

2017 SUPPLEMENT

Guide to Fruit Production

Publication 360S – November 2016

This supplement is an update to OMAFRA Publication 360, *Guide to Fruit Production 2016–2017*, published in Spring 2016. The following information includes new product registrations and changes from December 2015 to November 2016. For complete information, please

refer to the full edition of Publication 360. This supplement can be downloaded from the OMAFRA website at ontario.ca/crops. Refer to this website for updates throughout the year. Printed copies are available from OMAFRA Resource Centres or ServiceOntario Publications.

CONTENTS

New Products	2	Chapter 4: Specialty Bushberries	16
Label Expansions and New Uses	3	Chapter 5: Grape Calendar	17
Spotted Wing Drosophila Emergency Use Registrations Update	3	Chapter 6: Sweet Cherry Calendar	18
Product Deregistration or Removal	4	Chapter 6: Tart Cherry Calendar	18
Important Notice for Products Used on Nectarines	4	Chapter 6: Pear Calendar	18
Product Changes and Corrections	5	Chapter 7: Walnut Calendar	20
Additions and New Uses for 2017	7	Chapter 7: Pecan and Sweet Chestnut Calendar	20
Chapter 3: Apple Calendar	7	Chapter 7: Filbert/Hazelnut Calendar	20
Chapter 4: Blueberry Calendar	9	Important Notice Regarding Re-Evaluation of Carbaryl for the Use of Apple Thinning	21
Chapter 4: Currant and Gooseberry Calendar	10	Promalin to Reduce Russetting in Apples	21
Chapter 4: Summer-fruiting Raspberry and Blackberry Calendar	11	Promalin for Modifying Tree Growth	22
Chapter 4: Fall-bearing Raspberry Calendar	11	Promalin to Improve Fruit Shape in Apples	23
Chapter 4: Saskatoon Berry Calendar	12		
Chapter 4: Non-bearing Strawberry Calendar	13		
Chapter 4: June-bearing Strawberry Calendar	14		
Chapter 4: Day-neutral Strawberry Calendar	15		

NEW PRODUCTS

New Products	Registrant	Registration number	Crops	Pests controlled (unless suppression is indicated)	Relative acute toxicity (p. 310)	Bee toxicity (Table 11-2, p. 312-313)
Intuity (mandestrobin 43.4%)	Valent Canada, Inc.	32288	strawberry	botrytis grey mould	No poison symbol on label; lower acute toxicity	Relatively non-toxic
			grape	botrytis bunch rot powdery mildew (suppression)		
Semios CM plus (pheromone)	SemiosBIO Technologies Inc.	32047	apple pear	codling moth	No poison symbol on label; lower acute toxicity	Relatively non-toxic
Sivanto Prime (flupyradifurone 200 g/L)	Bayer CropScience Inc.	31452	apple	aphids (except woolly apple aphid) leafhoppers San Jose scale oystershell scale	No poison symbol on label; lower acute toxicity	Moderately toxic
			pear	San Jose scale oystershell scale pear pynlla (suppression)		
			blueberry	aphids blueberry maggot		
			currant and gooseberry saskatoon berry specialty bushberry (various) strawberry	aphids		
			grape	leafhoppers		
			walnut pecan and sweet chestnut filbert/hazelnut	aphids		
Torrent 400 SC (cyazofamid 34.5%)	ISK Biosciences Corporation Distributed by Engage Agro	30392	grape	downy mildew	No poison symbol on label; lower acute toxicity	Relatively non-toxic
			raspberry blackberry	phytophthora root rot		

LABEL EXPANSIONS AND NEW USES

Product	Crop	Pest Controlled (unless suppression is indicated)
Buran	apple	powdery mildew (suppression)
Copper Spray	pear	fire blight
Delegate	apple	European apple sawfly
Fontelis	strawberry	powdery mildew
Inspire Super	blueberry	monilinia blight, mummy berry, alternaria, anthracnose, botrytis, rust (suppression)
Intrepid	grape	climbing cutworm
Kasumin 2L	blackberry, raspberry, saskatoon berry	fire blight
	cherry (sweet, tart)	bacterial canker (suppression)
Luna Tranquility	pear	scab, powdery mildew
	strawberry	powdery mildew, botrytis grey mould, common leaf spot
	blueberry	botrytis fruit rot
	currant, gooseberry	powdery mildew, botrytis grey mould
Movento 240 SC	blackberry, raspberry	aphids
Oberon Flowable	specialty bushberry (lingonberry)	two-spotted spider mite
Phostrol	blueberry, currants, gooseberry, specialty bushberry (various)	septoria leaf spot, phytophthora root rot (suppression)
Senator 50 SC	apple	scab, powdery mildew
	pear	scab

SPOTTED WING DROSOPHILA EMERGENCY USE REGISTRATIONS UPDATE

Currently registered products for spotted wing drosophila (SWD) are listed in Publication 360, *Guide to Fruit Production 2016–2017*. Additional Emergency Use Registrations for SWD are expected for the 2017 growing season. See ontario.ca/spottedwing for the most up-to-date recommendations on SWD control.

PRODUCT DEREGISTRATION OR REMOVAL

Product	Chapter	Crop	Diseases and Insects	Change
Diazinon 500 E, Diazinon 50 WSP	3, 4, 6	apple, blackberry, cherry, currant, gooseberry, pear, raspberry, strawberry	all pests	Use is no longer permitted as of December 31, 2016.
Presidio	5	grape	all pests	No longer registered for use on grapes.
Sevin XLR	3, 4, 5, 6	apple, apricot, cherry, grape, peach, pear, plum, strawberry	all pests	No longer registered for insecticide use on apples, apricot, cherry, grape, peach, pear, plum and strawberry. <i>See Important Notice Regarding Re-Evaluation of Carbaryl for the Use of Thinning in Apples for information on new thinning measures (p. 21).</i>
Thiodan 4E, Thionex 50 WP, Thionex 50 WSP	4, 6	apricot, cherry, nectarine, peach, plum, strawberry	all pests	Use is no longer permitted as of December 31, 2016.
Vivando	3	apple	powdery mildew	No longer registered for use on crop group 11-09.

IMPORTANT NOTICE FOR PRODUCTS USED ON NECTARINES

While the following products are labelled for use on peaches, the Pest Management Regulatory Agency (PMRA) has determined they are not labelled for nectarines:

- Copper Spray
- Decis 5 EC
- Ferbam 76 WDG
- Funginex DC
- Granuflo-T
- Guardsman Copper Oxychloride 50
- Imidan 70-WP Instapak
- Kumulus DF
- Maestro 80 DF
- Microscopic Sulphur WP
- Microthiol Disperss
- Purespray Green Spray Oil 13 E
- Rovral WDG
- Superior 70 Oil
- Thiram 75 WP

Application of these products to nectarines is a violation of the *Pest Control Products Act* (PCPA).

PRODUCT CHANGES AND CORRECTIONS

Product to Change	Chapter	Crop	Diseases and Insects	Change
Acrobat 50 WP	5	grape	downy mildew	Formulation has changed to Forum (Registration # 32026). New rate: 450 mL/ha.
Blossom Protect	3, 6	apple, pear	all pests	Belongs to fungicide group 44.
Botector	5	grape	all pests	Belongs to fungicide group 44.
Buran	3	apple	scab	New rate: 1.8% v/v (i.e., 9 L in 500 L water/ha). Do not use more than 18 L/ha per application. This product should only be used as a post-infection treatment, but before 350 degree-hours (base 0°C) after beginning of infection. Apply after rainfall or when conditions are conducive to disease development.
Cygon 480 – Ag	4	blueberry	blueberry maggot	Preharvest interval (PHI): 21 days. Restricted entry interval (REI): 12 days for hand harvesting.
	7	hazelnut	aphids	Restricted entry interval (REI): 34 days for hand thinning, 21 days for hand-harvesting and laying irrigation pipe, and 5 days for all other activities.
Delegate	5	cherry (sweet, tart)	all pests	Preharvest interval (PHI): 5 days. Full registration for spotted wing drosophila.
		plum, apricot	all pests	Preharvest interval (PHI): 3 days.
		peach	all pests	Preharvest interval (PHI): 1 day.
Double Nickel	5	grape	powdery mildew	Add to powdery mildew section under “shoot length 20–25 cm,” p. 166.
Flint	6	apricot, peach, plum	all pests	Registered on apricot, peach and plum. Add to Table 6–11. <i>Activity of Fungicides on Tender Fruit Diseases</i> , p. 249.
Fracture	4, 5, 6	strawberry, grape, apricot, cherry, peach, plum	all pests	Belongs to fungicide group M.
Jade	6	pear	all pests	Not registered on pear as currently indicated on Table 6–11. <i>Activity of Fungicides on Tender Fruit Diseases</i> , p. 248.
Kasumin 2L	3, 6	apple, pear	fire blight	Rate clarification: 5 L in 1,000 L water/ha If using lower water volumes, refer to the water volume chart indicated on label for rate recommendations.
Lagon 480 E	4	blueberry	blueberry maggot	Preharvest interval (PHI): 21 days. Restricted entry interval (REI): 12 days for hand harvesting.
		strawberry	aphids tarnished plant bug	Maximum 2 applications per season.
	7	hazelnut	aphids	Restricted entry interval (REI): 34 days for hand thinning, 21 days for hand harvesting and laying irrigation pipe, and 5 days for all other activities.
Phostrol	4	strawberry	leather rot	New rate: 2.9–5.8 L/ha. Apply in a minimum of 225 L water/ha. Use higher rate and increased water volume when there is a history of leather rot, or when disease pressure is high.

Product to Change	Chapter	Crop	Diseases and Insects	Change
Senator 70 WP	4	raspberry	botrytis grey mould powdery mildew	Formulation has changed to Senator 50 SC (Registration # 32096). New rate: 700 mL/1,000 L of water. Maximum 3.08 L/ha per season.
		strawberry	botrytis grey mould common leaf spot	Formulation has changed to Senator 50 SC (Registration # 32096). New rate: 700 mL/1,000 L of water. Maximum 3.08 L/ha per season.
	6	cherry, peach, plum	brown rot	Formulation has changed to Senator 50 SC (Registration # 32096). New rate: 700 mL/1,000 L of water. Maximum 4.9 L/ha per season.
Timorex Gold	5	grape	all pests	Preharvest interval (PHI): 2 days.
TwinGuard	6	pears	scale	New timing: Summer sprays (p. 233). Apply TwinGuard at 500 g/ha. See comments on p. 232.
Various products	5	grape	leafhoppers	For all products listed at immediate pre-bloom for leafhopper, new timing: Special sprays (when monitoring indicates the need) (p. 171). If significant leafhopper damage continues later than fruit set, a subsequent treatment may be required.

ADDITIONS AND NEW USES FOR 2017

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 3: Apple Calendar (page 34)					
Buran	powdery mildew	<ul style="list-style-type: none"> • green tip to half-inch green • half-inch green to tight cluster • tight cluster to pink • pink • petal fall (calyx) • first summer spray – 7–14 days after petal fall (calyx) • first sprays (non-bearing) 	1.8% v/v (i.e., 9 L in 500 L water/ha)	<p>Suppression only.</p> <p>Do not use more than 18 L/ha per application.</p> <p>Begin applications preventively when conditions are conducive to disease development. Re-apply every 7–10 days if needed. Do not apply if rain is expected within 48 hr.</p>	<p>Common name: garlic powder</p> <p>Group: U</p> <p>Preharvest interval: 0 days</p> <p>Re-entry period: when dry</p> <p>Maximum per season: n/a</p>
Delegate	European apple sawfly	<ul style="list-style-type: none"> • pink • petal fall (calyx) 	420 g/ha	Use sufficient water volume to ensure thorough coverage. Apply pre-bloom and/or post-bloom when thresholds have been reached. Re-apply at 14–21-day intervals, if monitoring indicates a need.	<p>Common name: spinetoram</p> <p>Group: 5</p> <p>Preharvest interval: 7 days</p> <p>Re-entry period: 12 hr</p> <p>Maximum per season: 3 applications</p>
Semios CM Plus	codling moth	<ul style="list-style-type: none"> • half-inch green to tight cluster 	2.5 dispensers/ha	Reduces mating of codling moth. Install in orchard in spring before flight begins. Canisters for use with Semios automated aerosol dispensers. Use a higher density (up to double the standard density) at the orchard edge toward the prevailing winds. Under typical dispensing rate, canisters should last for approximately 160 days. For more information regarding the installation or application of Semios CM Plus, contact Semios (info@semios.com) at least 6–8 months prior to the planned use.	<p>Common name: pheromone</p> <p>Group: pheromone</p> <p>Preharvest interval: n/a</p> <p>Re-entry period: n/a</p> <p>Maximum per season: n/a</p>

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 3: Apple Calendar (page 34)					
Senator 50 SC	scab powdery mildew	<ul style="list-style-type: none"> • green tip to half-inch green • half-inch green to tight cluster • tight cluster to pink • pink • petal fall (calyx) • first summer spray – 7–14 days after petal fall (calyx) • subsequent summer spray • first sprays (non-bearing) 	<p>Tank-mix: Senator 50 SC: 250 mL/1,000 L water plus Supra Captan 80 WDG or Maestro 80 DF: 0.625 kg/1,000 L water</p>	<p>Historically, Benlate-resistant forms of apple scab have been present in Ontario. Senator belongs to the same chemical family as Benlate. Use caution if Benlate was used in your orchard in the past. For resistance management, tank-mix with a compatible protectant scab fungicide from a different group. See label for more information on suggested tank-mix partners.</p> <p>Do not use oil within 14 days of Supra Captan or Maestro.</p> <p>Reduce spray intervals under conditions of severe disease pressure.</p>	<p>Common name: thiophanate-methyl Group: 1 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: Supra Captan/Maestro tank-mix: 1.75 L/ha Granuflo tank-mix: 0.875 L/ha</p>
			<p>Tank-mix: Senator 50 SC: 250 mL/1,000 L water plus Granuflo-T: 1.5–2.25 kg/1,000 L water</p>		
Sivanto Prime	rosy apple aphid	<ul style="list-style-type: none"> • half-inch green to tight cluster • pink • petal fall (calyx) • first summer spray – 7–14 days after petal fall (calyx) • special summer sprays • summer sprays (non-bearing) 	500–750 mL/ha	<p>If using with oil, may cause bark injury on some varieties, such as Red Delicious, Empire and Mutsu/Crispin. Do not use oil within 14 days of using Supra Captan, Maestro, Folpan or any other product containing sulphur. Do not apply within 48 hr of freezing temperatures, when temperatures exceed 25°C, to crops under moisture stress or just prior to rain.</p> <p>Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Where possible, rotate with products from different groups.</p> <p>Re-apply, if necessary, after 10–14 days.</p> <p>For rosy apple aphid, apply if 20% of clusters are infested.</p>	<p>Common name: flupyradifurone Group: 4D Preharvest interval: 14 days Re-entry period: 12 hr Maximum per season: 2 L/ha</p>
	green apple aphid	<ul style="list-style-type: none"> • special summer sprays • summer sprays (non-bearing) 			
	white apple leafhopper potato leafhopper	<ul style="list-style-type: none"> • special summer sprays • summer sprays (non-bearing) 			
	San Jose scale oystershell scale	<ul style="list-style-type: none"> • petal fall (calyx) • special summer sprays 	750 mL–1.0 L/ha + 0.25% v/v oil	<p>For green apple aphid, apply if 10% of terminals are infested.</p> <p>For leafhoppers, apply when nymphs are active in the orchard.</p> <p>For scale, apply when crawlers are active in orchards with a history of this pest.</p>	

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Blueberry Calendar (page 94)					
Inspire Super	mummy berry	<ul style="list-style-type: none"> • bud swell to green tip • green tip • pink bud 	558–836 mL/ha	<p>Use no more than 2 applications before alternating to a different fungicide group. Avoid drift onto sweet cherries.</p> <p>For spray volumes greater than 400 L/ha and high agitation, use a non-ionic adjuvant at 1 L/1,000 L of spray.</p> <p>For mummy berry, spray buds and foliage to prevent primary infection of blueberry shoots. Make the first application when flower buds swell and repeat until first bloom. Continue applications through bloom if primary (shoot) infections are not controlled.</p> <p>For alternaria leaf spot, spray at green tip, pink bud and petal fall if the weather is cool and wet and there is a history of this disease.</p> <p>For anthracnose, most infections occur during bloom to green fruit, especially when weather is warm and wet.</p> <p>For botrytis, apply when wet weather occurs. Re-apply at 7–10-day intervals through bloom if conditions continue.</p> <p>For rust, suppression only.</p>	<p>Common name: difenoconazole + cyprodinil Group: 3 + 9 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: botrytis: 2 applications mummy berry, alternaria leaf spot, anthracnose, rust: 4 applications (5.9 L/ha)</p>
	alternaria leaf spot	<ul style="list-style-type: none"> • special sprays 	836 mL–1.5 L/ha		
	anthracnose	<ul style="list-style-type: none"> • green tip • pink bud • first bloom • petal fall • fruit ripening 	1.2–1.5 L/ha		
	botrytis	<ul style="list-style-type: none"> • first bloom • fruit ripening 	1.0–1.5 L/ha		
	rust	<ul style="list-style-type: none"> • special sprays 	836 mL/ha		
Luna Tranquility	botrytis fruit rot	<ul style="list-style-type: none"> • first bloom • fruit ripening 	1.2 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. Apply just prior to harvest to improve post-harvest disease control. Will also control powdery mildew.</p>	<p>Common name: fluopyram + pyrimethanil Group: 7 + 9 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 2 applications</p>

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Blueberry Calendar (page 94)					
Phostrol	septoria leaf spot	• special sprays	2.9–5.8 L/ha	Apply in a minimum of 400 L water/ha and ensure thorough coverage of the foliage. Use the higher rate and shorter application interval when disease pressure is high. May cause crop injury to blueberries in the form of marginal leaf necrosis and brown spots. Use higher water volumes to help reduce the risk of crop injury. For phytophthora root rot, suppression only .	Common name: mono- and dibasic sodium, potassium and ammonium phosphites Group: 33 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 4 applications
	phytophthora root rot	• pink bud stage • post-harvest			
Sivanto Prime	aphids	• green fruit	500–750 mL/ha	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Do not make a foliar application following a soil application of a Group 4 insecticide. For aphids, apply when population starts to build but before winged stages develop. Repeat before harvest if necessary. For blueberry maggot, apply when first flies are trapped or when berries begin to turn blue. Re-apply if adults remain active.	Common name: flupyradifurone Group: 4D Preharvest interval: 3 days Re-entry period: 12 hr Maximum per season: 2 L/ha
	blueberry maggot	• fruit ripening	750 mL–1.0 L/ha		
Chapter 4: Currant and Gooseberry Calendar (page 106)					
Luna Tranquility	powdery mildew	• just before blossoms open • green fruit	1.2 L/ha	Rotate with fungicides from different groups that control the same diseases. For powdery mildew, if warm and humid conditions persist, spray regularly until fruit begins to colour. For botrytis, apply at first bloom and re-apply at 7–10-day intervals during bloom.	Common name: fluopyram + pyrimethanil Group: 7 + 9 Preharvest interval: currant: 0 days gooseberry: 7 days Re-entry period: 12 hr Maximum per season: botrytis: 2 applications powdery mildew: 4 L/ha
	botrytis grey mould	• just before blossoms open • bloom			
Sivanto Prime	aphids	• just before blossoms open • green fruit • post-harvest	500–750 mL/ha	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Monitor for leaf curling. Spray red and white currants immediately after fruit is picked.	Common name: flupyradifurone Group: 4D Preharvest interval: 3 days Re-entry period: 12 hr Maximum per season: 2 L/ha

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Summer-fruiting Raspberry and Blackberry Calendar (page 111)					
Kasumin 2L	fire blight	• bloom	5.0 L in 1,000 L water/ha	Make the first application at the beginning of bloom and re-apply every 3–4 days during bloom when conditions favour disease development. If using lower water volumes, refer to the water volume chart indicated on the label for rate recommendations.	Common name: kasugamycin Group: 24 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: 4 applications
Movento 240 SC	aphids	• post-harvest	220–365 mL/ha	Apply post-bloom in a minimum of 300 L water/ha when aphids are first observed.	Common name: spirotetramat Group: 23 Preharvest interval: 3 days Re-entry period: 12 hr Maximum per season: 3 applications (1.1 L/ha)
Torrent 400 SC	phytophthora root rot	• post-harvest	250 mL/ha	Apply in up to 1,000 L water/ha after harvest when conditions favour disease development (high soil moisture and cool temperatures). Apply as a high-volume spray as a soil drench. Do not use a surfactant with this product.	Common name: cyazofamid Group: 21 Preharvest interval: 90 days Re-entry period: 12 hr Maximum per season: 2 applications
Chapter 4: Fall-bearing Raspberry Calendar (page 117)					
Kasumin 2L	fire blight	• bloom (mid-July to August)	5.0 L in 1,000 L water/ha	Make the first application at the beginning of bloom and re-apply every 3–4 days during bloom when conditions favour disease development. If using lower water volumes, refer to the water volume chart indicated on the label for rate recommendations.	Common name: kasugamycin Group: 24 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: 4 applications
Torrent 400 SC	phytophthora root rot	• primocanes emerge • post-harvest	250 mL/ha	Apply in up to 1,000 L water/ha in early spring but at least 90 days before harvest. Re-apply after harvest when conditions favour disease development (high soil moisture and cool temperatures). Apply as a high-volume spray as a soil drench. Do not use a surfactant with this product.	Common name: cyazofamid Group: 21 Preharvest interval: 90 days Re-entry period: 12 hr Maximum per season: 2 applications

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Saskatoon Berry Calendar (page 125)					
Kasumin 2L	fire blight	• bloom	5.0 L in 1,000 L water/ha	Make the first application at the beginning of bloom and re-apply every 3–4 days during bloom when conditions favour disease development. If using lower water volumes, refer to the water volume chart indicated on the label for rate recommendations.	Common name: kasugamycin Group: 24 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: 4 applications
Sivanto Prime	aphids	• special sprays	500–750 mL/ha	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. This spray does not control root-feeding woolly elm or apple aphids.	Common name: flupyradifurone Group: 4D Preharvest interval: 3 days Re-entry period: 12 hr Maximum per season: 2 L/ha

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Non-bearing Strawberry Calendar (page 129)					
Fontelis	powdery mildew	<ul style="list-style-type: none"> July to mid-August mid-August and again 2–3 weeks later 	1.0–1.75 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. Begin applications when conditions favour disease development. Continue as needed on a 7–10-day interval.</p> <p>Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., captan, sulphur) can cause crop safety issues. Read and follow all label restrictions regarding tank-mixes with this product.</p>	<p>Common name: penthiopyrad Group: 7 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 5.25 L/ha</p>
Luna Tranquility	powdery mildew	<ul style="list-style-type: none"> July to mid-August mid-August and again 2–3 weeks later 	1.2 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. For powdery mildew, begin applications when conditions favour disease development. Continue as needed on a 7–14-day interval.</p> <p>For common leaf spot, protect new leaves as they unfold and ensure thorough coverage of lower leaf surface. Spray susceptible varieties such as Jewel, Mira, Kent, Veestar and MicMac. Re-apply prior to wetting periods, if needed.</p>	<p>Common name: fluopyram + pyrimethanil Group: 7 + 9 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: 4 L/ha</p>
	common leaf spot	<ul style="list-style-type: none"> 1 month after planting and again once or twice at 2-week intervals July to mid-August mid-August and again 2–3 weeks later 			
Sivanto Prime	aphids	<ul style="list-style-type: none"> May or early June 1 month after planting and again once or twice at 2-week intervals July to mid-August mid-August and again 2–3 weeks later 	500–750 mL/ha	<p>Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Do not make a foliar application following a soil application of a Group 4 insecticide.</p> <p>Monitor for aphids and protect new growth when present.</p>	<p>Common name: flupyradifurone Group: 4D Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 2 L/ha</p>

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: June-bearing Strawberry Calendar (page 132)					
Fontelis	powdery mildew	<ul style="list-style-type: none"> • new growth after renovation • mid-August and again 2–3 weeks later 	1.0–1.75 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. Begin applications when conditions favour disease development. Continue as needed on a 7–10-day interval.</p> <p>Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., captan, sulphur) can cause crop safety issues. Read and follow all label restrictions regarding tank-mixes with this product.</p>	<p>Common name: penthiopyrad Group: 7 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 5.25 L/ha</p>
Intuity	botrytis grey mould	<ul style="list-style-type: none"> • first bloom • 7–10 days after first bloom • pre-harvest 	439–877 mL/ha	<p>Apply prior to infection. Rainfast after 2 hr. No surfactant needed.</p> <p>Do not make more than 2 sequential applications.</p> <p>Under high disease pressure, use higher rate and shorter interval.</p>	<p>Common name: mandestrobin Group: 11 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 4–5 applications (3.51 L/ha)</p>
Luna Tranquility	powdery mildew	<ul style="list-style-type: none"> • new growth after renovation • mid-August and again 2–3 weeks later 	1.2 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. For powdery mildew, begin applications when conditions favour disease development. Continue as needed on a 7–14-day interval.</p> <p>For botrytis, keep all flower parts protected during bloom. Continue as needed on a 7–10-day interval.</p> <p>For common leaf spot, protect new leaves as they unfold and ensure thorough coverage of lower leaf surface. Spray susceptible varieties such as Jewel, Mira, Kent, Veestar and MicMac. Re-apply prior to wetting periods, if needed.</p>	<p>Common name: fluopyram + pyrimethanil Group: 7 + 9 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: botrytis: 2 applications powdery mildew, leaf spot: 4 L/ha</p>
	botrytis grey mould	<ul style="list-style-type: none"> • first bloom • 7–10 days after first bloom • pre-harvest 			
	common leaf spot	<ul style="list-style-type: none"> • when flower buds are visible in the crown • mid-August and again 2–3 weeks later 			
Sivanto Prime	aphids	<ul style="list-style-type: none"> • when flower buds are visible in the crown • first bloom • green fruit • new growth after renovation • mid-August and again 2–3 weeks later 	500–750 mL/ha	<p>Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Do not make a foliar application following a soil application of a Group 4 insecticide.</p> <p>Apply when aphid populations start to build but before winged stages develop.</p>	<p>Common name: flupyradifurone Group: 4D Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 2 L/ha</p>

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Day-neutral Strawberry Calendar (page 139)					
Fontelis	powdery mildew	<ul style="list-style-type: none"> • bloom • bloom, green fruit and harvest (June, July, August) • bloom, green fruit and harvest (September) 	1.0–1.75 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. Begin applications when conditions favour disease development. Continue as needed on a 7–10-day interval.</p> <p>Contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g., captan, sulphur) can cause crop safety issues. Read and follow all label restrictions regarding tank-mixes with this product.</p>	<p>Common name: penthiopyrad Group: 7 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 5.25 L/ha</p>
Intuity	botrytis grey mould	<ul style="list-style-type: none"> • bloom • bloom, green fruit and harvest (June, July, August) • bloom, green fruit and harvest (September) 	439–877 mL/ha	<p>Apply prior to infection. Rainfast after 2 hr. No surfactant needed.</p> <p>Do not make more than 2 sequential applications.</p> <p>Under high disease pressure, use higher rate and shorter interval.</p>	<p>Common name: mandestrobin Group: 11 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 4–5 applications (3.51 L/ha)</p>
Luna Tranquility	powdery mildew	<ul style="list-style-type: none"> • bloom • bloom, green fruit and harvest (June, July, August) • bloom, green fruit and harvest (September) 	1.2 L/ha	<p>Rotate with fungicides from different groups that control the same diseases. For powdery mildew, begin applications when conditions favour disease development. Continue as needed on a 7–14-day interval.</p> <p>For botrytis, keep all flower parts protected during bloom. Continue as needed on a 7–10-day interval.</p>	<p>Common name: fluopyram + pyrimethanil Group: 7 + 9 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: botrytis: 2 applications powdery mildew: 4 L/ha</p>
	botrytis grey mould				
Sivanto Prime	aphids	<ul style="list-style-type: none"> • when flower buds extend from the crown • bloom • bloom, green fruit and harvest (June, July, August) 	500–750 mL/ha	<p>Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Do not make a foliar application following a soil application of a Group 4 insecticide.</p> <p>Apply when aphid populations start to build but before winged stages develop. Do not apply when bees are active. Spray in the evening.</p>	<p>Common name: flupyradifurone Group: 4D Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 2 L/ha</p>

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 4: Specialty Bushberries (page 153)					
Oberon Flowable	two-spotted spider mite	<ul style="list-style-type: none"> when monitoring indicates the need 	0.9–1.2 L/ha	<p>Registered on lingonberry.</p> <p>For best results, apply when mite populations begin to build, but before damaging levels are established. Controls egg and nymph stages.</p>	<p>Common name: spiromesifen Group: 23 Preharvest interval: 3 days Re-entry period: 12 hr Maximum per season: 3 applications (3.48 L/ha)</p>
Phostrol	septoria leaf spot phytophthora root rot	<ul style="list-style-type: none"> before rain, when monitoring indicates the need 	2.9–5.8 L/ha	<p>Not registered on all specialty bushberries. See product label for specific crops.</p> <p>Apply in a minimum of 400 L water/ha and ensure thorough coverage of the foliage.</p> <p>Use the higher rate and shorter application interval when disease pressure is high.</p> <p>May cause crop injury to bushberries in the form of marginal leaf necrosis and brown spots. Use higher water volumes to help reduce the risk of crop injury.</p> <p>For phytophthora root rot, suppression only.</p>	<p>Common name: mono- and dibasic sodium, potassium and ammonium phosphites Group: 33 Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 4 applications</p>
Sivanto Prime	aphids	<ul style="list-style-type: none"> when monitoring indicates the need 	500–750 mL/ha	<p>Not registered on all specialty bushberries. See product label for specific crops.</p> <p>Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season.</p> <p>Apply when aphid populations start to build but before winged stages develop.</p>	<p>Common name: flupyradifurone Group: 4D Preharvest interval: 3 days Re-entry period: 12 hr Maximum per season: 2 L/ha</p>

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 5: Grape Calendar (page 163)					
Intrepid	climbing cutworm	<ul style="list-style-type: none"> • bud burst to first leaf 	600 mL/ha	Apply at first sign of feeding damage in the early spring. Re-apply 10–14 days later, if needed.	Common name: methoxyfenozide Group: 18 Preharvest interval: 30 days Re-entry period: 12 hr Maximum per season: 2 applications
Intuity	botrytis bunch rot	<ul style="list-style-type: none"> • trace bloom (first cap fall) • immediate post-bloom to early fruit set • berry touch to cluster closure • beginning of ripening (veraison) through harvest • special sprays (when monitoring indicates the need) 	439–877 mL/ha	<p>Locally systemic. Rainfast after 2 hr. No surfactant needed. Phytotoxicity has been observed in some instances in grapes with surfactants containing organosilicones. Rotate with fungicides from different groups that control these diseases.</p> <p>Under high disease pressure, use higher rate and shorter interval.</p> <p>For botrytis, if bloom/post-bloom period is wet, spray immediately to control latent infections in susceptible varieties. Direct this spray at the fruiting zone.</p> <p>For powdery mildew, suppression only. Apply at 7–10-day intervals to protect expanding leaves and developing fruit clusters before symptoms appear.</p>	Common name: mandestrobin Group: 11 Preharvest interval: 10 days Re-entry period: 12 hr Maximum per season: 2 applications
	powdery mildew	<ul style="list-style-type: none"> • 3–5 leaves unfolded, 10–15-cm shoot length • shoot length 20–25 cm • trace bloom (first cap fall) • immediate post-bloom to early fruit set • berries pea-sized • berry touch to cluster closure • beginning of ripening (veraison) through harvest 	439–877 mL/ha		
Sivanto Prime	leafhoppers	<ul style="list-style-type: none"> • immediate pre-bloom • immediate post-bloom to early fruit set • special sprays (when monitoring indicates the need) 	500–750 mL/ha	<p>Apply as a foliar spray ensuring thorough coverage.</p> <p>Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Where possible, rotate with products from different groups. If significant leafhopper damage continues later than fruit set, a subsequent treatment may be required.</p>	Common name: flupyradifurone Group: 4D Preharvest interval: 0 days Re-entry period: 12 hr Maximum per season: 2 L/ha
Torrent 400 SC	downy mildew	<ul style="list-style-type: none"> • shoot length 20–25 cm • trace bloom (first cap fall) • immediate post-bloom to early fruit set • berries pea-sized • berry touch to cluster closure • beginning of ripening (veraison) through harvest 	150–200 mL/ha	<p>Fruit clusters are highly susceptible to downy mildew until 4–6 weeks after bloom. Spray at 10–14-day intervals to protect developing leaves and fruit clusters. Apply at shorter intervals if conditions are conducive to disease.</p> <p>Do not use any surfactant with this product. Spray volume should be at least 400 L/ha. Rotate with fungicides from different groups that control this disease.</p>	Common name: cyazofamid Group: 21 Preharvest interval: 30 days Re-entry period: 12 hr Maximum per season: 6 applications

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 6: Sweet Cherry Calendar (page 196)					
Kasumin 2L	bacterial canker	• bloom	5.0 L in 1,000 L water/ha	Suppression only. Make the first application at the beginning of bloom and re-apply at 7-day intervals if conditions favour disease development. If using lower water volumes, refer to the water volume chart indicated on the label for rate recommendations. Will also control blossom blast.	Common name: kasugamycin Group: 24 Preharvest interval: 30 days Re-entry period: 12 hr Maximum per season: 4 applications
Chapter 6: Tart Cherry Calendar (page 204)					
Kasumin 2L	bacterial canker	• bloom	5.0 L in 1,000 L water/ha	Suppression only. Make the first application at the beginning of bloom and re-apply at 7-day intervals if conditions favour disease development. If using lower water volumes, refer to the water volume chart indicated on the label for rate recommendations. Will also control blossom blast.	Common name: kasugamycin Group: 24 Preharvest interval: 30 days Re-entry period: 12 hr Maximum per season: 4 applications
Chapter 6: Pear Calendar (page 227)					
Copper Spray	fire blight	• bloom	2.2 kg/1,000 L water	To reduce blossom infection, apply when blossoms open. Re-apply every 5 days if conditions are conducive to disease development. In case of hail damage, apply immediately following trauma event. Do not use on d'Anjou or other russet-prone varieties.	Common name: copper oxychloride Group: M Preharvest interval: 2 days Re-entry period: 48 hr Maximum per season: 10 applications
Luna Tranquility	scab	• green tip • white bud • bloom • petal fall • first cover	800 mL/ha	Start scab control early and re-apply if weather remains wet. Reduce spray intervals under conditions of severe disease pressure. Rotate with fungicides from different groups that control the same disease. Do not apply within 72 days of harvest.	Common name: fluopyram + pyrimethanil Group: 7 + 9 Preharvest interval: 72 days Re-entry period: 12 hr/24 hr (hand thinning) Maximum per season: 4 applications

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 6: Pear Calendar (page 227) (cont'd)					
Semios CM Plus	codling moth	<ul style="list-style-type: none"> green tip 	2.5 dispensers/ha	Reduces mating of codling moth. Install in orchard in spring before flight begins. Canisters for use with Semios automated aerosol dispensers. Use a higher density (up to double the standard density) at the orchard edge toward the prevailing winds. Under typical dispensing rate, canisters should last for approximately 160 days. For more information regarding the installation or application of Semios CM Plus, contact Semios (info@semios.com) at least 6–8 months prior to the planned use.	Common name: pheromone Group: pheromone Preharvest interval: n/a Re-entry period: n/a Maximum per season: n/a
Senator 50 SC	scab	<ul style="list-style-type: none"> green tip white bud bloom petal fall first cover second cover 	Tank-mix: <i>Senator 50 SC:</i> 250 mL/1,000 L water plus <i>Supra Captan 80 WDG</i> or <i>Maestro 80 DF:</i> 0.625 kg/1,000 L water	Historically, Benlate-resistant forms of apple scab have been present in Ontario. Senator belongs to the same chemical family as Benlate. The status of resistance of pear scab to this group is unknown. Use caution if Benlate was used in your orchard in the past. Start scab control early and re-apply if weather remains wet. Reduce spray intervals under conditions of severe disease pressure. For resistance management, tank-mix with a compatible protectant scab fungicide from a different group. See label for more information on suggested tank-mix partners. Do not use oil within 14 days of Supra Captan or Maestro.	Common name: thiophanate-methyl Group: 1 Preharvest interval: 1 day Re-entry period: 12 hr Maximum per season: 1.75 L/ha
Sivanto Prime	San Jose scale oystershell scale	<ul style="list-style-type: none"> special sprays (when monitoring indicates the need at petal fall) summer sprays 	750 mL–1.0 L/ha + 0.25% v/v oil	Do not use on d’Anjou or other oil-sensitive varieties. Do not use oil within 14 days of using Supra Captan, Maestro or any other product containing sulphur. Do not apply within 48 hr of freezing temperatures, when temperatures exceed 25°C, to crops under moisture stress or just prior to rain.	Common name: flupyradifurone Group: 4D Preharvest interval: 14 days Re-entry period: 12 hr Maximum per season: 2 L/ha
	pear psylla	<ul style="list-style-type: none"> green tip white bud petal fall first cover summer sprays 	750 mL–1.0 L/ha + 0.25% v/v oil	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Where possible, rotate with products from different groups. Re-apply, if necessary, after 10–14 days. For scale, apply when crawlers are active in orchards with a history of this pest. For psylla, suppression only . Apply when the majority of the population is in early instar stages.	

Product to Add	Disease/Insect	Timing	Rate	Comments	Other Information
Chapter 7: Walnut Calendar (page 253)					
Sivanto Prime	aphids	<ul style="list-style-type: none"> • pre-bloom • first pistillate flower • summer sprays 	500–750 mL/ha	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Apply in early stages of aphid infestation.	Common name: flupyradifurone Group: 4D Preharvest interval: 7 days Re-entry period: 12 hr Maximum per season: 2 L/ha
Chapter 7: Pecan and Sweet Chestnut Calendar (page 258)					
Sivanto Prime	aphids	<ul style="list-style-type: none"> • pre-bloom • first pistillate flower • summer sprays 	500–750 mL/ha	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Apply in early stages of aphid infestation.	Common name: flupyradifurone Group: 4D Preharvest interval: 7 days Re-entry period: 12 hr Maximum per season: 2 L/ha
Chapter 7: Filbert/Hazelnut Calendar (page 262)					
Sivanto Prime	aphids	<ul style="list-style-type: none"> • early spring (>¼-in. vegetative growth) • summer 	500–750 mL/ha	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Apply in early stages of aphid infestation.	Common name: flupyradifurone Group: 4D Preharvest interval: 7 days Re-entry period: 12 hr Maximum per season: 2 L/ha

IMPORTANT NOTICE REGARDING RE-EVALUATION OF CARBARYL FOR THE USE OF APPLE THINNING

Due to post-application risk to workers, PMRA has re-evaluated the use of carbaryl (Sevin XLR). As of September 20, 2016, the following changes have been made to the label:

- Maximum **one** application per year.
- Wearing chemical resistant gloves is recommended for hand-thinning following carbaryl application.

For high-density trellised orchards:

- Maximum application rate per growing season is 1.5 kg a.i./ha.
- Minimum re-entry period for hand-thinning and managing hand-line irrigation is 14 days.
- Minimum re-entry period for pruning, scouting, pinching, tying and training is 4 days.

For low-density, traditional, non-trellised orchards:

- Maximum application rate per growing season is 1.0 kg a.i./ha.
- Minimum re-entry period for hand-thinning and managing hand-line irrigation is 10 days.
- Minimum re-entry period for pruning, scouting, pinching, tying and training is 6 hr.

PROMALIN TO REDUCE RUSSETING IN APPLES

Russeting can occur during extended cool, wet or humid periods of time during bloom and early stages of fruit development. Golden Delicious is a variety that is particularly prone to russeting during these favourable conditions. Promalin can be used to reduce russeting by increasing the epidermis cell density in the skin. Please note that Promalin cannot reduce russeting caused by frost damage, disease, herbicide drift or phytotoxicity.

- Apply 250–500 mL/ha of Promalin at 7–12-day intervals for a maximum of 4 applications, beginning at full bloom to petal fall.
- During conditions that favour russet development (long cold and wet periods during bloom), apply in shorter intervals at the higher rate.
- Apply during periods of slow-drying conditions to maximize efficacy.

Precautions:

- Do not apply Promalin when air temperatures are below freezing or greater than 32°C.
- Rainfall or overhead irrigation within 6 hr after application will often reduce the activity of Promalin.

PROMALIN FOR MODIFYING TREE GROWTH

Feathered nursery trees are important for most high-density apple planting systems. Nursery trees should have 6–10 feathers per tree to allow for adequate production in second and third years. Promalin can be used to stimulate lateral bud break and additional branch growth on young trees, resulting in improved branch angles and providing a better tree structure for early cropping. For orchard trees (apples and non-bearing pears), foliar applications are made when new terminal growth is approximately 2.5–8 cm long (from approximately king bloom to 1 week after petal fall).

For nursery stock, non-bearing apples, non-bearing pears and non-bearing sweet cherries, foliar applications should be made after the trees have reached a terminal height at which lateral branching is desired (e.g., 75 cm from the ground). Application rates are:

- **Apples (nursery and orchard):** apply 62.5–250 mL Promalin/10 L of spray solution (125–500 ppm).
- **Non-bearing pears (nursery and orchard):** apply 125–500 mL Promalin/10 L of spray solution (250–1,000 ppm).
- **Non-bearing sweet cherries (nursery only):** apply 125–500 mL Promalin/10 L of spray solution (250–1,000 ppm).

Thoroughly soak the area of the tree where branching is desired. The final spray solution should have a pH no greater than 8. A spray mixture of 72–144 L applied with a pressurized hand sprayer will treat 200–300 non-bearing trees 1–4 years old.

Apply during periods of slow-drying conditions to maximize efficacy.

Promalin can also be mixed with latex paint and applied directly to buds of apples (nursery and orchard) and sweet cherries (orchard only). Paint should be applied in the spring when terminal buds have started to swell, but before shoots emerge. Do not apply after bud break. Application after bud break may result in injury to tender shoot tips and prevent shoot growth from that point. The application rate is 100–166 mL Promalin/500 mL of latex paint. Apply the latex paint mixture with a brush or sponge uniformly covering the bark surface. Apply only to 1-year-old wood. Notching the bark above the bud with a hacksaw blade prior to treatment will greatly increase efficacy. Make sure to notch wood prior to at least 2 days of good weather (no rainfall predicted) to allow for adequate healing and to prevent against cankers. Sweet cherries, in particular, are susceptible to cankers and it is not recommended to notch the wood.

Caution: Do not apply Promalin when air temperatures are below freezing or greater than 32°C. A target pH of 7.0 and always below 8.5 will provide optimum results. Rainfall within 6 hr after spraying will often reduce the activity of Promalin.

PROMALIN TO IMPROVE FRUIT SHAPE IN APPLES

Promalin is now registered in all apple varieties to improve fruit shape by elongation of the fruit and development of more prominent calyx lobes (“typiness”). Promalin can be used on fruit that has natural typiness like Red Delicious, Golden Delicious, Ambrosia and Gala.

- Apply 1.2–2.3 L/ha of Promalin from early king bloom until the early stages of petal fall on the side blooms.
- If it is a long bloom period, two applications of Promalin will give the best results. Apply 0.6–1.2 L/ha of Promalin as the first application from early king bloom until the early stages of petal fall on the side blooms. Apply the second application of 0.6–1.2 L/ha of Promalin 3–21 days later (or when the rest of the canopy is in bloom).
- Apply during periods of slow-drying conditions to maximize efficacy.



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