

Raspberry Management Schedule

*A guide to insect, mite and disease
management in raspberries in
Nova Scotia*



2019



RASPBERRY INSECT & DISEASE MANAGEMENT SCHEDULE FOR NOVA SCOTIA

Nova Scotia Guide to Pest Management in Raspberry 2019

[Rasp 1-19]

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LIABILITY STATEMENT

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Raspberry Insect & Disease Management Schedule

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PESTICIDE EMERGENCY CONTACT INFORMATION

Poison Control Centres		
Nova Scotia	1.800.565.8161 or 1.902.470.8161 or 911	Regional Poison Centre, Halifax, NS
New Brunswick	911	Ask for Poison Information
Prince Edward Island	1.800.565.8161 or 1.902.470.8161	Regional Poison Centre, Halifax, NS
Newfoundland	709.722.1110 or 1.866.727.1110	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	1.800.565.1633
New Brunswick	1.800.565.1633
Prince Edward Island	1.800.565.1633
Newfoundland	1.800.563.9089

ABBREVIATIONS & CONVERSIONS

Formulation, and Measurement Abbreviations			
DF	Dry flowable	g	gram
EC, E, EW	Emulsifiable concentrate	kg	kilogram
EG	Water dispersible granule	kPa	kiloPascal
L	Liquid	l	litre
WDG	Wettable dry granule	ml	millilitre
WP or W	Wettable powder	BIU	Billions of International Units
SC	Suspension concentrate	ppm	Parts per million

Label Abbreviations	
PHI	Pre-Harvest Interval
REI	Restricted Entry Interval

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

* Pesticide Units of Measurement

It is not recommended to convert label rates to imperial units because there is a high likelihood of mathematical errors creeping in to the results. 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!

Toxicity Table

LD ₅₀ (mg/kg)	Hazard Rating	Relative Toxicity Rating
Above 500	Very Low Hazard	1
101-500	Low Hazard	2
21-100	Moderate Hazard	3
11-20	Very High Hazard	4
10 and less	Extremely Hazardous	5

Emergency and First-Aid Procedure for Pesticide Poisoning

- Become familiar with the chemicals you are using. Keep a list of common names in case of accidents or emergencies. This information can be found on product labels cross-referenced in this publication.
- If a pesticide has come in contact with the skin or has been spilled on clothing, remove the clothing and wash the skin thoroughly with soap and warm water.
- If a person suspects poisoning from exposure to a pesticide by swallowing, inhalation or contact with skin or eyes, read the label of the pesticide container and carry out first-aid treatment as suggested.
- Immediately after first-aid treatment has been given, wrap the patient in a coat or blanket and rush him/her to the nearest hospital. Take the list of chemical common names with you and identify the one being used.
- If a person is unconscious or lapses into unconsciousness, call **911** immediately.
- Emergency advice on pesticide poisoning is available from the Regional Poison Centre, Halifax, NS. Phone 1-800-565-8161 (NS & PEI).

Raspberry Insect & Disease Management Schedule

Site Selection & Preparation

Insect / Disease	Note
White Grubs	Do not plant raspberries on land that has recently been in sod or in fields known to have a wireworm or white grub problem.
Wireworms	
Raspberry Crown Borer	Crown borers, root weevils, and bud weevils can be a problem in old plantings and may pose a threat to nearby new plantings. Avoid planting near old plantings. Remove wild brambles from area surrounding commercial fields. See <u>Established Plantings</u> and <u>Occasional Pests</u> sections.
Root Weevils	
Strawberry Bud Weevil	
Phytophthora Root Rot	Avoid poorly drained soils and fields with a history of this disease. Do not introduce the disease to clean fields by planting infected plants. Planting tissue culture plants produced in soilless culture can prevent introduction of this disease into the field. Purchase certified planting stock. Research indicates that a 30 cm high raised row effectively reduces root rot severity. In some areas, however, this may result in increased risk of winter injury to roots. No commercial cultivars adapted to the Atlantic region have adequate resistance to <i>Phytophthora</i> root rot. Ridomil Gold is registered as a spring and fall treatment on new beds and as a fall treatment on established beds. Aliette is registered for spring and fall treatments. Phostrol can be used for preventative suppression of phytophthora root rot in new plantings; begin applications when the plants produce new growth of 1-3 inches. See <u>Occasional Pests</u> section.
Verticillium Wilt	Do not plant raspberries following potatoes or alfalfa or where <i>Verticillium</i> is known to occur. Effective control can be achieved with soil fumigation.
Nematodes	Several nematode species have been associated with poor growth of raspberries. The root lesion nematode is the most important with a threshold of 500-1000 nematodes per kilogram of dry soil. Summer following the year before planting will reduce nematode populations. In the fallow year, cultivate every few weeks during the summer to kill young weeds and to desiccate nematodes. Crop rotations using fall fescue, brome grass, or rye grass are less likely to increase nematode populations than crops such as soybeans, corn and clovers. Effective control of nematodes can also be achieved with soil fumigation.

Soil Fumigation

Insect/Disease	Product	Rate/ha	Note
Nematodes	Pic Plus Fumigant	108 L	Broadcast application only. For control of root knot and root lesion nematodes. Read label for application instructions
	Chloropicrin 100	93 L	
Verticillium Wilt	Vapam	470-900 L	May be applied with an irrigation system. See label for directions. Some fumigants will also suppress certain weeds and control soil insects such as wireworms and white grubs.
	Pic Plus Fumigant	108 L	Broadcast application only. Also for Phytophthora. Read label for application instructions
	Chloropicrin 100	93 L	
<p>FUMIGATION should be done in September or early October in the fall prior to spring planting. Previous crop debris must be cultivated into the soil during the summer so that it is fully decomposed at the time of fumigation. One week prior to fumigation, till the soil to a depth of at least 25 cm to break clods and loosen the soil. The soil should be moist but not wet. Inject fumigant 15 to 20 cm deep and drag immediately to fill injector shank slits. Seal by rolling, cultipacking, covering treated area with a plastic tarpaulin or with a light irrigation. For Vapam only, apply via sprinkler irrigation. Apply a minimum of 25mm of water per hectare. For fall fumigation, the soil can be left undisturbed until spring. Cultivate several times in the spring at one week intervals prior to planting to allow complete aeration of the soil. Heavy, wet, cold soils require longer to fully aerate. To prevent contamination do not cultivate deeper than the injection depth. Do not plant if you can still smell the fumigant. Read the label completely before handling fumigants. Follow all safety precautions.</p>			

Established Plantings

Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
Delayed Dormant to Green Tip (buds showing green tips not more than 1 cm in length)						
Spur Blight/ Cane Blight/ Rust	M	Lime Sulfur	2.6L/100L water at 1000-1500 L/ha water	48 hrs	Not past 1cm green tip	
Early Bud Break (when blossom buds begin to separate from one another)						
Raspberry Fruitworm (Adult stage)	Adult beetles skeletonize developing leaves and feed on buds. Larvae feed on berries. At the time of publication, there were no products registered for use on Raspberry Fruitworm.					
Raspberry Crown Borer	18	Diazinon 500E	1L/1000L water	12 hrs	Not past prebloom	Apply in spring to control young larvae before they tunnel into the crowns and when new growth is about 10cm above ground. Do not apply more than once/year.
Phytophthora Root Rot	33	Aliette	5.5 kg/ha	When dry	60 days	Use as a preventative treatment.

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
		Phostrol	5.2 L/ha	12 hrs	1 day	Suppression only. Use as a preventative treatment.
Prebloom (before blossoms open)						
Spur Blight/ Anthracnose	M	Ferbam 76WDG	4.5 kg in 1000L water	12 hrs	Not past prebloom	Apply when new canes are 30 cm high.
	11+27	Tanos 50 DF	840 g/ha	9 days	9 days	Apply to foliage and fruit and repeat on a 7 day interval. Make no more than 6 applications per year.
	7+11	Pristine WG	1.3-1.6 kg	24 hrs	0 days	Anthracnose only. Begin applications prior to disease development, continue on 7-14 day schedule. Use shorter interval and/or higher rates when disease pressure is high. Max. 4 applications/season.
Late Yellow Rust	Remove alternate host (white spruce). Nova and K81-6 have significant resistance. Boyne has partial resistance.					
	3	Topas 250E / Tilt 250	0.5 L	12 hrs	30 days	Apply at first detection of disease and then 14 days later. Maximum of 2 applications per year.
		Propi Super 25EC	500 ml/ha			Apply by ground application at first detection of disease in the field and then 14 days later. Max of two applications per season.
		Nova	175 g/ha		1-6 days based on harvest method	Begin at early bud break when new growth is 3-4 inches. Apply in 250 l/ha at 10-14 day intervals.
Clipper Weevil	Small round holes in flower petals and clipped buds indicate the presence of this pest.					
	1B	Malathion 85E	1345ml/ha	24 hrs	1 day	
Two-spotted Spider Mite	6	Agri-Mek 1.9% EC	1 L/ha	12 hrs-3 days	7 days	Apply first application when mites appear. Reapply if monitoring indicates necessity. Application interval 7 days.
	10	Apollo	500ml/ha	12 hrs-10 days	15 days	Kills mite eggs and young nymphs. Apply when mites are mostly in the egg stage.
	20	Kanemite 15SC	2.07 L/ha	12 hrs	1 day	Apply as a full coverage spray to foliage to drip. Apply as soon as mite population

Raspberry Insect & Disease Management Schedule

Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
						reaches economic infestation levels. Allow minimum of 21 day application interval.
	23	Oberon	880-1160 ml/ha	12 hrs	3 days	Maximum 3 applications per season. Also for control of <u>McDaniel Spider Mite</u> .
	NC	Purespray Green Spray Oil 13E	10L in 1000L/ha water	12 hrs	-	Suppression only. Begin when mites appear. Apply at 7 – 14 day intervals. Do not apply more than 8 summer spray applications per growing season.
	NC	Vegol Crop Oil	2% v/v in 700-1900 L/ha water	12 hrs	0 days	Do not apply within 48 hours of freezing or 30°C, or prior to rain/heat/moisture stressed crop.
	UN	Acramite 50WS	851 g/ha	12 hrs	1 day	Maximum 1 application/year. Apply in a minimum of 500 L water/ha to ensure adequate coverage of all leaf surfaces. Primarily effective on motile stages of mites.
Bacterial blight	M1	Cueva	0.5-2% solution at 470-940 L/ha water	4 hrs	1 day	Apply at the start of flowering and continue every 7 to 10.
Raspberry Fruit Worm	Adult beetles skeletonize developing leaves and feed on buds. Larvae feed on berries. At the time of publication, there were no products registered for use on Raspberry Fruitworm.					
Bloom (WARNING – Spraying insecticides during bloom is hazardous to bees)						
Botrytis Fruit Rot	Target bloom for fruit rot sprays. Apply 2-3 applications beginning at 5-10 % bloom and a second at full bloom. Varieties flower at different times so treat varieties separately. If wet weather persists make additional applications. Create an open canopy with proper cane densities and trellising. This improves air circulation, increases light penetration and speeds up drying of plant surfaces. See section on resistance.					
	M	Supra Captan 80WDG Maestro 80DF	2.5 kg	72 hrs	2 days	Do not use within 14 days of oil or as a tank-mix or sequential application with Exirel.
	1	Senator 50 SC	700 mL/1000 L of water (1.54 L/ha)	12 hrs	1 day	Apply during flowering and repeat every 7 - 10 days as necessary. May also control powdery mildew. See product label.
	2	Rovral	2.0 kg	12 hrs	1 day	

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
	7	Cantus WDG	0.56 kg	12 hrs	0 days	7-14 day schedule just prior to disease development and no more than 4 applications per year.
	7	Kenja 400 SC	0.987-1.24 L/ha	12 hrs	7 days	Use once then rotate to another fungicide group.
		Sercadis	250-666 ml/ha		0 days	Suppression only.
	7+9	Luna Tranquility	1200 ml/ha	12 hrs	0 days	Begin fungicide applications preventatively. Continue as needed, on a 7- to 14-day interval. When disease pressure is severe use shorter intervals. Make first application at early flowering.
	7+11	Pristine WG	1.3-1.6 kg	When dry/24 hrs	0 days	Begin applications prior to disease development and continue on a 7-14 day schedule. Use a shorter interval and/or higher rates when disease pressure is high. Maximum 4 applications per season
	9	Scala SC	2L/ha	12 hrs	0 days	
	9+12	Switch 62.5 WG	775-975 g/ha	12 hrs	1 day	Begin applications during early bloom. Persistent active that may carryover. Products containing fludioxonil not be used in areas treated with this product during the previous season.
	11+27	Tanos 50 DF	840 g in 250-800 L/ha water	9 days	9 days	Apply to foliage and fruit and repeat at least 12 days later. Apply no more than 3 times/year.
	17	Elevate 50WDG	1.7 kg	4 hrs	1 day	
	19	Diplomat 5SC	463-926 ml/ha	-	0	Suppression only. Begin as a preventative application when conditions favour disease development.
	44	Serenade Opti	1.7-3.3 kg/ha	When dry	0 days	Suppression only. Begin applications at first sign of the disease or when conditions become conducive for disease development. Repeat as necessary on a 7-10 day interval.

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
	46	Timorex Gold	1.5-2.0 L/ha in 400-1200L/ha spray volume	4 hrs	2 days	For preventative treatments, apply at 7-14 day intervals, depending on disease level. Use the shorter application interval under conditions that promote rapid disease development.
Fireblight	24	Kasumin 2L	5.0 L/ha	12 hrs	1 day	Begin applications at beginning of bloom and continue every 3-4 days under conditions favouring disease development. Under cool conditions apply every 5-7 days. Max. 4 applications/year. Do not make more than two consecutive applications.
	-	BlightBan C9-1	370-500 g/ha in 1000-2000 L/ha water	4 hrs	-	Suppression only. Maximum of 3 applications per year. First application at 15-20% bloom, second application at full bloom. Use high rate under high disease pressure.
		Bloomtime Biological FD Biopesticide	375 – 500 g/ha in 1000-2000 L/ha water		0 days	Suppression only. Max. 2 applications/year. First application at 15-20% bloom; second at full bloom to petal fall.
Postbloom/Green Fruit						
Two-spotted Spider Mite	6	Agri-Mek 1.9% EC	1 L/ha	12 hrs	7 days	Apply first application when mites appear. Reapply if monitoring indicates necessity. Apply by ground equipment with sufficient water to obtain full coverage of the foliage or target area. Application interval 7 days.
		Agri-Mek SC	225 mL/ha 0.1-0.5% v/v non-ionic surfactant			

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
	20B	Kanemite 15SC	2.07 L/ha	12 hrs	1 day	Apply as a full coverage spray to the foliage to drip. Application should be made as soon as the mite population reaches economic infestation levels. Allow a minimum of 21 days between applications.
	NC	Vegol Crop Oil	2% v/v in 700-1900 L/ha water	12 hrs	0 days	Do not apply in extreme high or freezing temperatures. See label for product restrictions.
		Purespray Green Spray Oil 13E	10 L in 1000 L water		-	Begin when mites appear. Apply at 7 – 14 day intervals. Do not apply more than 8 summer spray applications per growing season.
	UN	Acramite 50WS	851 g/ha in min 500L/ha water	12 hrs	1 day	Maximum of 1 application/year. Primarily effective on motile stages of mites.
Aphids	3	Pyganic EC 1.4 II	2.32-4.65 L/ha	12 hrs	-	Apply when pests are first observed. Do not wait until plants are heavily infested. Reapply, if needed. Do not use when other beneficial insects are present.
	4	Admire 240	175 ml/ha in 200L/ha water	24 hrs	4 days	Suppression only. Apply up to 3 times per season. Do not apply pre-bloom or during bloom or when pollinators are actively foraging. If multiple applications are required allow 7 days between applications.
	4	Assail 70 WP Aceta 70 WP	56-86 g/ha in min. 187 L/ha water	12 hrs	1 day	Max 4 applications per season. Use a 7 day re-treatment interval. Use high rate under heavy pressure.
	4D	Sivanto Prime	500-750 ml/ha	12 hrs	0 days	Toxic to some beneficial insects
	NC	Purespray Green Spray Oil 13E	10 L in 1000 L water	12 hrs	-	Begin when aphids appear. Apply at 7 – 14 day intervals. Do not apply more than 8 summer spray applications per growing season.

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
		Vegol Crop Oil	2% v/v in 700-1900 L/ha water		0 days	Do not apply in extreme high or freezing temperatures. See label for product restrictions.
	1A	Sevin XLR	5.25 L/ha	6-10 days	11 days	<i>Blackberry leafminer, Japanese beetle, Leafhoppers, Leafrollers, Rose stem girdler, Spotted-winged raspberry aphid.</i> Apply when insects or damage appear.
Raspberry Cane Borers	4	Admire 240	467 ml/ha in 200 L/ha water	24 hrs	4 days	Suppression only. Apply when evidence of cane borer activity is noted. Apply up to 3 times/season. Do not apply pre-bloom or during bloom or when pollinators are actively foraging. If multiple applications are required allow 7 days between applications.
		Alias 240 SC				
	28	Altacor	215-285 g/ha in min. 500 L/ha water	12 hrs	3 days	
Botrytis Fruit Rot	Same as for Bloom period					
Preharvest						
Botrytis Fruit Rot	Same as for Bloom period Apply if wet weather persists during the ripening period.					
Aphids	4	Assail 70 WP Aceta 70 WP	56-86 g/ha	12 hrs	1 day	Use a 7 day spray interval. Use the high rate under heavy pressure. Maximum two applications from group 4A per season.
	23	Movento 240 SC	220-365 ml/ha in min. 300 L/ha water	12 hrs	3 days	Apply post-bloom when aphids are first observed.
Leafhoppers	1B	Malathion 85E	880 ml/ha	24 hrs	1 day	

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
	4	Admire 240 Flowable	175 ml/ha in 300 L/ha water	24 hrs	4 days	Under high pressure, may provide suppression rather than control. Maximum two products from group 4A per season.
		Alias 240 SC				
		Assail 70 WP Aceta 70 WP	56-86 g/ha	12 hrs	1 day	
	NC	Surround WP	25 kg/ha	12 hrs	1 day	Apply at 7-14 day intervals when leafhoppers first detected by monitoring. Do not use when fruit is present or during bloom.
Caneborers	Same as Post Bloom/Green Fruit period					
Spotted wing <i>Drosophila</i>	5	Delegate	315-420 g/ha	12 hrs	1 day	Maximum of three applications per year with a minimum re-treatment interval of 7 days and 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.
		Entrust SC	334-440 ml/ha	When dry		
		Success	145-182 ml/ha			
	28	Exirel	1.0-1.5 L/ha	12 hrs	1 day	
Postharvest						
Spur Blight / Anthracnose	M	Ferbam 76 WDG	4.5 kg	-	Apply after harvest only	Apply immediately after harvest. Pruning out fruiting canes after harvest is also beneficial in reducing disease pressure.
	11+27	Tanos 50 DF	840 g	9 days	9 days	Apply to foliage and fruit and repeat on a 7 day interval. Maximum of 6 applications per year. Apply in sufficient water volume to ensure thorough coverage (250-800 L/ha).

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Insect / Disease	Group	Product ¹	Rate / ha	REI	PHI	Note
Anthracnose	7+11	Pristine WG	1.3-1.6 kg/ha	24 hrs	0 days	Begin applications prior to disease development and continue on a 7-14 day schedule. Use a shorter interval and/or higher rates when disease pressure is high. Maximum of 4 applications/season.
Two-spotted Spider Mite	6	Agri-Mek 1.9% EC	1 L/ha	3 days	Post-harvest application	Apply as post-harvest treatments to the bushes after the fruit are harvested. Apply first application when mites appear and second application after 7-10 days interval. Do not make more than two post-harvest applications per year.
		Agri-Mek SC	225 mL/ha 0.1-0.5% v/v non-ionic surfactant	12 hrs general, 3 days hand-set irrigation		
	20B	Kanemite 15SC	2.07 L/ha	12 hrs	1 day	Apply as a full coverage spray to the foliage to drip. Application should be made as soon as the mite population reaches economic infestation levels. Allow a minimum of 21 days between applications.
	21	Nexter	600 g/ha	24 hrs	Post-harvest	
	NC	Purespray Green Spray Oil 13E	10 L in 1000 L water	12 hrs	-	Begin when mites appear. Apply at 7 – 14 day intervals. Do not apply more than 8 summer spray applications per growing season.
	UN	Acramite 50WS	851 g/ha in min. 500 L/ha water	12 hrs	1 day	Maximum of 1 application per year. Primarily effective on motile stages of mites.
Aphids	Same as Pre-harvest period					
Leafhoppers	Same as Pre-harvest period					
Caneborers	4A	Admire Flowable	467 ml/ha in 300L/ha water	24 hrs	4 days	Suppression only. Maximum two applications of products from Group A per season.
		Alias 240 SC				
	28	Altacor	215-285 g/ha	12 hrs	3 days	Apply soon after damage first appears.

¹ Refer to the Pesticide Information Summary table for a list of trade names and common chemical names.

² Unless otherwise stated, use at least 2000 L water per hectare.

Occasional Pests

Insect / Disease	Note
Diseases	
Virus Diseases	Raspberries are susceptible to many virus diseases. Mosaic, leaf curl and crumbly berry are the most common. Mosaic and leaf curl are spread by aphids while crumbly berry is spread by the dagger nematode. Rogue out affected plants. Use certified nursery stock. Destroy nearby wild brambles. Do not plant new plantings near old ones.
Crown Gall	Do not plant canes infected with crown gall. Avoid injury to the crown and roots of plants and maintain good soil fertility.
Powdery Mildew	This disease is seldom a problem. Senator 70WP 1.1 kg/ha may provide some control. Nova 40W – Apply at first sign of disease at a rate of 340 g/ha. Do not apply more than 340 g/ha per season. 6 day PHI; There is an 8 day REI for hand setting of irrigation line and a 6 day REI for harvesting training and tying. 12 hours REI for all other activities. Purespray Green Spray Oil 13E. Apply 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. 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.
Phytophthora Root Rot	Ridomil Gold 480EC - On <u>established plantings</u> , apply 37 mL per 100 m of row to the soil surface in a one meter wide band centered over the row (do not apply in the spring). Apply one application prior to freeze-up (no later than November 30). On <u>new plantings</u> , apply in the spring after planting and again in the fall using the above rate. Do not apply later than November 30. Time applications prior to rain or irrigation. Aliette 80 WDG - can be applied as a foliar application up to four times per year at 5.5 kg/ha to bearing and non-bearing raspberries. Apply in the fall when conditions favor disease. Repeat in 3 to 4 weeks. Last application must be 30 days prior to leaf drop. Apply Aliette in the spring when there is 7 cm of new growth and repeat in 3 to 4 weeks. Consider using raised rows. PHI is 60 days. Phostrol – Apply at a rate of 5.2 L/ha in new plantings when plants produce new growth of 1-3 inches. Continue on a 45-60 day interval. In fall shorten interval to 21-28 days. Apply in 400L of water/ha. Maximum of 4 applications per season. PHI = 1 day REI = 12 hours Torrent 400SC - 0.25 L in up to 1000 liters of water/ha. Make one application of the fungicide solution in the Fall and one application in the Spring as a soil drench. Do not use any surfactant with this drench application. PHI = 90 days. Orondis Or Zorvec-Enicade – 1.4-2.8 L/ha. Directly apply to soil with a banded drench application at a minimum of 200L/ha, continue on a 7-14 day interval. Follow by sprinkler or drip irrigation within 24 hours to adequately distribute the product to the root zone. See specific soil application directions on the label. Use higher rate and shorter interval when disease pressure is high. Use 1-2 applications at 7-14 days apart made in spring and 1-2 applications at 7-14 days apart made in fall. REI = 12 hours, PHI = 1 day. Zorvec Epicaltrin- 07-1.4 L/ha. Directly apply to soil with a banded drench application at a minimum of 200L/ha, continue on a 7-14 day interval. Follow by sprinkler or drip irrigation within 24 hours to adequately distribute the product to the root zone. See specific soil application directions in the label. REI: 12 hours. PHI: 1 day.

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Cane Blight	Lime Sulphur: Apply 26L/1000L water to ensure thorough coverage to point of near drip. Do not use later than ¼ inch green tip. Do not spray on wet foliage.
Cane Botrytis	Cane Botrytis is caused by the same fungus that causes grey mold fruit rot. It attacks primocanes from mid-late summer to early fall. Wide rows and dense canopies favor the disease. Fungicides used for Botrytis fruit rot will help control cane Botrytis if the spray is directed at the entire cane. Tanos 50DF, 840g/ha is registered for spur blight, anthracnose, Botrytis fruit rot, as well as cane Botrytis. Tanos may be used post-bloom and post-harvest for cane Botrytis control. Maximum of 6 applications per year.
Insects*	
Raspberry Cane Borer	Canes are girdled near the tip by 2 rings approximately 12 mm apart and 12-20 cm from a lateral tip. Cut off wilted tips below the rings in June & July. Note: Altacor registration for cane and crown borer listed in post bloom timing above.
Raspberry Crown Borer	Remove wild brambles from the area. Apply Altacor to first instar when they are actively feeding in the cambium before they tunnel into the root, crown or canes. Apply in a minimum of 500 L/ha. Maximum of 3 applications per season. Maximum of 645g/ha per season. Do not apply more than once every 14 days. PHI: 3 days
Root Weevils	Different species of weevils feed on raspberry but the black vine weevil is the most common. Larvae feed on roots and crowns. Damage is suspected when adults feed on foliage producing characteristic notching (July & August). Actara 25WG: Apply at 210-280 g/ha. Maximum 2 applications per season. Apply as a foliar application by broadcast spray before pests reach damaging levels. Scout fields and treat again if populations rebuild to potentially damaging levels. PHI: 3 days.
Raspberry Sawfly	The pale green sawfly larvae feed on the outer edge of leaves chewing out irregular holes and in some cases skeletonizing the foliage. Sprays timed to control raspberry fruitworm will also control sawfly.
Raspberry Bud Moth	In the spring, the small, bright-red caterpillars emerge from the soil, climb up fruiting canes and tunnel into buds and laterals. There are no registered chemicals to control raspberry bud moth. Sanitation practices, such as removing and burning cane debris, will help. This pest is of particular concern in Newfoundland and is known to occur in NB. Nova Scotia is in the distribution zone so producers should be on the outlook for it.
Brown marmorated stink bug	At the time of publication there were no products registered for the control of brown marmorated stink bug in raspberries.
Leafhoppers	Potato leafhoppers do not overwinter in Nova Scotia. Surround WP – Apply at 12.5-25 kg/ha. Apply in 500L water at 7-14 day intervals once initial infestation is detected. Use high rate for early applications. Do not exceed 25kg/ha/application. Aster leafhoppers only.
White Grubs (Larvae of European Chafer)	Admire 240 – Apply at 1.2 L/ha in 200 L/ha water. Apply just prior to or during egg hatch. Applications should be based on previous populations, monitoring, and adult trapping. Do not apply pre-bloom or during bloom or when pollinators are actively foraging. Irrigate 5-10mm within 24 hours after application to move the active ingredient into the root zone. Over watering (more than 20mm) must be avoided. Apply only once per season as a soil drench. REI: 24 hrs PHI: 14 days

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<p>Oblique-banded Leafroller</p>	<p>Capture: Apply at a rate of 467 ml/ha. Sequential applications must be at least 30 days apart. REI: 12 hrs PHI: 3 days Delegate: Apply to eggs and small larvae at 200 g/ha. REI: 12 hrs PHI: 1 day Entrust: Apply to eggs and small larvae at 267-364 ml/ha. REI: when dry PHI: 1 day Success: Apply to eggs and small larvae at 145-182 ml/ha. REI: when dry PHI: 1 day Bioprotec CAF: 1.4-2.8 L/ha Dipel 2X DF: 525-1125 g/ha Foray 48 BA: 1.4-2.8 L/ha. Products must be consumed to be effective. Spray when and where pests are actively feeding. Make 2 applications 3-7 days apart, when larvae are very small. Death of insect may take several days. Acidify spray mix to below pH 7.0 and apply on cloudy days or in the evening. REI: 12 hrs PHI: 1 day Intrepid: Apply at a rate of 500-750 ml/ha. Sequential applications must be at least 30 days apart. REI: 12 hrs PHI: 3 days</p>
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-* A thorough survey/inventory of raspberry insects in Nova Scotia has not been compiled and published. Therefore, it is highly advisable to monitor the crop for insects, learn more about insect identification, and be aware to potential problems and new pest species.

PESTICIDE INFORMATION SUMMARY

(Read product label for re-entry intervals, precautions, and other product specific details)

TRADE NAMES	COMMON NAME	DAYS TO HARVEST	TOXICITY			
			TO PRED MITES*	TO BEES	TO APPLICATOR	
					ORAL	DERMAL
Insect/Mite Control						
Acramite	bifenazate	1	high	mod	low	low
Actara	Thiamethoxam	3	low	high	low	low
Admire	imidacloprid	4 (foliar) 14 (drench)	mod	high	low	low
Agri-Mek	abamectin	7	low	high	mod	low
Alias	imidacloprid	4 (foliar) 14 (drench)	low	high	low	low
Assail 70 WP	acetamiprid	1	-	high	low	low
Altacor	chlorantraniliprole	3	low	mod	low	low
Apollo	clofentezine	15	low	low	low	low
Bioprotec, Foray, Dipel 2X DF	<i>Bacillus thuringiensis</i>	0	-	low	low	low
Capture	bifenthrin	3	-	high	low	low
Delegate WG	spinetoram	1	low	high	low	low
Diazinon 500E	diazinon	prebloom		high	low	low
Entrust, Success	spinosad	1	low	high	low	low
Exirel	cyantraniliprole	1	-	high	low	low
Intrepid	methoxyfenozide	3	-	low	low	low
Kanemite	acequinocyl	1	-	low	low	low
Malathion	malathion	1	low	high	low	low
Movento	spirotetramat	3	-	mod	low	low
Nexter	pyridaben	For postharvest only	mod	high	mod	low
Oberon	spiromesifen		mod	high	mod	mod
Purespray Green Spray Oil 13E	mineral oil	-	low	-	low	low
Pyganic EC 1.4	pyrethrins	-	low	high	low	low
Sevin XLR	carbaryl	11	mod	high	mod	mod
Sivanto Prime	flupyradifurone	0	low	mod	high	low
Surround	kaolin	-	low	low	low	low
Vegol Crop Oil	canola oil	0	low	-	low	low
Disease Control						
Aliette	fosetyl-al	60	-	low	low	low
BlightBan C9-1	<i>Pantoea agglomerans</i> strain C9-1	-	low	low	low	low
Bloomtime Biological FD Biopesticide	<i>Pantoea agglomerans</i> strain E325	0	low	low	low	low
Bumper	propiconazole	30	low	low	low	low
Cantus, Lance	boscalid	0	-	low	low	low
Cueva	copper		low	low	low	low

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Diplomat	Polyoxin D zinc salt		low	low	low	low
Elevate	fenhexamid	1	-	low	low	low
Ferbam	ferbam	DO NOT use after berries begin to form	low	low	low	low
Fitness, Jade	propiconazole	30	low	low	low	low
Kasumin	kasugamycin	1	-	low	low	low
Kenja	isofetamid	7	low	low	low	low
Luna tranquility	Fluopyram, pyrimethanil		low	low	low	low
Lime Sulfur	lime sulfur	DO NOT use after 6 mm green	high	low	low	low
Maestro, Supra Captan	captan	2	low	low	low	mod
Nova	myclobutanil	6	mod	low	low	low
Phostrol	mono- and dibasic sodium, potassium, and ammonium phosphites	1	low	low	low	low
Pristine	boscalid, pyraclostrobin	0	-	low	low	low
Purespray Green Spray Oil 13E	mineral oil	-	low	-	low	low
Ridomil Gold	metalaxyl-M	Postharvest but no later than Nov 30	-	low	low	low
Rovral	iprodione	1	-	low	low	low
Scala	pyrimethanil	0	low	low	low	low
Senator	thiophanate-methyl	1	low	low	low	low
Sercadis	fluxapyroxad	0	low	low	low	low
Serenade Opti	<i>Bacillus subtilis</i>	0	low	mod	low	low
Switch	cyprodinil, fludioxonil	1	-	-	low	low
Tanos	famoxadone / cymoxanil	0	low	low	low	low
Tilt, Topas, Propi Super	propiconazole	30	low	low	low	low
Timorex Gold	Tea tree oil	2	low	low	low	low
Vegol Crop Oil	canola oil	0	low	-	low	low

* Various beneficial species. If the commercially available organophosphate resistant strain of *Amblyseius fallacis* is used, then the toxicity of organophosphates to this species can be considered to be **low**.

LABEL DEFINITIONS

DAYS TO HARVEST - Is the minimum number of days from the last application of the product to first harvest. This interval has been set to ensure that any residue of the pesticide left on the fruit at harvest is within an acceptable tolerance. Read the label and do not spray nearer to harvest, or later than the growth stage recommended.

TOXICITY TO BEES - Bees are important pollinators of raspberries. If a pesticide must be applied during the bloom period, choose products with the least toxicity to bees. Spray in late evening or early morning when bees are not present. Spray deposit should be dry before bees begin foraging. If you have rented bees, notify the beekeeper that you intend to spray. Give enough advance notice so that the bees can be moved. Do not allow pesticide spray to drift onto hives. The presence of large numbers of dead bees at the hive entrance may be an indicator of pesticide poisoning.

TOXICITY TO PREDATORY MITES – Two-spotted spider mites are a common pest of raspberries. Predatory mites help suppress two-spotted spider mite infestations. When possible, choose products and use patterns with the least toxicity to these beneficial mites.

TOXICITY TO APPLICATOR - Poisoning as a result of pesticide exposure can result from inhalation, ingestion (Oral), or absorption through the skin (Dermal). It is essential that protective clothing, respirator and eye protection are worn when handling products listed as having a high or moderate toxicity. However, since pesticides may also have adverse affects after long term sublethal exposures it is recommended that protective equipment be worn when using all pesticides. Some of the wettable powder (W or WP) formulations recommended in this guide are now available in low exposure packaging (Instapak, Solupak) or low dust formulations such as dry flowable (DF) and wettable dry granule (WDG). Use of these products reduces inhalation exposure during handling.

RESISTANCE MANAGEMENT - Current disease concerns are for the development of resistance in the fruit rot fungus to Elevate, Switch, Lance and Rovral (they are from different chemical families). To slow the development of resistance, use the products at full rates and rotate with other fungicides from different chemical families or groups. Avoid application of more than 2 consecutive sprays of the same fungicide or a fungicide from the same group. If additional protection or control is required, choose a product from another chemical family. Refer to the labels for more detailed information on resistance management.

PESTICIDE POISONING - If you suspect poisoning from exposure to a pesticide, consult the label for immediate first-aid instructions. Transport the person to your nearest hospital or call 911. Take the label information or the sealed pesticide container with you since it supplies treatment information. ***The Pest Control Products Act Number (P.C.P. No.) on the label will enable the attending physician to obtain specific treatment guidelines from the Poison Control Centre.***

HOW TO REDUCE / AVOID PESTICIDE USE

By applying good management practices, growers can sometimes reduce or eliminate the need for some pesticides. Good management practices include:

- Learn to recognize raspberry pests and diseases and their symptoms. For example, by scouting for the early signs of the strawberry bud weevil you can accurately time the application of control sprays. If the pest is not present then you may be able to eliminate sprays for this pest completely.
- Sanitation. Remove diseased canes from the field. Thinned or diseased canes left in the row can act as a source of infection for diseases such as anthracnose and fruit rot.
- Know the product you are using. Some products are more effective under specific conditions, such as temperature, or are only effective when the target pest is at a specific stage of development. Read the label.
- Use resistant varieties of raspberries. Varieties which are resistant to late yellow rust are available.
- Choose the planting site carefully. Wet, poorly drained soils can lead to root rot. The crops that had been previously planted in the field can potentially cause disease and pest problems. Planting raspberries in a field which has recently been in sod can lead to a white grub problem, while planting

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after potatoes can lead to Verticillium wilt. Consider using raised rows at least 25-30 cm high for root rot control. See extension service for methods.

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