2022

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EXTENSION AND ADVISORY TEAM

ORGANIC APPLE MANAGEMENT GUIDE

A guide to insect, mite, and disease management in organic apple orchards in Nova Scotia



Discard old editions of the pesticide spray guide. Each year, the Perennia Tree Fruit Specialist updates the pesticides and information contained in this publication.

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Note: Perennia offers supplemental guides for conventional stone fruit and apple production on our website at www.perennia.ca > Agriculture > Product Information > Fruits > Tree Fruit

Emergency and First Aid Procedure for Pesticide Poisoning

- Become familiar with the chemicals you are using. Keep a list of common and active ingredient names in case of accidents or emergencies. This information can be found on product labels and cross-referenced in this publication.

- If poisoning from exposure to a pesticide by swallowing, inhalation or contact with skin or eyes is suspected, read the product label of the pesticide container and carry out first aid treatment as suggested.

- If a person is seriously injured, call **911** immediately.

- Emergency advice on pesticide poisoning is available 24 hours/day from the IWK Regional Poison Information Centre, Halifax, NS. Phone: 1-800-565-8161 (NS & PEI).

Sources of Information on Pesticides
Information Service of the Pest Management Regulatory Agency
Phone: 1-800-267-6315
Web Site: http://www.hc-sc.gc.ca/cps-spc/pest/index-eng.php

Pest Management Regulatory Agency –Electronic Labels: Search Tool
Web Site: http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php

Ontario Pesticides Classification Database
Web Site: https://www.lrcsde.lrc.gov.on.ca/PCDWeb/showSearch.action

National Pesticide Information Centre
Web Site: http://npic.orst.edu/

Environmental Emergencies – Nova Scotia
Pesticide and Chemical spills
Phone: 1-800-565-1633

Organic Agriculture Centre of Canada
Web Site: http://www.organicagcentre.ca/

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1. Pesticide Handling and Application

Registration of Pesticides

A pesticide that is used in Nova Scotia must be registered by the Pest Management Regulatory Agency (PMRA) of Health Canada, and be approved for use in the province of Nova Scotia. All registered pesticides may be re-evaluated and are subject to discontinuation if they do not meet current standards. The pesticide product label is a legal document, and all label directions must be followed.

- To search for product labels, visit the Health Canada website: http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php
- To download the smartphone application, search for the app "Pesticide Labels" by Health Canada.

Applicator Pesticide Certification

Applicators must hold a valid applicator certificate of qualification to apply a commercial class pesticide in Nova Scotia. The regional offices for Nova Scotia Environment offer certificates, approvals, exams and exam study materials.

- Central Region: Halifax and Hants Counties, (902) 424-7773
- Western Region: Kings, Annapolis, Digby, Yarmouth, Shelburne, Queens and Lunenburg, (902) 679-6086

Environmental Stewardship

Environmental stewardship and food safety programs are important components of best management practice for fruit production. Guidelines and fact sheets have been developed under the Nova Scotia Environmental Farm Program for the best means to store, handle, and apply pesticides. Factsheets on the NS Federation website (http://www.nsfa-fane.ca/efp/resources/factsheets/) include:

- On-farm Pesticide Use
- Pesticide Storage and Handling
- Air-Blast Sprayer Calibration for Orchard and Vineyards
- Tree-Row Volume: Concept, Calculations and Application

Food Safety

The CHC CanadaGap on-farm food safety manual provides procedures and guidelines with regard to the safe handling, storage and record keeping for tree fruit pesticides and fertilizers: http://www.canadagap.ca/manuals/downloads/

Buffer Zones

Most pesticide labels have a required distance between site of spray application and a buffer zone. A buffer zone is the distance between the point of direct pesticide application and the nearest downwind boundary of a sensitive habitat. A buffer zone is a no-spray area because the sensitive habitat contains organisms that are affected by the pesticide being applied. A sensitive area may be aquatic, terrestrial (shelterbelts and woodlots) or a combination (wetlands, marshes etc). It is the applicator's responsibility to identify the sensitive areas within and adjacent to treated fields.

Pesticide Formulation Abbreviations

DF	dry flowable	SG	soluble granules
DP	dispersible powder	SN	solution
DU	dust	SP	soluble powder
EC	emulsifiable concentrate	SU	suspension
F or FLO	flowable solution	SURF	surfactant
GR or G	granular	W or WP	wettable powder
OD	oil dispersible	WSP	water soluble pouch
SC	spray concentrate	WDG or DG	water dispersible granules

Warning

Please note that we make no warranty or guarantee of any kind, expressed or implied, concerning the use of products listed in this publication. The user assumes all risks, whether recommendations are followed or not. This publication is intended as a guide only.

For specific product information always refer to and follow directions on the label.

2. Pest Problem Codes

The following codes can be used on the spray record sheet when recording your monitoring and spray activities. These codes are the same as those used in the Orchard Outlook newsletter. We encourage you to use these codes, as they may make record-keeping easier.

Insects	
Apple Brown Bug	ABB
Apple Grain Aphid	AGA
Apple Leaf-Curling Midge	ALM
Apple Maggot	AM
Codling Moth	CM
Xyleborus spp. borer	EFTB
European Fruit Scale	EFS
European Apple Sawfly	EAS
Eyespotted Bud Moth	ESBM
Fruittree Leafroller	FTR
Green Apple Aphid	GAA
Green Pug Moth	GPM
Leafrollers	LR
Lecanium Scale	LS
Mullein Bug	MB
Oystershell Scale	OS
Obliquebanded Leafroller	OBL
Pale Apple Leafroller	PAL
Pear Psylla	PP
Plum Curculio	PC
Rosy Apple Aphid	RAA
San Jose Scale	SJS
Speckled Green Fruitworm	SGFW
Stinging Mirids (ABB & MB)	SM

Insects	
Tarnished Plant Bug	TPB
Tent Caterpillar	TC
White Apple Leafhopper	WALH
Winter Moth	WM
Mites	
Apple Rust Mite	ARM
European Red Mite	ERM
Lemon Yellow Mite	LYM
Pear Leaf Blister Mite	PLBM
Pear Rust Mite	PRM
Two-spotted Spider Mite	TSSM
Typhlodromus pyri	TYPH
Diseases	
Apple Scab	AS
Bitter Pit	BP
Blossom End Rot	BER
European Canker	EC
Fire Blight	FB
Fly Speck	FS
Gleosporium Canker	GC
Powdery Mildew	PM
Sooty Blotch	SB

4. Pesticides Listed in this Schedule

This listing includes all the registered products (excluding herbicides) detailed in the Organic Apple Management Guide. Products are listed according to primary insects and diseases in Nova Scotia. Secondary diseases and pests may be present on some labels. Consult product labels for additional information.

Active Ingredient	Product	Chemical Family	Group	Relative Toxicitiy Ratings			Preharvest Interval (days)	Re-Entry Interval (minimum)	Diseases/Insects Controlled
				Acute (1=Low 4=High)	Bee (1=Low 3=High)	Typhs (1=Low 4=High)			
FUNGICIDES									
Garlic powder	Buran	Biopesticide	NC	1	1	1	0	12 h	Apple scab, powdery mildew (suppression)
hydrogen peroxide + peroxyacetic acid	OxiDate	Inorganic	NC	2	1	-	4 h	0	Fire blight - blossom blight suppression, scab suppression, powdery mildew suppression
Reynoutria sachalinensis	Regalia Maxx	Biopesticide	P5	1	1	1	0	12 h	Powdery mildew, sooty blotch/fly speck, bitter rot (suppression)
Bacillus subtilis	Serenade OPTI	Biopesticide	BM02	1	1	1	0	12 h	Fire blight (suppression), apple scab (suppression), powdery mildew (suppression)
bacillus amyloliquefaciens D747	Double Nickel LC	Live Organism	BM02	-	-	-	0	when dry	Fire blight (suppression)
Pseudomonas syringae	Bio-Save	Biopesticide	BM	1	N/A	N/A	N/A	N/A	Postharvest moulds (suppression)
Aureobasidium pullulans	Blossom Protect	Biopesticide	BM	1	1	1	0	12 h	Fire blight – blossom blight
sulphur	Kumulus	Inorganic	M	1	1	3	1	24 h	Apple scab, powdery mildew
sulphur	Microscopic Sulphur	Inorganic	M	2	1	3	1	24 h	Apple scab, powdery mildew
sulphur	Microthiol Disperss	Inorganic	M	2	1	3	1	24 h	Apple scab, powdery mildew
Calcium polysulphide	Lime Sulphur	Inorganic	M	4	1	3	2	48 h	Apple scab, powdery mildew
copper octanoate	Cueva	Inorganic	M1	1	1	2	1	4 h	Apple scab, fire blight
copper oxychloride	Copper Spray Fungicide	Inorganic	M	3	1	2	2	48 h	Fire blight – overwintering bacteria
sulphur	Cosavet DF Edge	Inorganic	M	1	1	3	1	24 h	Powdery mildew, rust mites
INSECTICIDES/MITICIDES									
petroleum oil	Superior Oil	Mineral oil	NC	4	1	3	0	12 h	European red mite, scale
mineral oil	Purespray Green	Mineral oil	NC	1	1	3	0	12 h	European red mite, scale
Canola oil	Vegol Crop Oil	Plant oil	NC	1	1	2	0	12 h	Aphids, scales, mites, powdery mildew
K salts of fatty acids	Opal	Inorganic	NC	1	1	4	0	12 h	Aphids, mites
Kaolin clay	Surround	Inorganic	NC	1	1	3	0	12 h	Tarnished plant bug, leafrollers, apple maggot, codling moth, European apple sawfly (suppression)
C. pomonella Granulovirus	Virosoft CP4	Biopesticide	NC	1	1	1	0	12 h	Codling moth
C. pomonella Granulovirus	CYD-X	Biopesticide	NC	1	1	1	0	12 h	Codling moth

Active Ingredient	Product	Chemical Family	Group	Relative Toxicitiy Ratings			Preharvest Interval (days)	Re-Entry Interval (minimum)	Diseases/Insects Controlled
				Acute (1=Low 4=High)	Bee (1=Low 3=High)	Typhs (1=Low 4=High)			
potassium salt of fatty acids	Kopa	Insecticidal soap	NC	-	-	-	12h	12 h	Two-spotted spider mite
Pheromone	Isomate-CM/OFM TT	Pheromone	NC	1	1	1	-	-	Codling moth
spinosad	Entrust	Spinosyns	5	1	3	2	7	12 h	Leafrollers
spinosad	GF-120 Fruit Fly Bait	Spinosyns	5	1	3	2	0	12 h	Apple maggot (suppression)
bacillus thuringienis	XenTari WG	Bt Microbial	11	1	1	1	0	12 h	Winter moth, leafrollers
bacillus thuringienis	Dipel 2XDF	Bt Microbial	11	1	1	1	0	12 h	Winter moth, leafrollers
bacillus thuringienis	Bioprotec PLUS	Bt Microbial	11	1	1	1	0	12 h	Winter moth, leafrollers

4. Overview of Apple Pest Management

Stage	Problem	Management Options			
		Monitoring	Physical Control	Chemical Control	Other
April	Xyleborus spp. borer	x			
	European Red Mite	x			
	Fire Blight Cankers	x	x	x	
May	Canker		x		
	Xyleborus spp. borer			x	
Green Tip	Apple Scab			x	
	European Red Mite	x	x		
15 mm Green to Tight Cluster	Apple Scab			x	
	Powdery Mildew	x		x	
	European Red Mite	x	x		
	Spotted Tentiform Leafminer	x			
	Winter Moth	x			
Bud Separation	Apple Scab			x	
	Powdery Mildew	x		x	
	Fruitworm			x	
	Winter Moth			x	
Pink	Apple Scab			x	
	Powdery Mildew	x		x	
	European Red Mite	x		x	
	Rosy Apple Aphid	x		x	
	Oblique Banded and Three	x		x	
	Lined Leafroller	x		x	
	Tarnished Plant Bug				
Bloom	Apple Sawfly		x		
	Pollination				x
	Wild Apple Tree		x		
	Fire Blight	x		x	
Calyx	Apple Scab	x		x	
	Powdery Mildew	x		x	
	European Red Mite	x		x	
	Apple Sawfly	x		x	
	Twospotted Spider Mite	x		x	
	Pale Apple, Oblique-banded	x		x	
	Three Lined Leafroller	x		x	
	Rosy Apple Aphid	x		x	
	Stinging Bugs	x		x	
	Tarnished Plant Bug	x		x	
	White Apple Leafhopper	x		x	
	Winter Moth	x		x	
	Fruitworm	x		x	

		Monitoring	Physical Control	Chemical Control	Other
First Cover	Apple Scab	x		x	
	Powdery Mildew	x		x	
	Codling Moth	x			
	European Red Mite	x		x	
	Apple Rust Mite	x		x	
	Twospotted Spider Mite	x		x	
Second Cover	Apple Scab	x		x	
	Powdery Mildew	x		x	
	Fire Blight	x	x		
	Codling Moth	x		x	
Third Cover	Apple Scab	x		x	
	Powdery Mildew	x		x	
	Fire Blight	x	x		
	Apple Maggot	x	x	x	
	Codling Moth	x		x	
	European Red Mite	x		x	
	Twospotted Spider Mite	x		x	
	Apple Rust Mite	x		x	
	Spotted Tentiform Leafminer	x		x	
Fourth Cover	Apple Scab	x		x	
	Apple Maggot	x	x	x	
	European Red Mite	x		x	
	Two-spotted Spider Mite	x		x	
	Apple Rust Mite	x		x	
	Codling Moth	x		x	
	Eyespotted Bud Moth			x	
	White Apple Leafhopper	x		x	
Early August	Soil & Leaf Analysis	x			
Late August	Storage Rots			x	
Pre Harvest	Fruit Injury	x			
Post Harvest	Storage Rots			x	
	Mice	x	x	x	

5. Apple Bud Growth Stages

1. SILVER TIP

2. GREEN TIP

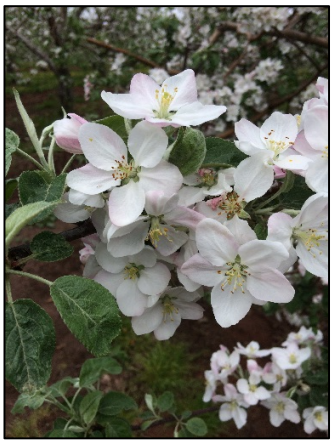
3. HALF-INCH GREEN

4. TIGHT CLUSTER

5. BUD SEPARATION

6. FULL PINK

7. FIRST BLOOM



8. FULL BLOOM

9. POST BLOOM-CALYX

8. Organic Apple Orchard Calendar

A guide to insect, mite, and disease management in organic apple orchards.

Please note: Red text is new to this guide in 2022

All rates are per hectare of mature ("standard") trees or full dilute volume of about 3,370 litres of water/ha. To adjust for smaller trees and higher density plantings, refer to Crop Adapted Spraying at http://sprayers101.com/.
Always read the label before using any pesticide. Where differences between the label and this guide occur, label information prevails.
These products may not be accepted by all certifying bodies. Organic growers must check with their certifying bodies prior to using any of the products listed below. This guide only lists products registered on apple orchards. For use on other tree fruit crops, refer to the product label to confirm crop registration and specific application information.
Solupacks- Many pesticides have been packed into solupacks, be aware that these may not dissolve properly in the presence of oil, boron or chlorine in the spray tank.

Disease & Insect		Products	Group	Formulation	Rate	Notes
DORMANT TO BUD SWELL						
Scale		May cause bark injury on Red Delicious, Empire, Mutsu/Crispin and Ambrosia. Apply in a high-volume spray to ensure thorough coverage of trunk and limbs. Do not apply within 48 hours of freezing temperatures, when temperatures are high (above 30ºC), prior to rain and to heat- or moisture-stressed trees.Do not use within 14 days of Supra Captan, Maestro or Folpan.				
	►	Purespray Green Spray Oil	NC	13 E	20 L/1,000 L	Do not use within 14 days of Ambush, Perm-Up, Pounce or sulphur.
	►	Superior Oil	NC	70 EC	20 L/1,000 L	Do not use within 30 days of sulphur.
	►	Vegol Crop Oil	NC	96 EC	20 L/1,000 L	Do not use within 14 days of copper and 30 days of sulphur. Do not apply to wet foliage.
Fire blight		Contact fungicide only, does not have activity on the fire blight pathogen within the plant tissue.				
	►	Copper Spray	M	50 WP	3.2 kg/ha	Apply when overwintering cankers begin to ooze as tree breaks dormancy. Apply up to 1/4-inch green. Phytotoxicity may occur with some copper formulations if applied at a later growth stage. Read label for more information. Thorough coverage of limbs and trunk is essential for good control. This spray does not eliminate the need for blossom blight management.
GREEN TIP						
Apple Scab		Use one of the following listed fungicides. Apply fungicides on preventative schedule and keep new tissue covered. Check compatibility with oil.				
	►	Microscopic Sulphur	M	92 WP	6.5 kg/1,000 L	Do not apply within 30 days of an oil treatment. Do not apply if high temperatures (>26º C) and humidity prevail or are expected during the three days following application. Do not use on Delicious. Usage may result in elevated populations of European red mite and scale.
	►	Kumulus	M	80 DF	7.5 kg/1,000 L	
	►	Microthiol Disperss	M	80 WP	4.0-5.0 kg/1,000 L	
	►	Lime Sulphur	M	30 SU	9.2 L/1,000 L	Do not spray when foliage is wet. Thorough coverage is essential. May cause leaf damage, particularly when applied at calyx or early summer. Also labelled for scale/mite control. Is the only organic product with some post-infection control of apple scab.
	►	Cueva	M1	1.8 S	0.5-2.0% solution	Do not exceed 1.0% solution on russet-sensitive varieties. Apply at 5-10 day intervals. Do not make more than 10 applications per year.
	►	Buran (suppression)	NC	15 S	18 L/1,000 L	This product does not have protectant activity. It should only be used as a post-infection treatment, applied after rainfall or when conditions are conducive to disease development. The treatment should be conducted before 350 degree hours (base 0°C) after the beginning of the infection. Begin applications at the first sign of disease. Subsequent applications may be made every 7-10 days if conditions remain conducive to disease development. Do not apply if rain is expected to fall within 48 hours.
	►	Serenade OPTI (suppression)	BM02	WP	1.7-3.3 kg/ha	Begin application at green tip or when environmental conditions become favorable for primary scab development, and repeat on 7-10 day intervals. When conditions are conducive to heavy disease pressure, use Serenade Opti in a rotational program with other registered fungicides.
	►	OxiDate 2.0	NC		1.0% v/v	Partial suppression only. Use sufficient spray mix to wet thoroughly. Do not spray during conditions of intense heat, drought, or poor plant vigour. Avoid application before rain or when winds are gusty. Works best using a solution with a neutral pH. Do not apply when bees and beneficial insects are active.
Fire Blight		Copper application at silver tip to green tip can be effective in reducing the overwintering bacterial population and is a useful component of an overall fire blight management strategy.				
	►	Copper Spray Fungicide	M	50 WP	3.2 kg/ha	Compatible with oil. Will also provide apple scab control but contact activity only. Do not make more than two applications per year. Use of copper after green tip may increase the risk of fruit russetting.
European Red Mite		Assess winter eggs on twigs and bark. For more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit.				

Disease & Insect		Products	Group	Formulation	Rate	Notes
	►	Superior Oil	NC	70 EC	20 L/1,000 L	
	►	Purespray Green Spray Oil (suppression)	NC	13 E	20 L/1,000 L	Best results are obtained when applied with a high volume of water 1,500 to 3,370 L/ha. Do not apply oil during or just prior to expected freezing temperatures or immediately following a frost. Check compatibility with fungicide. May cause bark injury on Red Delicious, Empire, and Ambrosia.
	►	Vegol Crop Oil	NC	96 EC	20 L/1,000 L	
	►	Kopa	NC		2% v/v in 700-1,900 L/ha water	Begin applications when populations are low and reapply every 1-3 weeks as needed. Test a small areas of each variety prior to spraying the whole block. Product coats the bodies of susceptible insects, so good coverage of plant parts is vital. Application of soaps more than 3 times in one season may cause plant injury. Avoid application in direct sunlight or to plants under stress. Application within 3 days of sulphur may increase plant injury on sensitive plants.
HALF-INCH GREEN						
Apple Scab		Use one of the fungicides as listed under Green Tip. Check fungicide compatibility with oil treatments for mites.				
Powdery Mildew		If mildew pressure was high during the previous growing season select an appropriate fungicide listed below. In most cases mildew treatment should begin around the tight cluster stage of bud development. Under extreme mildew pressure treatments can begin earlier.				
	►	Microscopic Sulphur	M	92 WP	6.5 kg/1,000 L	
	►	Kumulus	M	80 DF	7.5 kg/1,000 L	Do not apply within 30 days of an oil treatment. Do not apply if high temperatures (>26º C) and humidity prevail or are expected during the three days following application. Do not use on Delicious. Usage may result in elevated populations of European red mite and scale.
	►	Microthiol Disperss	M	80 WP	7.5 kg/1,000 L	
	►	Cosavet DF Edge	M	80 DF	7.5 kg/1,000 L	
	►	Buran (suppression)	NC	15 S	9 L/ha	Begin applications at the first sign of disease. Subsequent applications may be made every 7-10 days if conditions remain conducive to disease development. Do not apply if rain is expected to fall within 48 hours.
	►	Regalia Maxx (suppression)	P5	20 S	0.125% v/v in1,000 L	Repeat applications at 7-10 day intervals depending upon crop growth and disease pressure. When environmental conditions and plant stage are conducive to rapid disease development, use Regalia Maxx in a rotational program with other registered fungicides. May also suppress sooty blotch/flyspeck, and bitter rot.
	►	Serenade OPTI (suppression)	BM02	WP	1.7-3.3 kg/ha	Begin application at tight cluster, or sooner, if conditions are conducive to disease development. Repeat applications on a 7-10 day interval. Additional sprays beyond second cover may be needed on susceptible varieties or under heavy disease pressure. When conditions are conducive to heavy disease pressure, use Serenade Opti in a rotational program with other registered fungicides.
	►	OxiDate 2.0	NC		1.0% v/v	Suppression only. For increased coverage, use a compatible wetting agent/surfactant. Do not spray during conditions of intense heat, drought, or poor plant vigour. Avoid application before rain or when bees and beneficial insects are active.
	►	Purespray Green Spray Oil (suppression)	NC	13 E	10 L/1,000 L	Apply at tight cluster and continue every 10-14 days. Avoid application during bloom. Use the shorter spray interval when disease conditions are severe. Do not use within 30 days of a sulphur application.
	►	Vegol Crop Oil	NC	96 EC	2% v/v	
Winter Moth		Assess larvae at this stage. For more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit.				
Spotted Tentiform Leafminer		Assess adult activity at this time and for more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit.				
European Red Mite		Treatments listed under Green Tip may be used.				
BUD SEPARATION						
Apple Scab		Use one of the fungicides as listed under Green Tip. Check fungicide compatibility with oil treatments for mites.				
Powdery Mildew		Use one of the fungicides listed for Half-Inch Green. Check fungicide compatibility with oil treatments for mites.				
Winter Moth Green Pug Moth		Green pug moth seldom needs treatment. Contact an IPM advisor for advice on control of this pest. Application timing is late tight cluster to pink.				
	►	Entrust	5	240 SC	364 mL/ha	Do not make more than 3 applications per year.

Disease & Insect		Products	Group	Formulation	Rate	Notes
	►	Dipel	11	2X DF	1.13-1.68 kg/ha	More effective on early instar caterpillars. Best results are obtained if applications are made in the evening or on a cloudy day.
	►	XenTari	11	WG	0.5-1.6 kg/ha	
	►	Bioprotec PLUS	11	SU	0.44 L/ha	
Codling moth	►	Isomate-CM/OFM TT	NC		500 dispensers/ha	Reduces mating of codling moth and oriental fruit moth. Place pheromone traps for monitoring codling moth in orchard by bloom. Apply dispensers no later than petal fall, before first flight. Dispensers last up to 150 days for codling moth. Most orchards will require insecticides.
Speckled Green Fruitworm		For more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit. Treatments for winter moth and/or green pug moth would also control speckled green fruit worm.				
Rosy Apple Aphid		Refer to Best Management Practices for NS Apple Production for larval assessment. For more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit.				
PINK						
Apple Scab		Use one of the fungicides as listed under Green Tip. Check fungicide compatibility with oil treatments for mites.				
Powdery Mildew		Use one of the fungicides listed for Half-Inch Green. Check fungicide compatibility with oil treatments for mites.				
Rosy Apple Aphid		For more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit. If thresholds warrant, treat using an insecticide listed below.				
	►	Opal	NC	47 S	20 L/1,000 L	Combining this product with sulfur or applying this product within 3 days of sulfur application may increase the plant damage caused by sulfur on sensitive plants. Do not tank mix Opal Insecticidal Soap with sulfur when temperatures are higher than 32°C.
	►	Purespray Green Spray Oil (suppression)	NC	13 E	10 L/1,000 L	Do not use within 30 days of a sulphur application.
	►	Vegol Crop Oil	NC	96 EC	2% v/v	
	►	Kopa	NC		2% v/v in 700-1,900 L/ha water	
Tarnished Plant Bug		Assess need for treatment based on orchard history and monitoring. Treatments for tarnished plant bug pre-bloom will not affect populations of other stinging bugs such as apple brown bug or mullein bug which are not present until petal fall/calyx.				
	►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Start application before infestation begins and continue at 7-14 day intervals. Lengthening re-spray interval past 14 days is not recommended. Efficacy depends on complete coverage of leaves and fruit.
Obliquebanded Leafroller		Assess at this time. Refer to Pest Management Fact Sheet # 16. If treatment is required to control a high overwintering population of oblique-banded leafroller then select one of the following pesticides.				
	►	Entrust	5	240 SC	364 mL/ha	Do not make more than 3 applications per year.
	►	Dipel	11	2X DF	1.13-1.68 kg/ha	More effective on early instar caterpillars. Best results are obtained if applications are made in the evening or on a cloudy day.
	►	XenTari	11	WG	0.5-1.6 kg/ha	
	►	Bioprotec PLUS	11	SU	1.8-2.5 L/ha	
	►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Apply first 2 sprays 7 days apart starting just prior to green tip stage of host development or at initial emergence of leafroller larvae, as determined by monitoring. Make initial application before larvae roll up into leaves. For subsequent generations apply at 7-14 day intervals as larvae emerge. Efficacy depends on complete coverage of leaves and fruit.
European Apple Sawfly		Assess need for pre-bloom treatment based on orchard history of damage.				
	►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Apply at first detection. Continue applications every 7 days to keep fruit completely covered during egg laying period. Efficacy depends on complete coverage of leaves and fruit.
BLOOM						
Apple Scab		Use one of the fungicides listed under Green Tip.				
Insects		**DO NOT USE INSECTICIDES DURING BLOOM.**				
Mites		**DO NOT USE MITICIDES DURING BLOOM.**				

Disease & Insect		Products	Group	Formulation	Rate	Notes
Pollination		Place bee hives (2-3 per hectare) in orchards at 10% bloom.				
Wild Apple Trees		Flag during bloom for removal to eliminate unmanaged hosts for diseases and pests (e.g. apple maggot).				
Fire Blight		Use Maryblyt™ or other prediction models to determine the risk of fire blight infections during the bloom period. See below for product choices when risk is high.				
Fire Blight	►	Cueva	M1	1.8 S	0.5-2.0% solution	Do not exceed 1.0% solution on russet-sensitive varieties. Apply at 5-10 day intervals. Do not make more than 10 applications per year.
	►	Blossom Protect	BM	WG	1 package/1,000 L	Rate is based upon 2 m of canopy height. Apply up to 5 times 1-2 days ahead of Maryblyt™-forecasted risk of blossom blight infection. Apply with 1000 L/ha of water.
	►	Double Nickel	BM02	LC	5.0-7.5 L/ha	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	BM02	WP	1.1-1.7 kg/ha	Suppression only. Apply at 1-5% bloom and reapply every 3-7 days if conditions favour disease development. Under high pressure, follow with Streptomycin 2-3 days later.
	►	OxiDate 2.0	NC		1.0% v/v	Partial suppression only. For increased coverage, use a compatible non-ionic wetting agent/surfactant. Do not apply during conditions of intense heat, drought, or poor plant vigour. Avoid application before rain or when winds are gusty. Do not apply when bees or beneficial insects are active.
PETAL FALL/CALYX						
Apple Scab		Use one of the fungicides listed under Green Tip.				
Powdery Mildew		Use one of the fungicides listed for Half-Inch Green.				
Winter Moth Fruitworms		Assess and for more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit. Use one of the treatments listed under Bud Separation.				
Apple Leafrollers		Assess at this time for Pale apple, Obliquebanded, Fruittree or Threelined leafroller.				
	►	Entrust	5	240 SC	364 mL/ha	Do not make more than 3 applications per year.
	►	Dipel	11	2X DF	1.13-1.68 kg/ha	More effective on early instar caterpillars. Best results are obtained if applications are made in the evening or on a cloudy day.
	►	Bioprotec PLUS	11	SU	1.8-2.5 L/ha	More effective on early instar caterpillars. Best results are obtained if applications are made in the evening or on a cloudy day.
	►	XenTari	11	WG	0.5-1.6 kg/ha	More effective on early instar caterpillars. Best results are obtained if applications are made in the evening or on a cloudy day.
	►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Apply first 2 sprays 7 days apart starting just prior to green tip stage of host development or at initial emergence of leafroller larvae, as determined by monitoring. Make initial application before larvae roll up into leaves. For subsequent generations apply at 7-14 day intervals as larvae emerge. Efficacy depends on complete coverage of leaves and fruit.
Mites		Assess active mites and mite eggs on leaves. Treat only when thresholds are reached.				
	►	Purespray Green Spray Oil (suppression)	NC	13 E	10 L/1,000 L	Suppression of European Red Mite only. Begin applications when mites first appear. Apply every 10-14 days depending upon the level of pest pressure. Post harvesting sprays may be made to reduce over-wintering pressure. Do not exceed more than 10 L oil per ha per application for summer treatments. Do not use within 30 days of a sulphur application.
	►	Vegol Crop Oil	NC	96 EC	2% v/v	
	►	Kopa	NC		2% v/v in 700-1,900 L/ha water	
Rosy Apple Aphid		Assess at this time. For more information visit www.perennia.ca > Agriculture > Commodity Information > Fruits > Tree Fruit. If treatment is needed, use of the products listed under Pink.				
Stinging Bugs		Assess as close to petal fall as possible.				
	►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Start application before infestation begins and continue at 7-14 day intervals. Lengthening re-spray interval past 14 days is not recommended. Efficacy depends on complete coverage of leaves and fruit.
European Apple Sawfly		Treat as a special spray where there has been a history of damage. Apply as soon as petals have fallen. Use of the insecticides listed under Pink.				
FIRST COVER						

Disease & Insect	Products	Group	Formulation	Rate	Notes
Apple Scab	Use one of the fungicides listed under Green Tip.				
Powdery Mildew	Use one of the fungicides listed for Half-Inch Green.				
Codling Moth	Hang pheromone traps at this time (1 trap per 2 hectares). Approximate date June 10.				
Mites	Assess mites and mite eggs on leaves. Treat only when thresholds are reached. Use one of the miticides listed under Petal Fall/Calyx.				
SECOND COVER					
Apple Scab	Use one of the fungicides listed under Green Tip.				
Codling Moth	Monitor trap captures and if captures warrant, use one of the recommended treatments listed below.				
►	Virosoft	NC	CP4	250 mL/ha	Virus particles must be ingested by larvae to be effective. Applications should be timed so that early-instar larvae on the surface of the leaf or fruit come in contact with the virus before entering the fruit. Apply just prior to egg hatch and repeat application in 10-14 days. Best results are obtained when applied late afternoon or during cloudy days.
►	CYD-X	NC		250 mL/ha	
►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Apply at first detection. Continue applications every 7 days to keep fruit completely covered during egg laying period. Efficacy depends on complete coverage of leaves and fruit.
THIRD COVER					
Apple Scab	Use one of the fungicides listed under Green Tip. Depending on primary scab season length and freedom from primary infections, reduced rates of fungicides may be used. Inspect orchards for primary scab and refer to label instructions before reducing rates of fungicides.				
Apple Maggot	Hang traps in early July. Monitoring traps will determine when first maggot flies appear and when control is needed. It is recommended that yellow cards be replaced after 30 days of field exposure.				
►	GF-120 Fruit Fly Bait (suppression)	5	S	1.5 L/6 L water/ha	Begin applications as soon as monitoring traps indicate flies are present in the orchard and continue coverage until flights stop. Repeat applications every 7 days, reapplying sooner if rain washes off the deposit. Do not apply more than 10 applications per season.
►	Surround (suppression)	NC	95 WP	25-50 kg/ha	Apply 2 sprays 7 days apart before expected oviposition or at first detection of infestation. Continue applications every 7-14 days to keep fruit completely covered during egg laying period. Efficacy depends on complete coverage of leaves and fruit.
Mites	Assess mites and mite eggs on leaves. Treat only when thresholds are reached. Use one of the miticides listed under Petal Fall/Calyx.				
Obliquebanded Leafroller	Assess larval population. If treatment is required, use one of the leafroller products listed under Petal Fall/Calyx.				
Codling Moth	Monitor trap captures and if captures warrant, use one of the recommended treatments listed under Second Cover.				
FOURTH COVER					
Apple Scab	Use one of the fungicides listed under Green Tip. Depending on primary scab season length and freedom from primary infections, reduced rates of fungicides may be used. Inspect orchards for primary scab and refer to label instructions before reducing rates of fungicides.				
Apple Maggot	Use one of the insecticides listed under Third Cover.				
Mites	Assess mites and mite eggs on leaves. Treat only when thresholds are reached. Use one of the miticides listed under Petal Fall/Calyx.				
AUGUST to NOVEMBER					
Leaf Tissue Analysis	Collect tissue samples for nutrient analysis the first week of August or when terminal growth has completed for the season.				
Storage Rots	Postharvest dip applications – for control of blue and gray mould.				
►	Bio-Save (suppression)	BM	WP	500 g/300 L	Apply as a postharvest dip or drench application. Agitate the mixture to ensure proper suspension. Treat fruit for at least one minute. Recycled dip/drench suspensions will need to be recharged at intervals dependent on individual use conditions. Non-recovery Spray: Agitate the mixture to ensure proper suspension. Apply to freshly cleaned fruit prior to waxing. Apply over soft, clean brushes or donut rolls.
Mice/Voles	Clean up drop apples and keep orchard floor clean and mowed. Place tree guards on young trees and encourage predator populations.				