NA	NA	NA	NA	3 *	NR	NR	NR	NR	NR	✓
7	Cantus WDG	NT	4 *	4 *	—	0	NA	2	0	—	—	NA	✓	✓	✓	✓	✓	NR
7	Fontelis	NT	4 *	4 *	3 *	0	NA	4 *	0	1 *	2	NA	✓	✓	✓	✓	✓	NR
7	Kenja 400 SC	NT	4 *	4 *	0	0	0	0	0	0	0	NA	✓	✓	✓	✓	✓	NR
7	Sercadis	NT	4 *	4 *	—	0	0	4	0	—	—	4 *	✓	✓	✓	✓	✓	✓
7+9	Luna Tranquility	NT	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 *	NR	NR	NR	NR	NR	✓
7+11	Luna Sensation	NT	4 *	4 *	3 *	0	0	4 *	0	4 *	0	NA	✓	✓	✓	✓	✓	NR
7+11	Pristine WG	NT	4 *	4 *	3	0	NA	2 *	4 *	4 *	3	3 *	✓	✓	✓	✓	✓	✓
9	Scala SC	NT	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 *	NR	NR	NR	NR	NR	✓
11	Cabrio EG	NT	1 *	1	3	0	0	4 *	0	0	—	NA	✓	✓	✓	✓	✓	NR
11	Flint	NT	0	0	4	0	0	1 *	0	4 *	0	3 *	✓	✓	✓	✓	✓	✓
11	Sovran	NT	NA	NA	NA	NA	NA	NA	NA	NA	NA	3 *	NR	NR	NR	NR	NR	✓
12	Scholar 230 SC	NT	NA	4 * ph	NA	NA	NA	NA	4 *	NA	NA	NA	✓	✓	✓	✓	✓	✓
17	Elevate 50 WDG	NT	4 *	4 *	0	0	0	0	0	0	0	NA	NR	✓	✓	✓	NR	NR
50	Vivando SC	NT	0	0	0	0	0	3 *	0	0	0	NA	NR	✓	✓	✓	NR	NR
BM2	Serenade OPTI	NT	1 *	1 *	—	—	—	1	—	—	—	1 *	✓	✓	✓	✓	✓	✓
NC	Buran	NT	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 *	NR	NR	NR	NR	NR	✓

M = Multi-site fungicides. NC = Not classified by FRAC/IRAC, or group not indicated on product label. U = Mode of action has not been determined.
MT = Moderately toxic to bees. Can be used around bees if dosage, timing and method of application are correct, but do not apply them directly on bees, in the field or at the colonies.
NT = Relatively non-toxic to bees. [1] Source: PMRA Environmental Assessment Division. For more detailed information on the toxicity of specific pesticides to honeybees, refer to the pesticide label.

0 = Not effective. 1 = Slightly effective/suppression. 2 = Fair. 3 = Good. 4 = Very good. NA = Not used at this timing for this pest. — = No information is available.
* (shaded area) = Pest is listed on the product label for control or suppression. t = Tart cherries only. ph = Post harvest.

✓ = Registered on the crop, but not necessarily for all diseases. NR = Not registered for use on this crop.
Source: Various U.S. extension publications, scientific journal articles, Canadian Pest Management Research Reports and Plant Disease Management Reports (APS).

Table 3–14. Activity of Fungicides on Tender Fruit Diseases and Impact on Honeybees (cont'd)

Use fungicides only for diseases listed on the product label for the crop. The information provided in this table is based on information from other areas. It is intended to assist the grower in choosing the best fungicide for control of diseases listed on the product label, while managing resistance and avoiding unnecessary sprays. Efficacy can be affected by rate of the product.

Group	Fungicide	Honeybee Toxicity[1]	Brown rot blossom blight	Brown rot fruit phase	Peach scab	Peach leaf curl	Bacterial canker/spot	Powdery mildew	Rhizopusrot	Cherry leaf spot	Black knot	Pear scab	Registered for use on: Apricots	Cherries	Peaches	Nectarines	Plums	Pears
NC	MilStop	NT	0	0	0	0	0	1 *	0	0	0	NA	NR	NR	✓	✓	NR	NR
NC	Purespray Green Spray Oil 13 E	NT	0	0	0	0	0	3 *	0	0	0	0	✓	✓	✓	✓	✓	✓
NC	Sirocco	NT	0	0	0	0	0	1 *	0	0	0	NA	NR	NR	✓	✓	✓	NR
NC	Vegol Crop Oil	NT	0	0	0	0	0	3 *	0	0	0	0	✓	✓	✓	✓	✓	✓
P5	Regalia Maxx	NT	1 *	1 *	—	1 *	—	—	—	—	—	NA	✓	✓	✓	✓	✓	NR
U12	Equal 65 WP	NT	0	0	NA	NA	0	0	0	3 *	0	3	NR	✓	NR	NR	NR	✓
U12	Syllit 400 FL	NT	0	0	0	3 *	NA	0	0	3 *	NA	3 *	NR	✓	✓	✓	NR	✓

M = Multi-site fungicides. NC = Not classified by FRAC/IRAC, or group not indicated on product label. U = Mode of action has not been determined.
MT = Moderately toxic to bees. Can be used around bees if dosage, timing and method of application are correct, but do not apply them directly on bees, in the field or at the colonies.
NT = Relatively non-toxic to bees. [1] Source: PMRA Environmental Assessment Division. For more detailed information on the toxicity of specific pesticides to honeybees, refer to the pesticide label.

0 = Not effective. 1 = Slightly effective/suppression. 2 = Fair. 3 = Good. 4 = Very good. NA = Not used at this timing for this pest. — = No information is available.
* (shaded area) = Pest is listed on the product label for control or suppression. t = Tart cherries only. ph = Post harvest.

✓ = Registered on the crop, but not necessarily for all diseases. NR = Not registered for use on this crop.
Source: Various U.S. extension publications, scientific journal articles, Canadian Pest Management Research Reports and Plant Disease Management Reports (APS).

Table 3–15. Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees

Use these products only for pests listed on the product label for the crop. The information provided in this table is based on information from other areas. It is intended to assist the grower in choosing the best insecticide for control of pests listed on the product label, while managing resistance and avoiding unnecessary sprays for non-target pests. Efficacy can be affected by rate of the product.

Group	Product Name	Honeybee Toxicity[1]	Oriental fruit moth	Plum curculio	Tarnished plant bug	Obliquebanded leafroller	Japanese beetle	Aphids	Cherry fruit fly	Spotted wing drosophila†	Mites	Pear psylla	Codling moth	Registered for use on:					
														Apricots	Cherries	Peaches	Nectarines	Plums	Pears
1B	Imidan WP	HT	2 *	4 *	2 *	2 *	3 *	1	2 *	3 *	1 *	1	3 * R	NR	t	✓	NR	✓	✓
1B	Lorsban 50 W	HT	2 * 1st gen	—	4	—	—	—	—	—	0	—	—	NR	NR	✓	✓	NR	NR
1B	Malathion 85 E	HT	NA *	NA *	NA	NA *	NA	NA *	NA	3 *	NA *	1 *	1 * R	✓	✓	✓	✓	✓	✓
3	Ambush 500 EC	HT	4 *	2 *	3 *	4	3	0	2	3	0	3 *	2 *	NR	NR	✓	✓	✓	✓
3	Danitol	HT	4 *	2 *	2 *	4 *	3 *	2	—	3 *	0	1 *	3 *	✓	✓	✓	✓	✓	✓
3	Decis 5 EC, Decis 100 EC	HT	3 *	1	3	3	0	1	—	3	0	4 *	3	NR	NR	✓	NR	NR	✓
3	Labamba	HT	3 *	3 *	3 *	4	3	2 * gpa	2 *	3–4	0	3 *	3 *	NR	✓	✓	✓	✓	✓
3	Matador 120 EC	HT	3 *	3 *	3 *	4	3	2 * gpa	2 *	3–4	0	3 *	3 *	NR	✓	✓	✓	✓	✓
3	Perm-UP EC	HT	4 *	2 *	2 *	4	3	2	—	3	0	3 *	3 *	NR	NR	✓	✓	✓	✓
3	Poleci	HT	3 *	1	3	3	0	1	—	3	0	4 *	3	NR	NR	✓	NR	NR	✓
3	Pounce 384 EC	HT	4 *	2 *	2 *	4	3	2	—	3	0	3 *	3 *	NR	NR	✓	✓	✓	✓
3	Silencer 120 EC	HT	3 *	3 *	3 *	4	3	2 * gpa	2 *	3–4	0	3 *	3 *	NR	✓	✓	✓	✓	✓
3	UP-Cyde 2.5 EC	HT	3 *	3 *	3 *	4	3	2	2	3	0	3	3	NR	NR	✓	✓	✓	✓
4A	Aceta 70 WP	MT	4 *	1–2 *	2	1	2	4	1 *	1	0	3 *	3 *	✓	✓	✓	✓	✓	✓
4A	Assail 70 WP	MT	4 *	1–2 *	2	1	2	4	1 *	1	0	3 *	3 *	✓	✓	✓	✓	✓	✓
4A	Calypso 480 SC	NT	3 *	3 *	3	—	—	—	—	—	0	3 *	3 *	NR	NR	NR	NR	NR	✓
4A	Clutch 50 WDG	HT	3	3	—	—	2	4	—	—	0	3	1	✓	✓	✓	✓	✓	✓

HT = Highly toxic to bees. Severe losses may be expected if used when bees are present at treatment time or within a few days thereafter.
MT = Moderately toxic to bees. Can be used around bees if dosage, timing and method of application are correct, but do not apply them directly on bees, in the field or at the colonies.
NT = Relatively non-toxic to bees.
I = Irritant. May act as a repellent to bees if white film barrier present on plant tissue while foraging.
[1] Source: PMRA Environmental Assessment Division. For more detailed information on the toxicity of specific pesticides to honeybees, refer to the pesticide label.
[2] May be toxic to bee colonies exposed to direct treatment, drift or residues on flowering crops or weeds.

0 = Not effective. 1 = Slightly effective/suppression. 2 = Fair. 3 = Good. 4 = Very good. NA = Not used at this timing for this pest. MD = Mating disruption.
— = No information is available. R = Resistance detected in Ontario. E = Early season application. 1st gen = First generation only. gpa = Green peach aphid. bca = Black cherry aphid.
ow = Overwintering generation. * (shaded area) = Pest is listed on the product label for control or suppression. † = Product efficacy may be reduced due to long preharvest intervals.

✓ = Registered on the crop, but not necessarily for all insects. NR = Not registered for use on this crop. t = Tart cherry only.
Source: Various U.S. extension publications, scientific journal articles, Canadian Pest Management Research Reports, Plant Disease Management Reports (APS), Arthropod Management Reports (ESA).

Table 3–15. Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees (cont'd)

Use these products only for pests listed on the product label for the crop. The information provided in this table is based on information from other areas. It is intended to assist the grower in choosing the best insecticide for control of pests listed on the product label, while managing resistance and avoiding unnecessary sprays for non-target pests. Efficacy can be affected by rate of the product.

Group	Product Name	Honeybee Toxicity[1]	Oriental fruit moth	Plum curculio	Tarnished plant bug	Obliquebanded leafroller	Japanese beetle	Aphids	Cherry fruit fly	Spotted wing drosophila†	Mites	Pear psylla	Codling moth	Registered for use on:					
														Apricots	Cherries	Peaches	Nectarines	Plums	Pears
4A+15	Coromoran	NT	4 *	2 *	0	0	0	0	0	0	0	0	0	✓	✓	✓	✓	✓	NR
4C	Closer	HT	0	0	0	0	0	3 *	0	—	0	0	0	✓	✓	✓	✓	✓	✓
4C+5	TwinGuard	MT	4 *	2 *	0	4 *	0	3 *	0	2	0	3	3 *	✓	✓	✓	✓	✓	✓
4D	Sivanto Prime	MT	—	—	—	—	—	4 *	—	—	—	1 *	—	✓	✓	✓	✓	✓	✓
5	Delegate	HT	4 *	2 *	0	4 *	0	0	2	2–3 *	0	3	3 *	✓	✓	✓	✓	✓	✓
5	Entrust	HT	1	0	0	3 *	0	0	3 *	3 *	0	0	1	✓	✓	✓	✓	✓	✓
5	GF-120 Fruit Fly Bait	HT	—	0	0	0	0	0	3 *	0	0	0	0	NR	✓	NR	NR	NR	NR
5	Success	HT	1	0	0	3 *	0	0	3 *	3	0	0	1	✓	✓	✓	✓	✓	✓
6	Agri-Mek SC	HT	0	0	0	0	0	0	—	0	4 *	4 *	0	NR	NR	NR	NR	NR	✓
6+28	Minecto Pro	HT	4 *	4 *	0	4 *	NA	NA	NA	NA	0	4 *	4 *	NR	NR	NR	NR	NR	✓
9D	Versys	NT	0	0	0	0	0	4 * bca	0	0	0	0	0	NA	✓	NA	NA	✓	NA
10	Apollo SC	NT	0	0	0	0	0	0	0	0	3 * E	0	0	NR	NR	✓	✓	NR	✓
11	Bioprotec CAF	NT	1	0	0	3 *	0	0	0	0	0	0	1	✓	✓	✓	NR	✓	✓
11	BioProtec PLUS	NT	1	0	0	3 *	0	0	0	0	0	0	1	✓	✓	✓	NR	✓	✓
11	Dipel 2X DF	NT	1	0	0	3 *	0	0	0	0	0	0	1	✓	✓	✓	✓	✓	✓
11	Foray 48 BA	NT	0	0	0	3 *	0	0	0	0	0	0	0	NR	NR	NR	NR	NR	✓
11	XenTari WG	NT	1	0	0	3 *	0	0	0	0	0	0	0	✓	✓	✓	✓	✓	✓
15	Rimon 10 EC	MT[2]	4 *	0	4	4 *	0	0	0	0	0	NA	NA	✓	✓	✓	✓	✓	NR
18	Intrepid	NT	3 * 1st gen	0	0	3 *	0	0	0	0	0	0	1	✓	✓	✓	✓	✓	✓

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[1] Source: PMRA Environmental Assessment Division. For more detailed information on the toxicity of specific pesticides to honeybees, refer to the pesticide label.
[2] May be toxic to bee colonies exposed to direct treatment, drift or residues on flowering crops or weeds.

0 = Not effective. 1 = Slightly effective/suppression. 2 = Fair. 3 = Good. 4 = Very good. NA = Not used at this timing for this pest. MD = Mating disruption.
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ow = Overwintering generation. * (shaded area) = Pest is listed on the product label for control or suppression. † = Product efficacy may be reduced due to long preharvest intervals.

✓ = Registered on the crop, but not necessarily for all insects. NR = Not registered for use on this crop. t = Tart cherry only.
Source: Various U.S. extension publications, scientific journal articles, Canadian Pest Management Research Reports, Plant Disease Management Reports (APS), Arthropod Management Reports (ESA).

Table 3–15. Activity of Insecticides and Miticides on Tender Fruit Pests and Impact on Honeybees (cont'd)

Use these products only for pests listed on the product label for the crop. The information provided in this table is based on information from other areas. It is intended to assist the grower in choosing the best insecticide for control of pests listed on the product label, while managing resistance and avoiding unnecessary sprays for non-target pests. Efficacy can be affected by rate of the product.

Group	Product Name	Honeybee Toxicity[1]	Oriental fruit moth	Plum curculio	Tarnished plant bug	Obliquebanded leafroller	Japanese beetle	Aphids	Cherry fruit fly	Spotted wing drosophila†	Mites	Pear psylla	Codling moth	Registered for use on:					
														Apricots	Cherries	Peaches	Nectarines	Plums	Pears
20B	Kanemite 15 SC	NT	0	0	0	0	0	0	0	0	4 *	0	0	NR	NR	NR	NR	NR	✓
21	Nexter SC, Nexter WP	HT	0	0	0	0	0	0	0	0	3–4 *	2 *	0	NR	✓	✓	✓	NR	✓
23	Envidor 240 SC	MT	0	0	0	0	0	0	0	0	4 *	0	0	✓	✓	✓	✓	✓	✓
23	Movento 240 SC	HT[2]	0	0	0	0	0	4 *	0	1	0	4 *	0	✓	✓	✓	✓	✓	✓
25	Nealta	NT	0	0	0	0	0	0	0	0	3 *	0	0	NR	NR	NR	NR	NR	✓
28	Altacor	NT	4 *	1	1	4 *	1 *	0	1 *	0	0	0	4 *	✓	✓	✓	✓	✓	✓
28	Exirel	HT	4 *	4 *	3	4 *	3 *	3 *	3 *	4 *	0	—	3 *	✓	✓	✓	✓	✓	✓
28	Harvanta 50 SL	HT	4 *	1 *	0	4 *	1	0	0	4 *	0	0	4 *	✓	✓	✓	✓	✓	✓
28	Vayego 200 SC	NT	4 *	1 *	0	4 *	0	1	0	0	0	0	4 *	✓	✓	✓	✓	✓	✓
29	Beleaf 50 SG	NT	0	0	2 *	0	0	3 *	0	0	0	0	NA	✓	✓	✓	✓	✓	NR
NC	Kopa Insecticidal Soap	NT	0	0	0	0	0	0	0	0	2 *	0	0	✓	✓	✓	✓	✓	✓
NC	Purespray Green Spray Oil 13 E	—	0	0	0	0	0	2 *	0	0	4 *	2*	0	✓	✓	✓	✓	✓	✓
NC	SuffOil-X	—	0	0	0	0	0	2	0	0	3 *	2	0	✓	✓	✓	✓	✓	✓
NC	Superior 70 Oil	—	0	0	0	0	0	0	0	0	4 *	2 *	0	✓	✓	✓	✓	✓	✓
NC	Surround WP	I	1 *	2 *	2 *	2 * ow	1	0	—	1	0	2 *	1 * 1st gen	NR	NR	NR	NR	NR	✓
NC	Vegol Crop Oil	—	0	0	0	0	0	2 *	0	0	3 *	2 *	0	✓	✓	✓	✓	✓	✓
NC	Isomate OFM TT	—	MD *	0	0	0	0	0	0	0	0	0	0	✓	✓	✓	✓	✓	✓
NC	Isomate CM/OFM TT	—	MD *	0	0	0	0	0	0	0	0	0	MD *	✓	✓	✓	✓	✓	✓

HT = Highly toxic to bees. Severe losses may be expected if used when bees are present at treatment time or within a few days thereafter.
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[1] Source: PMRA Environmental Assessment Division. For more detailed information on the toxicity of specific pesticides to honeybees, refer to the pesticide label.
[2] May be toxic to bee colonies exposed to direct treatment, drift or residues on flowering crops or weeds.

0 = Not effective. 1 = Slightly effective/suppression. 2 = Fair. 3 = Good. 4 = Very good. NA = Not used at this timing for this pest. MD = Mating disruption.
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ow = Overwintering generation. * (shaded area) = Pest is listed on the product label for control or suppression. † = Product efficacy may be reduced due to long preharvest intervals.

✓ = Registered on the crop, but not necessarily for all insects. NR = Not registered for use on this crop. t = Tart cherry only.
Source: Various U.S. extension publications, scientific journal articles, Canadian Pest Management Research Reports, Plant Disease Management Reports (APS), Arthropod Management Reports (ESA).

APPENDIX A: Additional Resources for Ontario Fruit Growers

Many factsheets, publications and other resources are available from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). These can be ordered from Service Ontario:

- Online at ServiceOntario Publications: ontario.ca/publications
- In person or by appointment at OMAFRA Resource Centres.

OMAFRA Publications

- *Guide to Weed Control, Hort Crops* – Publication 75B
- *Growing Strawberries in Ontario* – Publication 513
- *Growing Red Raspberries in Ontario* – Publication 105
- *Fruit Crop Protection Guide* – Publication 360 (includes Apples, Berries, Grapes, Tender Fruit, Tree Nuts)
- *Integrated Pest Management for Ontario Apples* – Publication 310
- *Soil Fertility Handbook* – Publication 611
- *Vegetable Crop Protection Guide* – Publication 838

For a complete list of publications from OMAFRA: ontario.ca/omafra.

Websites

Websites for technical information on pests and production in Ontario fruit crops:

- OMAFRA gateway to information on crops: ontario.ca/crops
- Spotted wing drosophila: ontario.ca/spottedwing
- Brown marmorated stink bug: ontario.ca/stinkbug
- CropIPM (integrated pest management) modules: ontario.ca/cropipm
- ONFruit blog: onfruit.ca
- Label Search Tool to find labels for pesticides and products registered for use in Canada: http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php
- Information on pesticide application technology: www.sprayers101.com
- Specialty Cropportunities to find information on specialty berries and fruit: ontario.ca/crops (search for “cropportunities”)

Resources on Application Technology

Ontario Pesticide Education Program: www.opep.ca

Best Management Practices

The Best Management Practices series of publications presents a practical, affordable approach to conserving a farm’s soil and water resources without sacrificing productivity.

For a complete list of publications in the BMP series visit: ontario.ca/agbestpractices.

Ontario Ministry of the Environment, Conservation and Parks

In case of pesticide drift, please contact the Ministry of the Environment, Conservation and Parks local district or area office. District Office contact information can be found at http://www.infogo.gov.on.ca/infogo/home.html#orgProfile/-270/en.

After business hours, please contact the Pollution Hotline at 1-866-MOE-TIPS (1-866-663-8477).

APPENDIX B: Suppliers of Pest Monitoring Equipment and Biological Control Agents

This list includes sources of weather monitoring equipment, pest monitoring supplies and biological control agents. For a more extensive list of beneficial insects and mite suppliers, see the OMAFRA website at ontario.ca/crops. This is a partial list and does not imply endorsement or recommendation by the Ontario Ministry of Agriculture, Food and Rural Affairs of the companies listed.

Company	Address	Telephone/Fax/Email	Products
Anatis Bioprotection www.anatisbioprotection.com	278 rang Saint-André Saint-Jacques-le-Mineur, QC J0J 1Z0	Toll-free: 1-800-305-7714 Email: info@anatisbioprotection.com	• beneficial insects and mites
Biobest Canada Ltd. www.biobestgroup.com	2020 Foxrun Rd. R.R. #4 Leamington, ON N8H 3V7	Tel: 519-322-2178 Fax: 519-322-1271 Email: info@biobest.ca	• beneficial insects, mites, nematodes • pheromone lures and traps • bumblebee hives for pollination
Cooper Mill Ltd. www.coopermill.com	31 Hastings Rd. R.R. #3 Madoc, ON K0K 2K0	Tel: 613-473-4847 Fax: 613-473-5080 Email: ipm@coopermill.com	• pheromone lures and traps
Distributions Solida Inc. www.solida.ca	480 rang St-Antoine St. Ferreol-les-Neiges, QC G0A 3R0	Tel: 418-826-0900 Fax: 418-826-0901 Email: info@solida.ca	• pheromone lures and traps • tangle traps, insect trap coating • hand lens magnifiers • tally counters
Gempler's www.gemplers.com	P.O. Box 5175 Janesville, WI USA 53547-5175	Toll-free: 1-800-382-8473 Fax: 1-800-551-1128 Email: customerservice@gemplers.com	• weather monitoring equipment • pheromone lures and traps • tangle traps • hand lens magnifiers • tally counters
Great Lakes IPM, Inc. www.greatlakesipm.com	7563 N. Crystal Rd. Vestaburg, MI USA 48891	Tel: 989-268-5693 Toll-free: 1-800-235-0285 Fax: 989-268-5311 Email: glipm@greatlakesipm.com	• apple scab monitoring equipment • pheromone lures and traps • tangle traps • hand lens magnifiers • tally counters • insect sweep nets • field diagnostic equipment
Koppert Canada Ltd. www.koppert.ca	50 Ironside Cres. Unit #3 Scarborough, ON M1X 1G4	Tel: 1-800-567-4195 Fax: 416-291-0902 Email: info@koppert.ca	• beneficial insects, mites • insect traps • BioWorks products
Natural Insect Control www.naturalinsectcontrol.com	3737 Netherby Rd. Stevensville, ON L0S 1S0	Tel: 905-382-2904 Fax: 905-382-4418 Email: nic@niagara.com	• beneficial insects, mites and nematodes (Canadian strains) • pheromone lures and traps • mating disruption devices • bird houses

Company	Address	Telephone/Fax/Email	Products
N.M. Bartlett Inc. www.bartlett.ca	4509 Bartlett Rd. Beamsville, ON L0R 1B1	Tel: 905-563-8261 Toll-free: 1-800-263-1287 Fax: 905-563-7882 Email: info@bartlett.ca	• pheromone lures and traps • mating disruption devices
PheroTech	7572 Progress Way Delta, BC V4G 1E9	Tel: 604-940-9944 Fax: 604-940-9433 Email: sales@pherotech.com	• pheromone lures and traps
Plant Products Inc. www.plantproducts.com	50 Hazelton St. Leamington, ON N8H 1B8	Tel: 519-326-9037 Toll-free: 1-800-387-2449 Fax: 519-326-9290 Email: info@plantproducts.com	• pheromone lures and traps • mating disruption devices • rodent and tangle traps • sticky tape and cards • beneficial insects

APPENDIX C: Diagnostic Services

The following labs provide diagnostic services in Ontario. Refer to their websites for information on sample collection and submission.

A & L Canada Laboratories Inc.
2136 Jetstream Rd.
London, ON N5V 3P5
Tel: 519-457-2575
Fax: 519-457-2664
Email: aginfo@alcanada.com
www.alcanada.com

Agriculture and Food Laboratory
Laboratory Services Division
University of Guelph
95 Stone Rd. W.,
Guelph, ON N1H 8J7
Tel: 519-767-6299
Fax: 519-767-6240
Website: www.afl.uoguelph.ca
Email: aflinfo@uoguelph.ca

APPENDIX D: Ontario Ministry of Agriculture, Food and Rural Affairs – Fruit Crop Advisory Staff

Application Technology Specialist	Jason Deveau	Tel: 519-209-1883	jason.deveau@ontario.ca
Crop Protection Specialist	Denise Beaton	Tel: 519-400-3636	denise.beaton@ontario.ca
Entomologist, Horticulture	Hannah Fraser	Tel: 905-708-8014	hannah.fraser@ontario.ca
Fresh Market Quality Specialist	Jennifer R. DeEll	Tel: 519-410-1806	jennifer.deell@ontario.ca
Fruit Crop Specialist (berry)	Erica Pate	Tel: 519-410-0624	erica.pate@ontario.ca
Fruit Crop Specialist (tender fruit, grape)	Kathryn Carter	Tel: 905-687-1280	kathryn.carter@ontario.ca
Horticulture IPM Specialist (pome fruit)	Kristy Grigg-McGuffin	Tel: 519-420-9422	kristy.grigg-mcguffin@ontario.ca
Horticulture IPM Specialist (specialty crops)	Melanie Filotas	Tel: 519-428-4340	melanie.filotas@ontario.ca
Horticulture IPM Specialist (tender fruit, grape)	Wendy McFadden-Smith	Tel: 905-932-8965	wendy.mcfadden-smith@ontario.ca
Horticulture Sustainability Specialist	vacant	—	—
Maple, Tree Nut and Agroforestry Specialist	Jenny Liu	Tel: 519-835-5872	jenny.liu2@ontario.ca
Minor Use Coordinator	Jim Chaput	Tel: 519-546-2482	jim.chaput@ontario.ca
New Crop Development Specialist	Evan Elford	Tel: 519-420-9343	evan.elford@ontario.ca
Pathologist, Horticulture	Katie Goldenhar	Tel: 519-835-5792	katie.goldenhar@ontario.ca
Soil Fertility Specialist, Horticulture	Tejendra Chapagain	Tel: 519-835-5794	tejendra.chapagain@ontario.ca
Soil Management Specialist, Horticulture	Anne Verhallen	Tel: 519-359-6707	anne.verhallen@ontario.ca
Surveillance Coordinator & Data Analyst	Cora Loucks	Tel: 519-546-8245	cora.loucks@ontario.ca
Tree Fruit Specialist	Erika DeBrouwer	Tel: 226-931-4098	erika.debrouwer@ontario.ca
Weed Management Specialist, Horticulture	Kristen Obeid	Tel: 519-965-0107	kristen.obeid@ontario.ca
A complete list of Ontario Ministry of Agriculture, Food and Rural Affairs crop advisory staff is available on the OMAFRA website at ontario.ca/crops.			

Agricultural Information Contact Centre
Provides province-wide, toll-free technical and business information to commercial farms, agri-businesses and rural businesses.
1 Stone Rd. W., Guelph, ON N1G 4Y2
Tel: 1-877-424-1300
Fax: 519-826-3442
Email: ag.info.omafra@ontario.ca

APPENDIX E: The Metric System

Metric Units

Linear Measures (length)

10 millimetres (mm)	=	1 centimetre (cm)
100 centimetres (cm)	=	1 metre (m)
1,000 metres	=	1 kilometre (km)

Square Measures (area)

100 m × 100 m = 10,000 m^2 = 1 hectare (ha)
100 ha = 1 square kilometre (km^2)

Cubic Measures (volume)

DRY MEASURE

1,000 cubic millimetres (mm^3)	=	cubic centimetre (cm^3)
1,000,000 cm^3	=	1 cubic metre (m^3)

LIQUID MEASURE

1,000 millilitres (mL)	=	1 litre (L)
100 L	=	1 hectolitre (hL)

Weight-Volume Equivalents (for water)

(1.00 kg) 1,000 grams	=	1 litre (1.00 L)
(0.5 kg) 500 g	=	500 mL (0.5 L)
(0.1 kg) 100 g	=	100 mL (0.1 L)
(0.01 kg) 10 g	=	10 mL (0.01 L)
(0.001 kg) 1 g	=	1 mL (0.001 L)

Weight Measures

1,000 milligrams (mg)	=	1 gram (g)
1,000 g	=	1 kilogram (kg)
1,000 kg	=	1 tonne (t)
1 mg/kg	=	1 part per million (ppm)

Dry–Liquid Equivalents

1 cm^3	=	1 mL
1 m^3	=	1,000 L

Approximate Metric Conversions

5 mL	=	1 tsp
15 mL	=	1 tbsp
28.5 mL	=	1 Imp. fl. oz.

Application Rate Conversions

Metric to Imperial or U.S. (approximate)

litres per hectare × 0.09	=	Imp. gallons per acre
litres per hectare × 0.11	=	U.S. gallons per acre
litres per hectare × 0.36	=	Imp. quarts per acre
litres per hectare × 0.43	=	U.S. quarts per acre
litres per hectare × 0.71	=	Imp. pints per acre
litres per hectare × 0.86	=	U.S. pints per acre
millilitres per hectare × 0.014	=	U.S. fluid ounces per acre
grams per hectare × 0.014	=	ounces per acre
kilograms per hectare × 0.89	=	pounds per acre
tonnes per hectare × 0.45	=	tons per acre

Imperial or U.S. to Metric (approximate)

Imp. gallons per acre × 11.23	=	litres per hectare (L/ha)
U.S. gallons per acre × 9.35	=	litres per hectare (L/ha)
Imp. quarts per acre × 2.8	=	litres per hectare (L/ha)
U.S. quarts per acre × 2.34	=	litres per hectare (L/ha)
Imp. pints per acre × 1.4	=	litres per hectare (L/ha)
U.S. pints per acre × 1.17	=	litres per hectare (L/ha)
Imp. fluid ounces per acre × 70	=	millilitres per hectare (mL/ha)
U.S. fluid ounces per acre × 73	=	millilitres per hectare (mL/ha)
tons per acre × 2.24	=	tonnes per hectare (t/ha)
pounds per acre × 1.12	=	kilograms per hectare (kg/ha)
pounds per acre × 0.45	=	kilograms per acre (kg/acre)
ounces per acre × 70	=	grams per hectare (g/ha)

Liquid Equivalents

LITRES/HECTARE		APPROXIMATE GALLONS/ACRE	
IMPERIAL GALLONS			U.S. GALLONS
50	=	4.45	5.35
100	=	8.9	10.7
150	=	13.53	16.05
200	=	17.8	21.4
250	=	22.25	26.75
300	=	26.7	32.1

Approximate Dry Weight Equivalents

GRAMS/HECTARE		OUNCES/ACRE
100	=	1 ½
200	=	3
300	=	4 ¼
500	=	7
700	=	10

KILOGRAMS/HECTARE		POUNDS/ACRE
1.10	=	1
1.50	=	1 ¼
2.00	=	1 ¾
2.50	=	2 ¼
3.25	=	3
4.00	=	3 ½
5.00	=	4 ½
6.00	=	5 ¼
7.50	=	6 ¾
9.00	=	8
11.00	=	10
13.00	=	11 ½
15.0	=	13 ½

Handy Metric Conversion Factor

litres per hectare × 0.4 = litres per acre
kilograms per hectare × 0.4 = kilograms per acre

Conversion Table – Metric to Imperial (approximate)

Length

1 millimetre (mm)	=	0.04 inch
1 centimetre (cm)	=	0.4 inch
1 metre (m)	=	39.4 inches
1 metre (m)	=	3.28 feet
1 metre (m)	=	1.09 yards
1 kilometre (km)	=	0.62 mile

Area

1 square centimetre (cm^2)	=	0.16 square inch
1 square metre (m^2)	=	10.77 square feet
1 square metre (m^2)	=	1.2 square yards
1 square kilometre (km^2)	=	0.39 square mile
1 hectare (ha)	=	107,636 square feet
1 hectare (ha)	=	2.5 acres

Volume (dry)

1 cubic centimetre (cm^3)	=	0.061 cubic inch
1 cubic metre (m^3)	=	1.31 cubic yards
1 cubic metre (m^3)	=	35.31 cubic feet
1,000 cubic metres (m^3)	=	0.81 acre-foot
1 hectolitre (hL)	=	2.8 bushels

Volume (liquid)

1 millilitre (mL)	=	0.035 fluid ounce (Imp.)
1 litre (L)	=	1.76 pints (Imp.)
1 litre (L)	=	0.88 quart (Imp.)
1 litre (L)	=	0.22 gallon (Imp.)
1 litre (L)	=	0.26 gallon (U.S.)

Weight

1 gram (g)	=	0.035 ounce
1 kilogram (kg)	=	2.21 pounds
1 tonne (t)	=	1.1 short tons
1 tonne (t)	=	2,205 pounds

Pressure

1 kilopascal (kPa)	=	0.15 pounds/in^2

Speed

1 metre per second	=	3.28 feet per second
1 metre per second	=	2.24 miles per hour
1 kilometre per hour	=	0.62 mile per hour

Temperature

$$°F = (°C \times 9/5) + 32$$

Conversion Tables – Imperial to Metric (approximate)

Length

1 inch	=	2.54 cm
1 foot	=	0.3 m
1 yard	=	0.91 m
1 mile	=	1.61 km

Area

1 square foot	=	0.09 m^2
1 square yard	=	0.84 m^2
1 acre	=	0.4 ha

Volume (dry)

1 cubic yard	=	0.76 m^3
1 bushel	=	36.37 L

Volume (liquid)

1 fluid ounce (Imp.)	=	28.41 mL
1 pint (Imp.)	=	0.57 L
1 gallon (Imp.)	=	4.55 L
1 gallon (U.S.)	=	3.79 L

Weight

1 ounce	=	28.35 g
1 pound	=	453.6 g
1 ton	=	0.91 tonne

Pressure

1 pound per square inch	=	6.90 kPa

Temperature

$$ºC = (ºF - 32) \times 5/9$$

Abbreviations

%	=	percent (by weight)
ai	=	active ingredient
cm	=	centimetre
cm^2	=	square centimetre
e.g.	=	for example
g	=	gram
ha	=	hectare
kg	=	kilogram
km/h	=	kilometres per hour
kPa	=	kilopascal
L	=	litre
m	=	metre
m/s	=	metres per second
m^2	=	square metre
mL	=	millilitre
mm	=	millimetre
t	=	tonne
v/v	=	volume/volume

Emergency and First-Aid Procedures for Pesticide Poisoning

For pesticide poisonings and pesticide injuries, call the Ontario Poison Centre: Toronto 1-800-268-9017

PREVENT ACCIDENTS

- **Read the label.** Follow all the precautions the label recommends. Read the First Aid section of the label BEFORE you begin to handle any pesticide.
- **Make sure that someone knows** what pesticides you are working with and where you are.
- **Keep a file of labels and product Safety Data Sheets (SDS) for the pesticides you use.** Make sure everyone knows where to find this in case of an emergency.
- **Post emergency numbers near all telephones.**
- **Keep clean water, paper towels, extra gloves and clean coveralls close by** in case you spill pesticide on yourself.

If someone has been working with pesticides and you see any possible symptoms of pesticide poisoning or injury, take emergency action immediately.

IF AN ACCIDENT OR POISONING HAPPENS

- protect yourself from injury first.
- Stop the exposure to the pesticide. Move the victim away from the contaminated area.
- Check the four basic facts — identify the pesticide, the quantity, the route of entry and time of exposure.
- Call an ambulance or the Ontario Poison Centre.
- Start first aid. This is not a substitute for professional medical help.
- **Provide the label, SDS sheet, container or a clear photo of the container to emergency personnel** at the scene — or take it with you to the hospital. Do not transport pesticide containers in the passenger compartment of the vehicle.

FIRST AID

If a pesticide comes in contact with skin:

- remove all contaminated clothing; wash skin thoroughly with lots of soap and warm water.
- dry skin well and cover with clean clothing or other clean material.

If pesticide comes in contact with eyes:

- hold eyelids open; wash the eyes with clean running water for 15 minutes or more.

If pesticide was inhaled:

- move the victim to fresh air and loosen tight clothing.
- give artificial respiration if the victim is not breathing.

Do not breathe in the exhaled air from the victim — you could also be poisoned.

If a pesticide was swallowed:

- call the Ontario Poison Centre IMMEDIATELY.

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Published by the Ministry of Agriculture, Food and Rural Affairs

Toronto, Canada

ISSN 2563-0989 (Print)
ISSN 2563-0997 (Online)

04-21

Cette publication est aussi disponible en français.

Agricultural Information Contact Centre

1-877-424-1300
1-855-696-2811 (TTY)
email: ag.info.omafra@ontario.ca
ontario.ca/omafra

For a major spill, a theft or a fire involving a pesticide:

Call the Ontario Ministry of the Environment, Conservation and Parks **Spills Action Centre** at **1-800-268-6060** (24 hr a day, 7 days a week).

Notify your municipality.