

GUIDE TO PEST MANAGEMENT IN FIELD TOMATO

Nova Scotia Vegetable Crop Guide to Pest Management 2011
[TOM1-11]

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IMPORTANT

This publication was compiled by representatives from AgraPoint 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, AgraPoint 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, AgraPoint 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	Pesticide Common Name	Pesticide Product Name	Rate	Days to Harvest	Remarks
WEEDS:					
Preplant <i>Perennial weeds including quackgrass</i>	glyphosate	Roundup 356 Sn	1.25-2.5 L/ha	7	Apply in the 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 to 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.
		Roundup WeatherMAX	1.67-8.0 L/ha	7	
		Touchdown 480	2.5-7.0 L/ha	7	
	carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	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.
Preplant Incorporated <i>Germinating annual grasses and some broadleaves</i>	trifluralin	Treflan EC	1.25-2.4 L/ha	-	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.
		Rival	1.2-2.2 kg/ha	-	
	napropamide	Devrinol 50-DF	2.25-4.5 kg/ha	-	Incorporate to a depth of 2.5-5 cm within 24 hours of application. Do not apply to soils with over 10% organic matter.

	s-metholachlor / benoxacor	Dual II Magnum	1.25-1.75 L/ha	-	Use only with transplant tomatoes grown for processing
	s-metholachlor / benoxacor plus metribuzin	Dual II Magnum plus Sencor 480 F	1.25-1.75 L/ha Plus 0.5-1.4 L/ha	-	
Postemergence	fenoxypop-ethyl	Excel Super	0.67 L/ha	55	Use only with transplant tomatoes grown for processing
<i>Grasses</i>	sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha 1-2 L/ha	30	Apply to actively growing grasses at the 1-6 leaf stage.
	fluazifop-p-butyl	Venture L	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>	thifensulfuron methyl	Pinnacle 75 Toss-N-Go plus Agral 90	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>	rimsulfuron	Prism plus Agral 90	60 g/ha 2 L/1000L water	30	Max 1 application/yr. Weeds that emerge after application will not be controlled.
<i>Inter-row shielded</i>	paraquat	Gramoxone 200 Sn	2.75-5.5 L/ha	-	Avoid spraying crop as damage may occur.
	diquat	Reglone 240	2.3-4.6 L/ha	-	
	carfentrazone- ethyl	Aim EC	36.5-117 mL/ha	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.
INSECTS:					
Aphids	acetamiprid	Assail 70 WP	56-86 g/ha	7	Max 4 applications/yr. Alternate with

					other insecticides.
	malathion	Malathion 500 E	1.5-2.0 L/ha	3	Not effective below 18 C,
	dimethoate	Lagon 480 EC	0.55-1.1 L/ha ml/ha	7	Maximum 3 applications per season
	diazinon	Diazinon 500 E	1.1-1.7 L/ha	1	Use sufficient water volume to provide adequate plant coverage
	acephate	Orthene 75 SP	1.2 kg in 2000 L water	-	Based on 14,000 plants/ha. Transplanting water treatment only.
	methomyl	Lannate Toss-N-Go	270-540 g/ha	1	24 hr re-entry
	endosulfan	Thiodan 4 EC	1.5-2.75 L/ha	2	Use sufficient water volume to provide adequate plant coverage
		Thionex 50 WP	1.1-2.25 kg/ha	2	
	thiamethoxam	Actara 25 WG	105 g/ha	1	Maximum 2 applications per year. Apply before aphids reach damaging levels. Allow at least 7 days between treatments. Use at least 100 L of water per hectare.
	Flonicamid	Beleaf 50SG	0.12-0.16 kg/ha	0 days	Thorough spray coverage of plant foliage is essential. Minimum of 94 litres of water/ha. Maximum of 3 applications per season, allow 7 days between applications. Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier and do not use adjuvants.
Aphids, Psyllids and Whiteflies	spirotetramat	Movento 240 SC	220-365 ml/ha	1	Minimum interval between applications is 7 days. Maximum of 730 ml/ha of product applied per season. This product is 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, orchard or vineyard.

		Movento 150 OD	347-585 ml/ha	1	Minimum interval between applications is 7 days. Maximum of 1.17 L/ha of product applied per season. This product is 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, orchard or vineyard.
Cutworms	acephate	Orthene 75 SP	1.2 kg in 2000 L water	-	Based on 14,000 plants/ha. Transplanting water treatment only.
	carbaryl	Sevin XLR Plus	45 ml/100 m row	2	Apply on 4 day intervals
	permethrin	Pounce 384 EC	180-260 ml/ha	1	Do not disturb soil for 5 days after treating. 24 hr re-entry.
	cyhalothrin-lambda	Matador 120 EC	83 ml/ha	7	
	methomyl	Lannate Toss-N-Go	270-540 g/ha	1	24 hr re-entry. Variegated cutworm
Loopers and European Corn Borer	<i>Bacillus thuringiensis</i>	Dipel 2X DF	275-550 g/ha	1	Most effective against small larvae.
		Thuricide HPC	2.0-4.25 L/ha	1	
	endosulfan	Thiodan 4 EC	2.75 L/ha	2	Tomato fruitworm only
		Thionex 50 WP	2.25 kg/ha	2	
	carbaryl	Sevin XLR Plus	2.5-5.25 L/ha	2	

	spinosad	Entrust 80 W	50-109 g/ha	1	Max 3 applications/yr. Allow 7-10 days between applications. Works best on small larvae.
	spinetoram	Delegate WG	140-200 g/ha	1	Time application with peak egg hatch. Repeat applications based on population monitoring. Use higher rate for higher infestations or advanced growth stages. Maximum of 3 applications per year with a minimum re-treatment interval of 5 days.
Colorado Potato Beetle <i>Transplant treatment</i>	imidacloprid	Admire 240 F	7-10 ml/100 m of row	-	Applications can be made as a drench in the planting water or through a soil application. After a soil application do not make any other Admire applications that year.
			0.46-1.3 L/ha		
	acephate	Orthene 75 SP	1.2 kg in 2000 L water	-	Based on 14,000 plants/ha. Transplanting water treatment only. Temporary plant damage can occur on light sandy soils.
<i>Foliar treatment</i>	imidacloprid	Admire 240 F	200 ml/ha	7	Max 2 foliar sprays 5 days apart/yr. 24 hr re-entry.
	acetamiprid	Assail 70 WP	40-80 g/ha	7	Max 4 applications/yr. Alternate with other insecticides. 12 hr re-entry
	<i>Bacillus thuringiensis</i>	Novodor	4.0-8.0 L ha	0	Field scouting is essential for timing of sprays.
	cyhalothrin-lambda	Matador 120 EC	83-125 ml/ha	7	Use higher rate for larger instars. 24 hr re-entry.
	spinosad	Success 480 SC	83 ml/ha	1	Use only on small instars and low infestations. Max 3 applications/yr.
		Entrust 80 W	50 g/ha	1	
	cypermethrin	Ripcord 400 EC	85 ml/ha	3	Use sufficient water volume to provide adequate plant coverage. Apply when

		UP-Cyde	140 ml/ha	3	first sign of damage is observed.
	delatmethrin	Decis 5 EC	100-150 ml/ha	3	Max 3 applications/yr. Apply in 200-500 L of water / ha.
	permethrin	Pounce 384 EC	180-260 ml/ha	1	Use sufficient water volume to provide adequate plant coverage
	endosulfan	Thiodan 4 EC	1.5-2.75 L/ha	2	Use sufficient water volume to provide adequate plant coverage
		Thionex 50 WP	1.1-2.25 kg/ha	2	
	chlorantraniliprole	Coragen	250-375 ml/ha	1	Begin applications when treatment thresholds have been reached. Use high rate under heavy insect pressure. Maximum of 4 applications per season. Do not apply more than once every 5 days. Do not exceed 1.125 L of Coragen per ha per season. Apply in a finished spray volume of 100L/ha.
	imidacloprid, deltamethrin	Concept	650 ml/ha	7	Apply once populations reach threshold. Allow a minimum of 5 days between applications and a maximum of 3 applications per year. Also controls tomato hornworm. 2 day REI. Do not tank mix concept with pesticides, fertilizers or any other chemical additives unless recommended on label
Flea Beetle	acephate	Orthene 75 SP	1.2 kg in 2000 L water	-	Based on 14,000 plants/ha. Transplanting water treatment only. Temporary plant damage can occur on light sandy soils.
	endosulfan	Thiodan 4 EC	1.5-2.75 L/ha	2	Spray plants thoroughly

		Thionex 50 WP	1.0-2.25 kg/ha	2	
	carbaryl	Sevin XLR Plus	2.5-5.25 L/ha	2	Repeat as necessary on 7-10 day intervals
	permethrin	Pounce 384 EC	180-260 ml/ha	1	Use sufficient water volume to provide adequate plant coverage
	cyhalothrin-lambda	Matador 120 EC	83 ml/ha	7	24 hr re-entry
	cypermethrin	Ripcord 400 EC	85 ml/ha	3	Use sufficient water volume to provide adequate plant coverage. Apply when first sign of damage is observed.
		UP-Cyde	140 ml/ha	3	
Tarnished Plant Bug	carbaryl	Sevin XLR Plus	5.25-6.4 L/ha	2	Repeat as necessary on 7-10 day intervals
	dimethoate	Lagon 480 EC	0.55-1.1 L/ha ml/ha	7	Maximum 3 applications per season
	cyhalothrin-lambda	Matador 120 EC	83 ml/ha	7	24 hr re-entry.
Mites (Broad and two spotted spider mite)	spiromesifen	Forbid 240 SC	500-600 ml/ha	7	Maximum of 3 applications per season. Minimum application volume of 100 L/ha. Also controls whiteflies (including silverleaf, sweetpotato and greenhouse) 12 hour REI. See label for buffer zone restrictions.
	malathion	Malathion 500 E	1.5-2.0 L/ha	3	Not effective below 18 C,
DISEASES:					
Bacterial Leaf spot	copper hydroxide	Kocide 101	2.25 kg/ha	1	Apply at 7 day intervals for at least three applications. Apply more frequently under wet conditions. Applications may continue until early bloom.
	mancozeb + copper hydroxide	Dithane DG + Kocide 101	1.75-2.25 kg/ha + 2.2 Kg/ha	7	
		Manzate DF + Kocide 101	1.75-2.25 kg/ha + 2.2 Kg/ha	7	

	<i>Bacillus subtilis</i>	Serenade MAX	1.0-3.0 Kg/ha	0	Serenade Max and Serenade ASO are biopesticides that will only suppress the indicated diseases. 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 bacteriacides.
		Serenade ASO	4.0-15 L/ha	0	
		Rhapsody ASO	1.0-2.0 L/100 L of water	0	
Damping Off	captan	Captan 80 WDG	1.5 kg/1000L	-	Apply 50-85 L/100 m2. Work into upper 7.5-10 cm of soil before planting
		Maestro 80 DF	1.5 kg/1000L	-	
Anthracnose, Early Blight, Late Blight and Septoria	pyraclostrobin	Cabrio EG	560-840 g/ha	0	Use up to 1 kg/ha for late blight. Max 6 applications/yr. Do not make more than 2 applications in a row before rotating to another chemical.
	boscalid	Lance WDG	175-315 g/ha	0	Early blight only. Use 420 g/ha to control botrytis. Max 5 applications/yr. Do not make more than 2 applications before rotating to a different fungicide group. 4 hr re-entry.
	chlorothalonil	Bravo 500	2.4-4.0 L/ha	1	Apply at 8-10 day intervals at the lower rate; apply at 14 day intervals using the higher rate.

	mancozeb	Dithane DG Rainshield	1.1-3.25 kg/ha	7	Early Blight, Late Blight and anthracnose only
		Manzate Pro-Stick	1.75-3.25 kg/ha	7	
	metiram	Polyram DF	2.25-3.25 kg/ha	7	Low rate for early and Late blight, high rate for anthracnose.
	captan	Captan 80 WDG	2.25-4.25 kg/ha	2	Anthracnose only. 48 hr re-entry.
		Maestro 75 DF	2.5-4.5 kg/ha	2	
	azoxystrobin	Quadris	300-500 ml/ha	1	Early and Late blight only. Max 3 applications/yr. Do not apply for 21 days after transplanting.
	famoxadone + cymoxanil	Tanos 50 DF	560-840 g/ha	3	Anthracnose, Early blight and Late blight only. 24hr re-entry. Do not apply sequential applications.
	copper hydroxide	Kocide 101	2.25 kg/ha	1	Early blight only. Apply at 7-10 day intervals
	mancozeb + copper hydroxide	Dithane DG + Kocide 101	1.75-2.25 kg/ha + 2.2 Kg/ha	7	Early blight and Late blight only. Apply at 7-10 day intervals.
		Manzate DF + Kocide 101	1.75-2.25 kg/ha + 2.2 Kg/ha	7	
	<i>Bacillus subtilis</i>	Serenade MAX	4.5 Kg/ha	0	Serenade Max and Serenade ASO are biopesticides that will only suppress the indicated diseases. Make the 1 st 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.
		Serenade ASO	8.0-15 L/ha	0	
	mandipropamid	Revus plus Non-ionic adjuvant	400-600 ml/ha plus 0.125% v/v	1	For control of Late Blight. Applications should begin prior to disease development and continue throughout the season on a 7-10 day schedule of fungicides, following the resistance management guidelines. Maximum four applications per year. REVUS Fungicide may be tank mixed with Bravo 500 Agricultural Fungicide for

					tomatoes. Follow the most restrictive use directions of either label.
	fluopicolide	Presidio	220-292 ml/ha	2	For resistance management, Presidio Fungicide 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 Fungicide in a tank mix with Bravo 500 for late blight, Revus for phytophthora blight. Follow the most restrictive use directions of either label Phytophthora Blight: Apply as a soil or foliar application on a 7 to 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.
Botrytis Gray Mold	<i>Bacillus subtilis</i>	Serenade MAX	3.0-6.0 Kg/ha	0	Serenade Max and Serenade ASO are biopesticides that will only suppress the indicated diseases. Make the 1 st 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.
		Serenade ASO	4.0-15 L/ha	0	
		Rhapsody ASO	1.0-2.0 L/100 L of water	0	
Powdery Mildew	<i>Bacillus subtilis</i>	Serenade MAX	3.0-6.0 Kg/ha	0	Serenade Max and Serenade ASO are biopesticides that will only suppress

		Serenade ASO	5.0-15 L/ha	0	the indicated diseases. Begin application soon after emergence or transplant, and repeat on an interval of 7-10 days.
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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.pmra-arla.gc.ca/portal/page?_pageid=34,17551&_dad=portal&_schema=PORTAL

PESTICIDE EMERGENCY CONTACT INFORMATION

Poison Control Centres		
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

Environmental Emergencies (Pesticide Spills)	
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

Formulation and Measurement Abbreviations			
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		

Helpful Conversions¹	
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

¹ **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!