

# Tomato Management Schedule

*A guide to weed, insect and  
disease management in field  
tomato in Nova Scotia*



2019



# GUIDE TO PEST MANAGEMENT IN FIELD TOMATO



## Nova Scotia Vegetable Crop Guide to Pest Management 2019 [TOM1-19]

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### IMPORTANT

This publication was compiled by representatives from Perennia using information from the Pest Management Regulatory Agency of Health Canada, specific pesticide labels, previous Atlantic Provinces Vegetable Pest Guides and manufacturer's information. **This information is continuously changing and therefore it can cease to be current and accurate. Pesticide labels are the best source of information and should always be consulted prior to using a product.** The label is the best source of information on: registered crop uses, rates, days to harvest, compatibility with other pesticides, toxicity and other special information on its effective and safe use

By printing this publication, Perennia does not offer any warranty or guarantee, nor do they 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.

### WARNINGS

**This publication is meant to be used as a reference for possible pest control options.** Where there are multiple brand names of a specific active ingredient registered in Canada, Perennia has only listed a couple for reference purposes and as such does not endorse one brand over another. If you have purchased a generic product not specifically in this guide but has your crop and pest on the label, always follow that product label.

**If any information in this or any other publication conflicts with the information on the label, always use the label recommendation.** If you have an old label, your pesticide supplier should be able to give you the newest label. You are legally responsible for the safe use of pesticides you purchase. This means the safe transport and storage of these materials, the label rates used on crops, and the safe disposal of containers.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
<b>WEEDS:</b>							
<b>Preplant</b>  <i>Perennial weeds including quackgrass</i>	9	Glyphosate	<b>Roundup 365 Sn</b>	1.25-2.5 L/ha	-	7	Apply in fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control, apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50-100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
			<b>Roundup WeatherMAX</b>	1.67-8.0 L/ha	12 hours	7	
			<b>Touchdown 480</b>	2.5-7.0 L/ha	12 hours	7	
	14	carfentrazone-ethyl	<b>Aim EC</b>	36.5-117 mL/ha	12 hours	1	
<b>Preplant Incorporated</b>  <i>Germinating annual grasses and some broadleaves</i>	3	trifluralin	<b>Treflan EC</b>	1.25-2.4 L/ha	12 hours	-	Incorporate within 24 hours of application. Ragweed and mustards are not controlled. This product has a carry-over effect on corn and cereal the following year.
			<b>Rival</b>	1.2-2.2 kg/ha	12 hours	-	
	15	napropamide	<b>Devrinol 50-DF</b>	2.25-4.5 kg/ha	12 hours	-	

							apply to soils with over 10% organic matter.
	15	s-metholachlor / R-enantiomer	<b>Dual II Magnum</b>	0.87 L (pre-plant incorporation) + 0.44 – 0.87 L (post-transplant)	12 hours	30	<b>Transplanted field tomatoes (for fresh market or processing).</b> Make the post-transplant application within 7 to 14 days after transplanting. The interval between pre-plant incorporation and post-transplant applications should be no longer than 14 days. Do not apply Dual II Magnum within 7 days of transplanting. Do not exceed 1.75 L on tomatoes per year. Do not apply on direct-seeded tomatoes.
	15	s-metholachlor / R-enantiomer	<b>Dual II Magnum</b>	1.25-1.75 L/ha	12 hours	-	Use with transplant tomatoes grown for processing.
	15 5	s-metholachlor / R-enantiomer plus metribuzin	<b>Dual II Magnum</b> plus <b>Sencor 480 F</b>	1.25-1.75 L/ha Plus 0.5-1.4 L/ha	12 hours	-	<b>Field tomato grown for fresh market.</b> Dual Magnum and Dual II Magnum can be used 1.25-1.75 L/ha, in 150-300 L water/ha. Max 1 application, PHI = 60 days. *Tomato varieties differ in tolerance to Dual and Dual II magnum herbicide.
<b>Postemergence</b>	1	fenoxyp-ethyl	<b>Excel Super</b>	0.67 L/ha	-	55	Use only with transplant tomatoes grown for processing
<i>Grasses</i>	1	Sethoxydim	<b>Poast Ultra</b> plus <b>Merge</b>	0.32-1.1 L/ha 1-2 L/ha	12 hours	30	Apply to actively growing grasses at the 1-6 leaf stage.
	1	fluazifop-p-butyl	<b>Venture L</b>	0.6-2.0 L/ha	-	60	Apply to actively growing grasses at the 1-6 leaf stage. Use high rate for quackgrass.
<i>Broadleaf weeds</i>	2	thifensulfuron methyl	<b>Pinnacle 75 Toss-N-Go</b> plus <b>Agral 90</b>	5.5-8.0 g/ha 2 L/1000L water	-	45	Apply 3 weeks after transplanting to weeds less than 10 cm tall. Max 1 application/yr. Do not apply to tomatoes that are stressed.

<i>Broadleaf and Grass weeds</i>	2	Rimsulfuron	<b>Prism</b> plus <b>Agral 90</b>	60-140 g/ha  2L/1000L water	-	30	<b>Field Tomatoes only.</b> Max 1 application/yr; at least 21 days after transplanting the crop. Weeds that emerge after application will not be controlled. Apply in 200 L of water/ha.
	5	Metribuzin	<b>Sencor 480F</b>	300 ml/ha	-	30	<b>Transplanted tomatoes grown for fresh market.</b> Apply in 150-300 L water/ha. Apply after plants have recovered from transplant shock. Allow 14 days between applications. Avoid applications when tomatoes are under stress. Varieties differ in tolerance to Sencor. Do not apply on soils with less than 2% organic matter.
	5	Metribuzin	<b>Sencor 75 DF</b>	200 g/ha	-	30	<b>Transplanted tomatoes grown for fresh market.</b> Apply in 150-300 L water/ha. Apply after plants have recovered from transplant shock. Allow 14 days between applications. Avoid applications when tomatoes are under stress. Varieties differ in tolerance to Sencor. Do not apply on soils with less than 2% organic matter.
<i>Inter-row shielded</i>	22	paraquat	<b>Gramoxone</b>	2.75-5.5 L/ha	12 hours	-	Avoid spraying crop as damage may occur.
		diquat	<b>Reglone Dessicash</b>	2.3-4.6 L/ha	24 hours	-	
	14	carfentrazone-ethyl	<b>Aim EC</b>	36.5-117 mL/ha	12 hours	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume.
<b>Crop: preplant Weeds: preemergence</b>	3	Pendimethalin	<b>Prowl H<sub>2</sub>O</b>	2.2 L/ha	24 hours	21	<b>Transplanted field tomatoes on mineral soils.</b> Do not apply prior to direct-seeded tomatoes. Do not apply postemergence

							over the top of or to foliage of tomatoes because severe injury may occur. Avoid root contact with Prowl H <sub>2</sub> O-treated soil when placing transplants into furrow or hole or injury may occur. Prowl H <sub>2</sub> O herbicide treatments will not control emerged weeds. Destroy existing weeds before applying Prowl H <sub>2</sub> O herbicide. Prowl H <sub>2</sub> O herbicide treatments are most effective in controlling weeds when adequate rainfall or overhead irrigation is received within seven (7) days after application.
<b>Direct-seeded and Transplant</b>  <i>Broadleaf weeds &amp; nutsedge</i>	2	Halosulfuron	<b>Sandea WG</b>	35-70 g/ha	12 hours	30	<b><u>See label for application instructions and timing.</u></b>

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
<b>INSECTS:</b>							
<b>Aphids</b>	4	acetamiprid	<b>Assail 70 WP</b> <b>Aceta 70 WP</b>	56-86 g/ha	48 hours	7	Maximum 4 applications/yr. Alternate with other insecticides.
	1B	malathion	<b>Malathion 500 E</b>	1.4-2.0 L/ha	12 hours	3	Not effective below 18°C.
	1B	dimethoate	<b>Lagon 480 EC</b>	0.55-1.1 L/ha ml/ha	12 hours	7	Maximum 3 applications per season
	1B	acephate	<b>Orthene 75 SP</b>	1.2 kg in 2000 L water	24 hours	-	Based on 14,000 plants/ha. Transplanting water treatment only.
	1A	methomyl	<b>Lannate Toss-N-Go</b>	270-540 g/ha	12 hours	1	
	4	thiamethoxam	<b>Actara 25 WG</b>	105 g/ha	12 hours	1	Max 2 applications/year. Apply before aphids reach damaging levels. Allow at least 7 days between treatments. Use at least 100 L water per hectare.
	29	Flonicamid	<b>Beleaf 50SG</b>	0.12-0.16 kg/ha	12 hours	0	Thorough spray coverage of plant foliage is essential. Minimum of 94 L water/ha. Max 3 applications/season, allow 7 days between applications. <b>Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier and do not use adjuvants.</b>
	28	Cyantraniliprol e	<b>Exirel</b>	500-1500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. For optimum control of aphids, apply Hasten NT Spray Adjuvant* at an application rate of 0.25% v/v or MSO Concentrate with Leci-Tech* at an application rate of 0.5% v/v. Maximum 4 applications per

							season. Also controls <u>Pepper Maggot</u> . Rate: 1000-1500 ml/ha.
	9D	Afidopyropen  <i>NEW 2019</i>	<b>Versys</b>	0.1 L/ha	12 hours	0	<u>Green peach aphid (<i>Myzus persicae</i>)</u> , <u>potato aphid (<i>Macrosiphum euphoribae</i>)</u> . Allow a minimum of 7 days between applications. Monitor pest population and reapply if necessary once thresholds are reached. Application during the crop blooming period may be made only in the evening when most bees are not foraging. Max 4 applications per year.
<b>Aphids, Psyllids and Whiteflies</b>	23	spirotetramat	<b>Movento 240 SC</b>	220-365 ml/ha	12 hours	1	Minimum interval between applications is 7 days. Max 730 ml/ha of product applied per season. <b>TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply this product during crop flowering period or when flowering weeds are present in the field.</b>
			<b>Movento 150 OD</b>	347-585 ml/ha	12 hours	1	Minimum interval between applications is 7 days. Maximum of 1.17 L/ha of product applied/season. <b>TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply this product during crop flowering period or when flowering weeds are present in the field.</b>
	4	thiamethoxam	<b>Actara 25 WG</b>	105 g/ha	12 hours	1	Apply before aphids reach damaging levels. Max two applications/year. <b>Highly toxic to bees, do not apply to blooming crops and wait at least 5 days before placing beehives in a treated field.</b> Allow at least 7 days between applications.



	4	Acetamiprid	<b>Assail 70 WP</b> <b>Aceta 70 WP</b>	120 g/ha	12 hours	7	Whitefly. Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more than 2 applications per season. Do not apply more than once every 7 days.
	9D	Afidopyropen	<b>Versys</b>	0.35-0.5 L/ha	12 hours	0	<u>Sweet potato whitefly (<i>Bemisia tabaci</i>) &amp; silverleaf whitefly (<i>Bemisia argentifolii</i>)</u> . Allow a minimum of 7 days between applications. Monitor pest population and reapply if necessary once thresholds are reached. Application during the crop blooming period may be made only in the evening when most bees are not foraging. Max 4 applications per year.
		<b>NEW 2019</b>					
<b>Cutworms</b>	1B	acephate	<b>Orthene 75 SP</b>	900 g in 2000 L water	24 hours	-	Based on 14,000 plants/ha. Transplanting water treatment only.
	1A	carbaryl	<b>Sevin XLR</b>	45 ml/100 m row	12 hours 6 days (tying, pruning, etc)	2	Apply on 4 day intervals
	3	permethrin	<b>Pounce 384 EC</b>	180-260 ml/ha	-	1	Do not disturb soil for 5 days after treating.
	3	cyhalothrin-lambda	<b>Matador 120 EC</b>	83 ml/ha	24 hours	7	
	1A	methomyl	<b>Lannate Toss-N-Go</b>	270-540 g/ha	12 hours	1	Variegated cutworm.
	28	Cyantraniliprol e	<b>Exirel</b>	500-750 ml/ha	12 hours	1	Begin applications when treatment thresholds are reached. Thorough coverage is important to obtain optimum control. For early season cutworm control, apply to foliage when rain is not expected in the next 24 hours. For optimal control, apply to smaller plants or when lower portions of

							plant can receive adequate coverage. Max 4 applications/season.
<b>Loopers and European Corn Borer</b>	11	<i>Bacillus thuringiensis</i>	<b>Dipel 2X DF</b>	275-550 g/ha	4 hours	1	Most effective against small larvae.
			<b>Thuricide HPC</b>	2.0-4.25 L/ha	-	1	
	1A	carbaryl	<b>Sevin XLR</b>	2.5-5.25 L/ha	12 hours 6 days (tying, pruning, etc)	2	<b>Tomato fruitworm only.</b>
	5	spinosad	<b>Entrust 80 W</b>	50-109 g/ha	12 hours	1	Max 3 applications/yr. Allow 7-10 days between applications. Works best on small larvae.
			<b>Entrust</b>	167-364 ml/ha			
			<b>Success</b>	Loopers: 182 ml/ha ECB: 83 ml/ha			
	5	spinetoram	<b>Delegate WG</b>	140-200 g/ha	4 hours	1	Time application with peak egg hatch. Repeat applications based on population monitoring. Use higher rate for higher infestations or advanced growth stages. Max 3 applications per year with a minimum of 5 days between treatments.
	18	Methoxyfenozide	<b>Intrepid 240F</b>	0.3 – 0.6 L/ha	12 hours	1	Apply at the first signs of feeding damage before the insect enters the fruit or when infestations reach threshold levels as determined by monitoring. Monitoring of insect populations is key to controlling this pest. Repeat applications after 7-14 days if required based on population monitoring. Use the higher rate for heavy infestations or larger crop canopies.
28	Cyantraniliprole	<b>Exirel</b>	<i>Cabbage looper</i> : 250-500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough	

				<i>European corn borer:</i> 500-750 ml/ha			coverage is important to obtain optimum control. Do not make more than 4 applications per season.
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	<b>XenTari WG</b>	500-1000 g/ha	-	0	<b>Cabbage looper.</b> Apply every 5 to 7 days. Apply using 500–1000 L water per ha to ensure full coverage but not to the point of run off.
<b>Colorado Potato Beetle</b> <i>Transplant treatment</i>	4	imidacloprid	<b>Admire 240 F</b>	7-10 ml/100 m of row	12 hours	-	Applications can be made as a drench in the planting water or through a soil application. After a soil application, do not apply Admire again that year.
				0.46-1.3 L/ha			
	1B	acephate	<b>Orthene 75 SP</b>	900 g in 2000 L water	24 hours	-	Based on 14,000 plants/ha. Transplanting water treatment only. Temporary plant damage can occur on light sandy soils.
<i>Foliar treatment</i>	4	imidacloprid	<b>Admire 240 F</b>	200 ml/ha	24 hours	7	Max 2 foliar sprays 5 days apart/yr.
	4	acetamiprid	<b>Assail 70 WP</b>	40-80 g/ha	12 hours	7	Max 2 applications/yr. Alternate with other insecticides.
	3	cyhalothrin-lambda	<b>Matador 120 EC</b>	83-125 ml/ha	24 hours	7	Use higher rate for larger instars.
	5	spinosad	<b>Success 480 SC</b>	83 ml/ha	12 hours	1	Use only on small instars and low infestations. Maximum 3 applications/yr.
				<b>Entrust 80 W Entrust SC</b>	50 g/ha 167 ml/ha	12 hours	
	3	cypermethrin	<b>Mako</b>	85 ml/ha	-	3	Use sufficient water volume to provide adequate plant coverage. Apply when first sign of damage is observed.
<b>UP-Cyde</b>				140 ml/ha	12 hours	3	

	3	delatmethrin	<b>Decis 5 EC</b>	100-150 ml/ha	12 hours	3	Max 3 applications/yr. Apply in 200-500 L of water / ha.
			<b>Poleci 2.5 EC</b>	200-300 ml/ha			
	3	permethrin	<b>Pounce 384 EC</b>	180-260 ml/ha	-	1	Use sufficient water volume to provide adequate plant coverage
	28	chlordantraniliprole	<b>Coragen</b>	250-375 ml/ha	12 hours	1	Begin applications when treatment thresholds are reached. Use high rate under heavy insect pressure. Max 4 applications/season. Do not apply more than once every 5 days. Do not exceed 1.125 L/ ha/season. Apply in a finished spray volume of 100L/ha.
	3 & 4	imidacloprid, deltamethrin	<b>Concept</b>	650 ml/ha	24 hours	7	Apply once populations reach threshold. Max 3 applications/year; allow a minimum of 5 days between applications. Also controls tomato hornworm. <b>Do not tank mix with pesticides, fertilizers or any other chemical additives unless recommended on label.</b>
	28	Cyantraniliprole	<b>Exirel</b>	750-1000 ml/ha	12 hours	1	Begin applications when treatment thresholds are reached. Thorough coverage is important to obtain optimum control. Do not make more than 4 applications per season.
	5	Spinetoram	<b>Delegate WG</b>	140-200 g/ha	12 hours	1	Time the application for egg hatch or small larvae. Use the higher rate for the higher pest pressure or for larger larvae. A repeat application in 7 to 14 days may be necessary depending on the pest pressure.
	4	Acetamiprid	<b>Assail 70 WP</b> <b>Aceta 70 WP</b>	40-80 g/ha	12 hours	7	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more

							than 2 applications per season. Do not apply more than once every 7 days.
<b>Flea Beetle</b>	1B	acephate	<b>Orthene 75 SP</b>	900 g in 2000 L water	12 hours	-	Based on 14,000 plants/ha. Transplanting water treatment only. Temporary plant damage can occur on light sandy soils.
	1A	carbaryl	<b>Sevin XLR</b>	2.5-5.25 L/ha	12 hours 6 days (tying, pruning, etc)	2	Repeat as necessary on 7-10 day intervals
	3	permethrin	<b>Pounce 384 EC</b>	180-260 ml/ha	-	1	Use sufficient water volume to provide adequate plant coverage
	3	cyhalothrin-lambda	<b>Matador 120 EC</b>	83 ml/ha	24 hours	7	
	3	cypermethrin	<b>Mako</b>	85 ml/ha	-	3	Use sufficient water volume to provide adequate plant coverage. Apply when first sign of damage is observed.
			<b>UP-Cyde</b>	140 ml/ha	12 hours	3	
<b>Tarnished Plant Bug</b>	1A	carbaryl	<b>Sevin XLR</b>	5.25-6.4 L/ha	12 hours 6 days (tying, pruning, etc)	2	Repeat as necessary on 7-10 day intervals
	1B	dimethoate	<b>Lagon 480 EC</b>	0.55-1.1 L/ha ml/ha	12 hours	7	Maximum 3 applications per season
	3	cyhalothrin-lambda	<b>Matador 120 EC</b>	83 ml/ha	24 hours	7	
<b>Mites (Broad and two spotted spider mite)</b>	23	spiromesifen	<b>Forbid 240 SC</b>	500-600 ml/ha	12 hours	7	Max 3 applications/season. Minimum application volume of 100 L/ha. <b>Also controls whiteflies (including silverleaf, sweetpotato and greenhouse)</b> See label for buffer zone restrictions.
	1B	malathion	<b>Malathion 500 E</b>	1.4-2.0 L/ha	12 hours	3	Not effective below 18°C.

	-	mineral oil	<b>Purespray Green Spray Oil 13E</b>	10 L in 1000 L water (1% solution) otherwise phytotoxicity may result.	-	-	Use sufficient spray volume (up to 1000 L/ha) to ensure thorough crop coverage. Spider mites: begin when mites appear. Apply at 7 – 14 day intervals. Do not apply more than 8 summer spray applications per growing season.
	25	Cyflumetofen	<b>Nealta</b>	1 L/ha	12 hours	3	Twospotted spider mite. Maximum of 2 applications per growing season. Allow a minimum of 14 days between applications. Monitor pest population and reapply if necessary once thresholds are reached.
<b>Brown Marmorated Stink Bug</b>	1A	methomyl	<b>Lannate</b>	540 g/ha	12 hours	1	Apply when insects first appear. Continue at 5-7 day intervals if monitoring indicates the need.
	1B	malathion	<b>Malathion 85E</b>	975 mL/ha	-	3	Ensure sufficient water volume is used to guarantee thorough coverage. Use a minimum of 500 L water/ha. Apply prior to harvest when treatment thresholds have been reached, as determined by local monitoring.
<b>Armyworm, Beet armyworm, Fall armyworm</b>	28	Cyantraniliprole	<b>Exirel</b>	500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more than 4 applications per season.
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	<b>XenTari WG</b>	500-1000 g/ha	-	0	<b>Beet armyworm.</b> Apply every 5 to 7 days. Apply using 500–1000 L water per ha to ensure full coverage but not to the point of run off.

<b>Tomato fruitworm (corn earworm)</b> <b>Tobacco hornworm (suppression)</b> <b>Tomato hornworm (suppression)</b>	28	Cyantraniliprole	<b>Exirel</b>	750 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more than 4 applications per season.
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	<b>XenTari WG</b>	500-1000 g/ha	-	0	<b>Tobacco budworm, Tomato fruitworm.</b> Apply every 5 to 7 days. Apply using 500–1000 L water per ha to ensure full coverage but not to the point of run off.
<b>Spotted wing drosophila</b>	5	Spinetoram	<b>Delegate WG</b>	140-200 g/ha	12 hours	1	Timing of applications should be based on the presence of adult pests (flies) as determined by local monitoring. Consult provincial guidelines and local extension specialists for monitoring protocols and treatment thresholds. A repeat application in 7 to 14 days may be necessary depending on the pest pressure. Max 3 applications/year.
	5	Spinosad	<b>Entrust SC</b>	364 ml/ha	12 hours	1	Maximum of 3 applications per year with 7 -10 days between applications. Application should be based on the presence of adult pests (flies) as determined by local monitoring.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
<b>DISEASES:</b>							
<b>Bacterial Leaf spot</b>	M	copper hydroxide	<b>Kocide 101</b>	2.25 kg/ha	48 hours	2	Apply at 7 day intervals for at least three applications. Apply more frequently under wet conditions. Applications may continue until early bloom.
	M3 + M	mancozeb + copper hydroxide	<b>Dithane DG + Kocide 101</b>	1.75-2.25 kg/ha + 2.2 Kg/ha	48 hours	7	
			<b>Manzate DF + Kocide 101</b>	1.75-2.25 kg/ha + 2.2 Kg/ha	48 hours	7	
	-	<i>Bacillus subtilis</i>	<b>Serenade Opti</b>	0.6-1.7 Kg/ha	-	0	<b>Biopesticide that will only suppress the indicated diseases.</b> Begin application soon after emergence or transplant, when conditions are conducive to disease development. Repeat as necessary on 7-10 day intervals. When environmental conditions and plant stage are conducive to rapid disease development, use in a rotational program with other registered bactericides.
	24	Kasugamycin as hydrochloride hydrate	<b>Kasumin</b>	1.2 L/ha in 240 L/ha of water	12 hours	1 day	Begin applications when conditions favour disease development. Repeat applications when conditions favour disease development. Min interval of 7 days between applications. Max 3 applications/season.
	M1	Copper	<b>Cueva</b>	0.5% to 2% solution, apply at 470-940 L/ha.	4 hours	1	Re-apply using 5-10 day intervals.



<b>Bacterial canker</b> ( <i>Clavibacter michiganensis</i> )	-	Citric acid, Lactic acid	<b>Tivano</b>	12 L/ha in 500 L/ha spray volume	-	-	Begin applications when conditions are conducive to disease development. Apply at 5-10 day intervals.
	24	Kasugamycin as hydrochloride hydrate	<b>Kasumin</b>	1.2 L/ha in 240 L/ha of water	12 hours	1 day	Begin applications when conditions favour disease development. Repeat applications when conditions favour disease development. Min interval of 7 days between applications. Max 3 applications/season.
	M1	Copper	<b>Cueva</b>	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	Re-apply using 5-10 day intervals.
<b>Damping Off</b>	M	captan	<b>Captan 80 WDG</b>	1.5 kg/1000L	72 hours	-	Apply 50-85 L/100 m <sup>2</sup> . Work into upper 7.5-10 cm of soil before planting
			<b>Maestro 80 DF</b>	1.5 kg/1000L	48 hours	-	
<b>Anthracnose, Early Blight, Late Blight and Septoria</b>	11	pyraclostrobin	<b>Cabrio EG</b>	560-840 g/ha	12 hours	0	Use up to 1 kg/ha for late blight. Max 6 applications/year. Do not make more than 2 applications in a row before rotating to another chemical.
	7	boscalid	<b>Cantus WDG</b>	175-315 g/ha	12 hours	0	<b>Early blight only.</b> Use 420 g/ha to control botrytis. Max 5 applications/ year. Max 2 applications before rotating to a different fungicide group.
	M	chlorothalonil	<b>Bravo 500 / Bravo ZN</b>	2.4-4.0 L/ha	48 hours	2	Apply at 8-10 day intervals at the lower rate; apply at 14 day intervals using the higher rate.
			<b>Echo 90DF</b>	1.3-2.2 kg/ha			Under severe disease conditions, shorten the spray interval. Max 9 applications per season.
			<b>Echo 720</b>	1.7-2.8 L/ha	48 hours	1	Processing tomatoes – Echo can be tank mixed with Lexone® herbicide. Follow the Echo label directions for disease control and use Lexone at 150 g active

							ingredient/ha for weed control. (Refer to the Lexone label for proper rates and use.) <b>When using this tank mix combination, DO NOT apply within 30 days before harvest.</b>
M3	mancozeb	<b>Dithane DG Rainshield</b>	1.1-3.25 kg/ha	24 hours	7		<b>Early blight, late blight and anthracnose only</b>
		<b>Manzate Pro-Stick</b>	1.75-3.25 kg/ha	24 hours	7		
M <sup>2</sup>	metiram	<b>Polyram DF</b>	2.25-3.25 kg/ha	-	7		<b>Low rate for early and late blight, high rate for anthracnose.</b>
M	captan	<b>Captan 80 WDG</b>	2.75-4.25 kg/ha	72 hours	2		<b>Anthracnose only.</b> 48 hr re-entry.
		<b>Maestro 75 DF</b>	2.75-4.25 kg/ha	48 hours	2		
11	azoxystrobin	<b>Quadris</b>	300-500 ml/ha	4 hours	1		<b>Early and late blight only.</b> Max 3 applications/year. Do not apply for 21 days after transplanting.
11	Azoxystrobin	<b>Azoshy 250EC</b>	300-500 ml/ha	12 hours	1		<b>Anthracnose:</b> Apply on a 7 to 10 day interval, starting at first fruit set. <b>Early blight:</b> Apply on a 7 to 14 day interval, starting prior to disease establishment.
11 & 27	famoxadone + cymoxanil	<b>Tanos 50 DF</b>	560-840 g/ha	12 hours	3		<b>Anthracnose, early blight and late blight only.</b> Do not apply sequential applications.
M	copper hydroxide	<b>Kocide 101</b>	2.25 kg/ha	48 hours	1		<b>Early blight only.</b> Apply at 7-10 day intervals
M3 + M	mancozeb + copper hydroxide	<b>Dithane DG + Kocide 101</b>	1.75-2.25 kg/ha + 2.2 Kg/ha	48 hours	7		<b>Early blight and late blight only.</b> Apply at 7-10 day intervals.
		<b>Manzate DF + Kocide 101</b>	1.75-2.25 kg/ha + 2.2 Kg/ha	48 hours	7		

	-	<i>Bacillus subtilis</i>	<b>Serenade Opti</b>	2.5 Kg/ha	-	0	<b>Biopesticide that will only suppress the indicated diseases.</b> <u>Early blight:</u> Make first application when plants are 6-10 cm high, or when conditions are conducive for disease development. Repeat at 5-7 day intervals.
	44	<i>Bacillus amyloliquefaciens</i> strain D747	<b>Double Nickel LC (1x10<sup>10</sup> spores/mL)</b>	2.5-10 L/ha	-	0	<b>Early blight.</b> Growth stage: From flowering to fruiting. Repeat application every 3 to 10 days for as long as conditions favor disease development.
			<b>Double Nickel 55 (5x10<sup>10</sup> spores/g)</b>	0.5-2.0 kg/ha			
	40	mandipropamid	<b>Revus plus Non-ionic adjuvant</b>	400-600 ml/ha plus 0.125% v/v	12 hours	1	<b>For control of late blight.</b> Applications should begin prior to disease development and continue throughout the season on a 7-10 day schedule, following resistance management guidelines. Maximum 4 applications per year. <b>May be tank mixed with Bravo 500 for tomatoes. Follow the most restrictive use directions of either label.</b>
	43	fluopicolide	<b>Presidio</b>	220-292 ml/ha	12 hours	2	For resistance management, Presidio must be tank-mixed with a labelled rate of another fungicide registered for the target pathogen, but with a different mode of action. Apply Presidio in a tank mix with Bravo 500 for late blight; Revus for phytophthora blight. Follow the most restrictive use directions of either label <b>Phytophthora blight:</b> Apply as a soil or foliar application on a 7-10 day schedule beginning when conditions are favourable for disease development and prior to

							disease onset. For best results, application should begin at planting or transplanting.
7	<i>penthiopyrad</i>	<b>Fontelis</b>	1.25-1.75 L/ha	12 hours	0		<b>Suppression of early blight.</b> Begin applications prior to disease development; continue on a 7-10 day interval. Use higher rate and shorter interval when disease pressure is high. Maximum seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
40	Dimethomorph	<b>Acrobat 50 WP</b>	450 g/ha	2 days (hand harvesting)  12 hours (no entry)	0		<b>Acrobat 50 WP must be applied as a tank mix with another fungicide active against late blight.</b> Begin applications when conditions favour disease development. Continue on a 5-10 day schedule as needed until weather conditions favouring infection and sporulation decrease. DO NOT use less than 200 L of water/ha for ground applications. Max 5 applications/year.
-	<i>Reynoutria sachalinensis</i>	<b>Regalia Maxx</b>	0.125 – 0.25 % v/v in 400 – 1000 L water /ha	-	Can be applied up to and including day of harvest		For bacterial blight. <b>Field:</b> Apply preventatively soon after transplanting. Repeat at 7-10 day intervals. <b>GH:</b> Begin applications at first sign of disease or when conditions become conducive for disease. Repeat at 7-10 day intervals.
33	Mono and dibasic sodium and potassium and ammonium phosphites	<b>Phostrol</b>	2.9-5.8 L/ha	12 hours	1		For suppression of <b>late blight</b> , begin foliar applications when conditions favouring disease development exist and continue on a 7-14 day interval if needed. Max 4 applications.
40,45	Ametoctradin, dimethomorph	<b>Zampro</b>	1.0 L/ha	All other activities – 12 hours	4		To reduce the risk of development of fungicide resistance, <b>Zampro</b> must be used in rotation with other fungicides

							having a different mode of action against downy mildew. Begin applications prior to disease development and continue on a 5-7-day interval. Max 3 applications.
	11	Fenamidone	<b>Reason 500 SC</b>	As a tank mix with Dithane DG - apply at 200 mL/ha plus Dithane DG at 1.25 kg/ha As a tank mix with Bravo 500 - apply at 200 mL/ha plus Bravo 500 at registered rates.	12 hours	14	Application of Reason 500SC should begin when plants are 15-20 cm high or when disease threatens. Maximum 6 applications per year.
	21	Cyazofamid	<b>Torrent 400 SC</b>  <b>+ Sylgard 309</b>	0.1 to 0.2 L in 200 to 600 L of water per hectare	12 hours	1	Apply on a 7-10 day schedule beginning when warning systems forecast disease infection periods, generally at flower initiation or when conditions are favorable for disease development. Max 5 applications/ season. <b>A plant back interval of 30 days is required.</b>
	M1	Copper	<b>Cueva</b>	0.5% to 2% solution, apply at 470-940 L/ha.	4 hours	1	Re-apply using 5-10 day intervals.
	7	Benzovindiflupyr	<b>Aprovia</b>	500-750 ml/ha	12 hours	1	<i>Early blight, Anthracnose, Septoria leaf spot.</i> Begin applications prior to disease development and continue throughout the season on a 7 day interval, starting at first fruit set for all diseases except Early blight. For Early blight apply on a 7-14 day interval starting prior to disease

							establishment. If disease pressure is high, use the highest rate.
	7-3	Benzovindiflupyr & Difenoconazole	<b>Aprovia Top</b>	643-967 ml/ha	12 hours	1	<i>Early blight, Anthracnose, Septoria leaf spot.</i> Begin applications prior to disease development and continue throughout the season on a 7 day interval, starting at first fruit set for all diseases except Early blight. For Early blight apply on a 7-14 day interval starting prior to disease establishment. If disease pressure is high, use the highest rate. For best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage. <b>(For suppression of Cercospora leaf spot, apply at 643mL/ha)</b>
	7-9	Fluopyram Pyrimethanil	<b>Luna Tranquility</b>	800 ml/ha	12 hours	1	<i>Early Blight &amp; Septoria leaf spot.</i> Begin fungicide applications preventatively. Continue as needed, on a 7 - 12 day interval.
	U15	Oxathiapiprolin	<b>Zorvec Enicade</b>	0.175-0.35 L/ha	12 hours	0	<b>Late blight.</b> Begin applications prior to disease development and continue on a 5 to 14 day interval. Use higher rate and shorter interval when disease pressure is high.
	19	Polyoxin D Zinc Salt	<b>Diplomat 5SC</b>	537-926 ml/ha	-	0	<b>Early blight suppression.</b> Apply as a foliar spray in sufficient water to provide thorough coverage of foliage (and fruit when present). Begin as a preventative application when conditions favour disease development and continue on a 7-14 day interval as needed to maintain suppression

<b>Botrytis Gray Mold</b>	-	<i>Bacillus subtilis</i>	<b>Serenade Opti</b>	1.7-3.3 Kg/ha	-	0	<b>Biopesticide that will only suppress the indicated diseases.</b> Make the first application when plants are 6-10 cm high, or when conditions are conducive for disease development. Repeat applications on an interval of 5-7 days.
	44	<i>Bacillus amyloliquefaciens</i> strain D747	<b>Double Nickel LC (1x10<sup>10</sup>spores/mL)</b>	6.25-18 L/ha Low disease pressure: 4.5-5 L/ha	-	0	Growth stage: From flowering to fruit maturity. Repeat application every 3 to 10 days for as long as conditions favor disease development.
			<b>Double Nickel 55 (5x10<sup>10</sup>spores/g)</b>	1.25-3.6 kg/ha Low disease pressure: 0.9-1 kg/ha			
	7	<i>penthiopyrad</i>	<b>Fontelis</b>	1.25-1.75 L/ha	12 hours	0	<b>Begin applications prior to disease development, continue on a 7-10 day interval.</b> Use higher rate and shorter interval when disease pressure is high. Maximum seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
	-	<i>Reynoutria sachalinensis</i>	<b>Regalia Maxx</b>	0.25 % v/v in 400 – 1000 L water /ha	-	0	<b>Field:</b> Apply preventatively soon after transplanting. Repeat at 7-10 day intervals. <b>GH:</b> Begin applications at first sign of disease or when conditions become conducive for disease. Repeat at 7-10 day intervals.
9, 12	Cyprodinil and fludioxonil	<b>Switch 62.5 WG</b>	775-975 g/ha	12 hours	0	Begin applications prior to or at the onset of disease and repeat at 7-10 day intervals if conditions remain favourable for disease development. Apply higher rate	

							under conditions of high disease pressure. Apply in sufficient water to ensure thorough coverage: Ground: 200 L of water /ha After 2 applications of Switch 62.5WG, alternate with another fungicide with a different mode of action for 1 application. Maximum 3 applications/year.
	M	Chlorothalonil	<b>Echo 90DF</b>	2.7 kg/ha	48 hours	1	Apply on an 8 – 10 day schedule.
			<b>Echo 720</b>	3.3 L/ha			
	-	BLAD polypeptide	<b>Fracture</b>	1.5-3.3 L/ha	-	0	Begin applications prior to onset of disease development and continue on a 7 to 10-day interval to maintain disease control. Under conditions of moderate to severe disease pressure, use the higher labeled rate and shorter interval. Apply in a minimum of 200 litres or more of water per hectare to assure thorough coverage of the plants. FRACTURE requires two to four hours drying time on plant foliage for the active ingredient to absorb into the plant tissue before rain or irrigation occurs. If, during the next 12 hours it rains significantly, a new application will be needed during the next 4 days. Do not make more than five foliar applications per harvest cycle.
	19	Polyoxin D zinc salt  <i>NEW 2019</i>	<b>Diplomat 5SC</b>	463 – 926 ml/ha	-	0	<b>Botrytis blight &amp; Grey mold.</b> Apply as a foliar spray in sufficient water to provide thorough coverage of foliage (and fruit when present). Begin as a preventative application when conditions favour disease development and continue on a 7-10 day interval as needed to maintain



							suppression. Do not apply more than 150 g a.i./ha/season or 12 months.
<b>Powdery Mildew</b>	-	<i>Bacillus subtilis</i>	<b>Serenade Opti</b>	1.7-3.3 Kg/ha	-	0	<b>Biopesticide that will only suppress the indicated diseases.</b> Begin application soon after emergence or transplant, and repeat on an interval of 7-10 days.
	-	<i>Streptomyces lydicus</i>	<b>Actinovate SP</b>	425-840g/1100L water	1 hour	-	Spray to wet but avoid run-off. Apply as a foliar spray to leaves and blossom. Make first application at transplant and repeat every 7-14 days.
	-	mineral oil	<b>Purespray Green Spray Oil 13E</b>	10 L in 1000 L water (1% solution) otherwise phytotoxicity may result.	12 hours	-	Use sufficient spray volume (up to 1000 L/ha) to ensure thorough crop coverage. Begin when conditions are favourable for disease development and/or when 1st symptoms appear. Apply at 7 – 14 day intervals. Do not apply more than 8 summer spray applications per growing season.
	7	Benzovindiflupyr	<b>Aprovia</b>	500-750 ml/ha	12 hours	1	Begin applications prior to disease development and continue throughout the season on a 7 day interval, starting at first fruit set for all diseases except Early blight. For Early blight apply on a 7-14 day interval starting prior to disease establishment. If disease pressure is high, use the highest rate.
	7-3	Benzovindiflupyr & Difenconazole	<b>Aprovia Top</b>	643-967 ml/ha	12 hours	1	Begin applications prior to disease development and continue throughout the season on a 7 day interval, starting at first fruit set. If disease pressure is high, use the highest rate. For best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.

	19	Polyoxin D zinc salt  <i>NEW 2019</i>	<b>Diplomat 5SC</b>	278 – 926 ml/ha	-	0	Apply as a foliar spray in sufficient water to provide thorough coverage of foliage (and fruit when present). Begin as a preventative application when conditions favour disease development and continue on a 7-14 day interval as needed to maintain control. Do not apply more than 150 g a.i./ha/season or 12 months.
<b>Phytophthora Blight</b> ( <i>Phytophthora capsici</i> )	U15	Oxathiapiprolin	<b>Orondis 200SC</b>	0.35-1.4 L/ha	12 hours	0	<b>Soil phase.</b> Apply at plant, in furrow, drip or in transplant water. Use the higher rates for heavier soils, for longer application intervals, or for susceptible varieties. <b>Foliar phase:</b> Begin applications prior to disease development and continue on a 5 to 14 day interval. Use higher rate and shorter interval when disease pressure is high. <b>Soil phase:</b> Apply at plant, in furrow, drip or in transplant water. See specific soil application directions on label.
			<b>Zorvec Enicade</b>	Foliar phase: 0.175-0.35 L/ha Soil phase: 0.7-2.8 L/ha			
			<b>Zorvec Epicaltrin</b>	0.35-1.4 L/ha	12 hours	0	<b>Phytophthora Blight – soil phase:</b> Apply at plant, in furrow, drip or in transplant water. Use the higher rates for heavier soils, for longer application intervals, or for susceptible varieties. <i>*Do not follow soil applications of Epicaltrin with foliar applications of Zorvec Enicade or other oxathiapiprolin-containing fungicides. Use either soil applications or foliar applications but not both to control the relevant disease.</i>
	44	<i>Bacillus amyloliquefaciens</i> strain D747	<b>Double Nickel LC (1x10<sup>10</sup>spores/mL)</b>	0.5-2.5 L/ha	-	0	<b>Partial suppression of soil level Phytophthora blight infection.</b> Growth stage: From planting/transplanting until maturity.

			<b>Double Nickel 55</b> (5x10 <sup>10</sup> spores/g)	0.1-0.5 kg/ha			For transplanted crops: Make preventative applications to transplants in the greenhouse or nursery before transplanting. See "Soil application" instructions on label. For crops grown from seed: Apply at planting, following the instructions below for "Banded/in furrow application." See "Soil application" instructions on label. Follow up applications can be made at 2-4 week intervals after planting or transplanting.
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**Use the following web link to search for any pesticide label mentioned in this guide, or any other pesticide registered in Canada:**

<http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>

# PESTICIDE EMERGENCY CONTACT INFORMATION

<b>Poison Control Centres</b>		
Nova Scotia	800.565.8161 or 902.428.8161	IWK, Halifax, NS
New Brunswick	911	Ask for Poison Information
Prince Edward Island	800.565.8161 or 902.428.8161	IWK, Halifax, NS
Newfoundland	709.722.1110	Dr. Charles A. Janeway Child Health Care Centre, St. John's, NF

<b>Environmental Emergencies (Pesticide Spills)</b>	
Transport Canada Regional Operations Centre (24 hours)	
Nova Scotia	800.565.1633
New Brunswick	800.565.1633
Prince Edward Island	800.565.1633
Newfoundland	800.563.9089

## ABBREVIATIONS & CONVERSIONS

<b>Formulation and Measurement Abbreviations</b>			
FORMULATIONS		MEASUREMENTS	
DF	Dry flowable	mL	millilitre
DG	Dry granule	kPa	kilopascal
EC, E	Oil-based emulsifiable concentrate	kg	kilogram
EW	Water-based concentrate	g	gram
EG	Water dispersible granule	L	litre
F	Flowable	BIU	Billions of International Units
L	Liquid	ppm	parts per million (1000 ppb)
Sn	Solution	ppb	parts per billion (1/1000 ppm)
SP	Soluble powder		
WDG	Wettable dry granule		
WP, W	Wettable powder		

<b>Helpful Conversions<sup>1</sup></b>	
kPa X 0.14 = pounds per square inch (psi)	millilitres X 0.035 = fluid ounces
hectares X 2.47 = acres	litres X 35 = fluid ounces
kilograms X 2.2 = pounds	litres X 0.22 = imperial gallons
kilograms per hectare X 0.89 = pounds per acre	litres per hectare X 14.17 = fluid ounces per acre
kilograms per hectare X 0.40 = kilograms per acre	litres per hectare X 0.40 = litres per acre
	degree-days C X 1.8 = degree-days F

<sup>1</sup> **Pesticide Units of Measurement**

It is not recommended to convert label rates to imperial units because there is a high probability of mathematical and rounding errors. Present day pesticides are formulated to be more effective in smaller amounts. Therefore, even small conversion errors can lead to the use of incorrect rates (either too high or too low). Use metric – you will be glad you did!