

Cranberry Management Schedule

A guide to insect, weed and disease management in cranberries in Nova Scotia



2019



GUIDE TO WEED, INSECT AND DISEASE MANAGEMENT IN CRANBERRY



Nova Scotia Guide to Pest Management in Cranberry 2019
[Cran1-19]

Updated April 23, 2019 by
Peter Burgess, Horticulturist, Perennia
Rachael Cheverie, Horticulturist, Perennia
Mélanie Leclerc, Research Associate, Perennia

IMPORTANT

This publication was compiled by representatives from Perennia using information from the Pest Management Regulatory Agency of Health Canada, and specific pesticide labels. **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 few 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
WEEDS:							
Pre-emergence	20	diclobenyl	Casoron 4G	110 kg/ha (Use lower rates of application on sandy bogs or upland soils)	12 hours	-	Use lower rates of application on sandy bogs or upland soils. The full label rate may cause plant damage on non-peat based bogs. Do not use on new plantings. Apply pre-bloom in early spring when perennial weeds are still dormant and annual weeds have not started to germinate. Do not use on newly sanded beds or beds that have been recently mowed. For more detail contact a crop specialist.
	15	napropamide	Devrinol 10G	45-67 kg/ha	12 hours	-	Application should be made in the spring. If not enough rainfall occurs after application irrigate so soil is wet to a depth of 10 cm.
	27	mesotrione	Callisto 480 SC	0.3 L/ha	12 hours	60	Make only one application per year. Apply in 100-200 L of water/ha
Post Emergence <i>Wickwiping</i>	9	glyphosate	Roundup 356 Sn	20% Solution	12 hours	30	Apply as a wipe refer to label for recommendations.
	9		Touchdown 480	20% Solution	12 hours	50	
	4	clopyralid	Lontrel 360	2% Solution	12 hours	60	Wipe in the fall after harvest or in the spring before bud break.
	4	Clopyralid	Pyralid	2.4 % Solution (24 mL product/L water)	12 hours	60	Make one-two applications per year, for the control of vetch . Apply with wiper type application equipment. Wipe treatments may be applied as a spot application onto weed foliage which extends above the cranberry canopy.

							Wipe in the fall or spring following cranberry bud-break (first emergence (1-2 mm) of terminal meristem) to control late emerging weeds. (<u>Contact of the treatment solution with cranberry foliage after budbreak should be avoided since it will result in plant injury.</u>)
	4	2,4-D	2,4-D Amine 500	33%	12 hours	50	Apply as a wipe to actively growing weeds in June and July. Refer to label for recommendations.
Postemergence <i>Grasses</i>	1	fluazifop-p-butyl	Venture L	0.8-2.0 L/ha	12 hours	-	Do not apply in the year of harvest. Apply post emergently on actively growing grasses. Max 1 application per year.
	1	sethoxydim plus Merge	Poast Ultra Plus Merge	0.32-1.1 L/ha 1-2 L/ha	-	15	Apply to actively growing grasses
	1	clethodim	Select plus Amigo or Centurion plus Amigo	0.19-0.38 L/ha 0.5-1.0% v/v	12 hours	30	Apply Select/Centurion post-emergence of weeds and crop. Do not apply between the hook stage and full fruit set. Apply a maximum of one application per year using ground equipment. Apply in a minimum spray volume of 110 L of water/ha. NOTE: Varieties of this crop may vary in their tolerance to herbicides, including Select or Centurion. Since not all crop varieties have been tested for tolerance to Select or Centurion, first use of Select or Centurion should be limited to a small area of each variety to confirm tolerance prior to adoption as a general field practice.

<i>Broadleaf weeds</i>	27	mesotrione	Callisto 480 SC	0.21 L/ha	12 hours	60	Max 2 applications per year. Allow for a minimum of 14 days between applications (check label for list of weed species controlled with 1 vs 2 applications). Apply in 100-200 L of water/ha. On bearing beds apply between bud break and fruit set. On non-bearing apply between bud break and 60 days prior to fall or winter flooding.
<i>Sedges</i>	-	Acetic Acid 20%	Serene	2-6% or soil injection at the rates of 6-12% (v/v) of a.i.	-	-	SUPPRESSION ONLY. For pure weed spot treatment only. Do not apply directly to cranberry. Retreatment is required for regrowth of weeds.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
INSECTS:							
Blackheaded Fireworm	1B	phosmet	Imidan 70 WP Instapak	1.57 kg/ha	3 days	30	Apply the first application after egg hatch and the second application 5-7 days later. Max 4 applications/yr.
	1B	acephate	Orthene 75 SP	0.75 kg/ha	12 hours	75	Apply in 225-1650 L of water per hectare. Apply the first application pre-bloom. A second application may be made post bloom if insect numbers indicate another application is required.
	1B	malathion	Malathion 85E	610-1100 ml	-	3	Do not apply during bloom. Apply in 1000 L of spray volume.
	-	1,2-benzisothiazolin-3-one	3M Sprayable Pheromone for Mating Disruption	150-222 ml/ha	-	0	Repeat applications should be made at 2-3 week intervals during adult flight periods.
	1A	carbaryl	Sevin XLR	6.4-7.6 L/ha	2 to 10 days	2	Apply in 3000 L water/ha. Apply at late bloom and repeat as necessary at 7-10 day intervals. Various carbaryl products available.
	18	tebufenozide	Confirm 240F	1.2 L/ha	-	30	Apply in a minimum of 190 L water /ha. Max 4 applications/season. Apply at first sign of larval infestation with a second application 10 days later. For second generation apply at 10% egg hatch with a second application 10 days later. Also controls <i>sparganthis</i> fruitworm.
	5	spinosad	Success 480 SC	182 ml/ha	12 hours	21	Apply 1-3 applications at 7-10 day intervals. Apply in a minimum of 500 L of water. Target eggs at hatch or small larvae.

							Also controls <i>sparganothis</i> fruitworm. See notes on label regarding chemigation of this product.
			Entrust 80W	109 g/ha	12 hours	21	Apply 1-3 applications at 7-10 day intervals. Apply in a minimum of 500 L of water. Target eggs at hatch or small larvae. Field sprayer or airblast application only. OMRI listed product. Also controls <i>sparganothis</i> fruitworm.
			Entrust SC	364 ml/ha			
	28	chlorantranil iprole	Altacor	145-285 g/ha	12 hours	1	Begin applications when treatment thresholds are met. Apply in 200L/ha. Max 3 applications/season. Do not apply more than once every 7 days. <u>For chemigation (Blackheaded fireworm and Sparganothis fruitworm only) apply in 3000 L/ha. Do not apply more than 2 applications/yr. Read label for Chemigation restrictions.</u>
	18	methoxyfen ozide	Intrepid 240F	0.75-1.16 L/ha	12 hours	14	For foliar applications, apply one or two applications during flower bud development period in a minimum of 200 L water /ha. For summer generation apply the first application during peak egg lay and early hatch. Re-apply in 10-18 days. Use higher rate for high infestations. May be applied through a solid set overhead irrigation system that will apply water uniformly and within the confines of a closed perimeter of dykes only. (3200-3500 L of water/ha) <u>Read label for restrictions with Chemigation.</u>
	5	spinetoram	Delegate WG	420 g/ha	12 hours	21	Target eggs at hatch or small larvae. Max 3 applications/year with a minimum re-treatment interval of 7 days. Make no more than two consecutive applications of group

							5 insecticides. <u>Read label for Chemigation restrictions.</u>
	15	Novaluron	Rimon 10 EC	677-835 mL/ha	12 hours	1	1 st generation larvae: Apply when the majority of overwintering eggs have hatched in early spring. 2 nd generation larvae: Apply at the first sign of oviposition through early egg hatch. <u>Read label for Chemigation restrictions.</u>
Cranberry Fruitworm	1B	malathion	Malathion 85E	610-1100 ml	-	3	Do not apply during bloom. Apply in 1000L of spray volume.
	1A	carbaryl	Sevin XLR	6.4-7.6 L/ha	2 to 10 days	2	Apply in 3000 L of water/ha. Apply at late bloom and repeat as necessary at 7-10 day intervals. Various carbaryl products available.
	5	spinosad	Success 480 SC	0.365 L/ha	12 hours	21	Suppression only. Apply in 500 L of water/ha to ensure thorough coverage of the foliage. Apply 1-3 applications at 7-10 day intervals. Begin applications 3 to 7 days after fruit set has reached 50% which corresponds to egg hatch.
			Entrust 80 W	218 g/ha	12 hours	21	Suppression only. Apply in 500 L of water/ha to ensure thorough coverage of the foliage. Apply 1-3 applications at 7-10 day intervals. Begin applications 3 to 7 days after fruit set has reached 50% which corresponds to egg hatch. <i>OMRI listed product.</i>
			Entrust SC	727 ml/ha			
	28	chlorantranil iprole	Altacor	145-285 g/ha	12 hours	1	Begin applications when treatment thresholds are met. Apply in 200 L/ha. Maximum 3 applications per season. Do not apply more than once every 7 days.
18	methoxyfen ozide	Intrepid 240F	1.16 L/ha	12 hours	14	For foliar applications, apply one or two applications during flower bud development period in a minimum of 200 L water /ha. For summer generation apply	

							the first application during peak egg lay and early hatch. Re-apply in 10-18 days. May be applied through a solid set overhead irrigation system that will apply water uniformly and within the confines of a closed perimeter of dykes only. (3200-3500 L of water/ha) <u>Read label for Chemigation restrictions.</u>
	15	Novaluron	Rimon 10 EC	677-835 mL/ha	12 hours	1	<i>Cranberry fruitworm, Cranberry spanworm, Sparganothis fruitworm.</i> Apply when the majority of the target pest population is at egg hatch to early instars. <u>Read label for Chemigation restrictions.</u>
Green and Brown Spanworm	11	<i>Bacillus thuringiensis</i>	Dipel 2X DF	275-550 g/ha	-	0	Needs to be applied to young larvae to be effective.
Leafroller species	11	<i>Bacillus thuringiensis</i>	Dipel 2X DF	525-1125 g/ha	-	0	Treat when larvae are young, before the crop is damaged. Repeat applications at an interval sufficient to maintain control, 3-14 days. Spray volume of 600 L/ha.
	11	<i>Bacillus thuringiensis</i>	Bioprotec 3P	0.72-1.45 kg/ha	-	0	Foliar application. Apply at first signs of infestation when larvae are small. Repeat applications, according to economic threshold, as necessary to maintain control. The minimum reapplication interval is 7 days. Thorough coverage of all foliage is essential. Apply in a minimum of 600 L water/ha.
Cranberry Weevil	4	thiamethoxam	Actara 25 WG	210-280 g/ha	12 hours	3	Apply as a foliar application by broadcast spray before pests reach damaging levels. If pests reach damaging levels during bloom, applications are to be made as soon as possible post-bloom. Scout fields and treat again if populations rebuild to potentially damaging levels. Max two

							(2) foliar applications/season. <i>This product is highly toxic to bees exposed to direct treatment or to residues on blooming crops and weeds.</i> Do not apply Actara or allow it to drift onto blooming crops or weeds if bees are foraging in/or adjacent to the treatment area. If bees are foraging in the ground cover and it contains any blooming plants or weeds, always remove flowers before making an application. This may be accomplished by mowing, disking, mulching, flailing, or applying a labeled herbicide. After an application, wait at least 5 days before placing beehives in the treated field.
Cranberry tipworm	5	spinetoram	Delegate WG	420 g/ha	12 hours	21	Suppression only. Target eggs at hatch or small larvae. Max 3 applications per year with a minimum re-treatment interval of 7 days. Do not make more than two consecutive applications of group 5 insecticides. <u>Read label for restrictions with Chemigation.</u>
	23	spirotetromat	Movento 240SC	365-435 mL/ha	12 hours	7	Apply at egg hatch. Minimum interval between applications is 7 days. Maximum amount used per season is 1.833L/ha. Apply uniformly in 200-3000 L total volume/ha by ground. For ground application: lower dose recommended for low pest pressure, higher dose for high pest pressure. Higher dose is recommended for chemigation. Movento 240SC must be tank mixed with spray adjuvant/additive that must be non-ionic or methylated seed oil or horticultural oil to maximize leaf uptake and systemicity of active ingredient

							in treated plants. 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.
	15	Novaluron	Rimon 10 EC	677-835 mL/ha	12 hours	1	Apply when the majority of the target pest population is at early instars. <u>Read Label for Chemigation restrictions.</u>

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
DISEASES:							
Fruit Rot	M2	copper oxychloride	Copper Oxychloride 50 WP	4 kg/ha	48 hours	10	Apply in 500-1000 L of water/ha. Maximum of 3 applications per season. Apply at early bloom and repeat at 10-14 day intervals.
	M	ferbam	Ferbam 76 WDG	6.75 kg/ha	-	see note*	Begin applications at early bloom and repeat two more times at 2 week intervals. Max 3 applications per season. *Label states do not apply within 28 days of mid-bloom. Clarification from UAP states, do not apply later than 28 days after mid-bloom. Consult UAP before applying product.
	M	chlorothalonil	Bravo 500 / Bravo ZN	6.8-11.6 L/ha	48 hours	50	Apply early bloom, late bloom and repeat 10-14 days later. Use high rate under severe conditions.
			Echo 90DF	3.8-6.4 kg/ha			
			Echo 720	4.7-8.1 L/ha			
M	Folpet	Folpan 50 WP	10 kg/ha	-	30	Apply when 5% of blossoms are open. Repeat 10-14 days later when 50-75% of blossoms are open. Apply in up to 2000 L of water/ha.	

	11	Azoxystrobin	Quadris	1.0 L/ha	12 hours	30	Begin applications at 5 -10% bloom. Apply as a broadcast foliar spray in sufficient water (minimum 100L/ha) for thorough coverage. Alternate with other registered fungicides on a 7-10 day schedule. Max 3 applications/year.
			Azoshy 250 SC				
	11,3	Azoxystrobin Difenoconazole	Quadris Top	1.0 L/ha	12 hours	30	
	19	Polyoxin D Zinc Salt <i>NEW 2019</i>	Diplomat 5SC	926 ml/ha	-	0	Suppression. Apply as a foliar spray in sufficient water to provide thorough coverage of foliage (and fruit when present). Begin as a preventative application at 25%-50% bloom or when conditions favour disease development and continue on 7-21 day interval if disease pressures exist.
Twig/leaf blight and Upright Dieback	M	chlorothalonil	Bravo 500 / Bravo ZN	6.8-11.6 L/ha	48 hours	50	Apply at bud break, early bloom and late bloom.
			Echo 90DF	3.8-6.4 kg/ha		50	Make applications at bud break, early bloom, and late bloom. Use the higher rate for severe disease conditions. DO NOT apply this product when fields are flooded or allow release of irrigation water from bogs for at least 3 days following an application.
			Echo 720	4.7-8.1 L/ha		50	Apply at bud break, early bloom, and late bloom. Use the higher rate under severe conditions.
	M2	copper oxychloride	Copper Oxychloride 50 WP	4 kg/ha	-	1	For use on twig/leaf blight only. Apply in 500-1000 L of water/ha. Max 3 applications per season. Apply at early bloom and repeat at 10-14 day intervals.

	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	Re-apply using 7-10 day intervals.
Cottonball (<i>Monilinia oxycocci</i>)	3	propiconazole	Topas 250 E / Tilt 250	500 ml/ha	12 hours	45	Max 4 applications/year. Apply first application at bud break, second 10-14 days later, third at early bloom and fourth 10-14 days later.
			Misson 418 EC / Bumper	300 ml/ha	12 hours	45	
			Propi Super 25EC	300 ml/ha	12 hours	45	
	11	azoxystrobin	Quadris	1.0 L/ha	12 hours	30	Suppression only. Begin applications at 5 - 10% bloom. Apply as a broadcast foliar spray in sufficient water (minimum 100L/ha) for thorough coverage. Alternate with other registered fungicides on a 7 - 10 day schedule. Do not make more than 3 applications per year.
			Azoshy 250 SC				
11,3	Azoxystrobin Difenoconazole	Quadris Top	1.0 L/ha	12 hours	30		
19	Polyoxin D Zinc Salt NEW 2019	Diplomat 5SC	463 ml/ha	-	0	Suppression. Apply as a foliar spray in sufficient water to provide thorough coverage of foliage (and fruit when present). Begin as a preventative application at 10%-25% bloom or when conditions favour disease development and continue on 7-14 day interval if disease pressures exist.	

Grey mold (<i>Botrytis cinerea</i>)	7	Isofetamid	Kenja 400SC	0.987-1.24 L/ha	12 hours	0	Initiate applications prior to disease development and continue on a 7- to 14-day interval. When disease pressure is high use the high rate and shortest interval. Max 5 applications/year.
	19	Polyoxin D Zinc Salt	Diplomat 5SC	463-926 ml/ha	-	0	Suppression. 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.

Product Toxicity:

COMMON NAME	TRADE NAMES	Use	TOXICITY		
			TO BEES	TO APPLICATOR	
				ORAL	DERMAL
2,4-D	2,4-D Amine 500	H	mod	mod	low
Acetic acid	Serene	H	low	low	low
acephate	Orthene	I	high	high	mod
azoxystrobin	Quadris, Azoshy	F	low	low	low
Azoxystrobin, difenoconazole	Quadris Top	F	low	low	low
<i>Bacillus thuringiensis</i>	Dipel, bioprotec	I	low	low	low
carbaryl	Sevin XLR Plus	I	high	mod	mod
chlorothalonil	Bravo, Echo	F	low	low	low
chlorantraniliprole	Altacor	I	low	low	low
clethodim	Select	H	low	low	low
clopyralid	Lontrel	H	low	low	low
copper oxychloride	Copper Oxychloride	F	low	mod	low
copper	Cueva	F	?	low	low
diclobenyl	Casoron	H	low	low	low
ferbam	Ferbam	F	low	low	low
fluazifop-p-butyl	Venture	H	low	low	low
folpet	Folpan	F	low	low	low
glyphosate	Roundup, Touchdown, Glyfos	H	low	low	low
isofetamid	Kenja 400SC	F	?	low	low
mesotrione	Callisto	H	low	low	low
malathion	Malathion	I	high	low	low
methoxyfenozide	Intrepid		low	low	low
napropamide	Devrinol	H	low	low	low
novaluron	Rimon		high	low	low
phosmet	Imidan	I	high	mod	low
Polyoxin D Zinc salt	Diplomat	F		low	low
propiconazole	Topas, Mission	F	low	low	low
sethoxydim	Poast Ultra	H	low	low	low
spinetoram	Delegate		mod	low	low
spinosad	Success, Entrust	I	mod	low	low
spirotetromat	movento		high	low	low
thiamethoxam	Actara	I	high	low	low
tebufenozide	Confirm	I	low	low	low

References: EXTOKNET (<http://extoknet.orst.edu/pips/ghindex.html>) and Individual Product MSDS sheets.

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/ls-re/index-eng.php>

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
EC,E	Emulsifiable concentrate	kPa	kilopascal
F	Flowable	kg	kilogram
G	Granular	g	gram
L	Liquid	L	litre
WDG	Wettable dry granule	BIU	Billions of International Units
WP,W	Wettable powder	ppm	parts per million
SC	Suspension concentrate		
Sn	Solution		
SP	Soluble powder		

Helpful Conversions*	
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

*** 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 have greater toxic effects in smaller amounts. Therefore, even small conversion errors can lead to the use of incorrect dosages (either too high or too low). Use metric – you will be glad you did!