

EXTENSION AND ADVISORY TEAM

# STRAWBERRY INSECT & DISEASE MANAGEMENT SCHEDULE APPLICABLE TO THE MARITIME PROVINCES

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Nova Scotia Guide to Pest Management in Strawberry 2021  
[Straw1-21]



# GUIDE TO INSECT & DISEASE MANAGEMENT IN STRAWBERRY

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**Nova Scotia Guide to Pest Management in Strawberry 2021**

[Straw1-21]

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## LIABILITY STATEMENT

Recommendations in this guide are given for general information only and do not give the user the right to use a product in a manner not in accordance with the pesticide label or Pest Control Products Act. Perennia, by funding and printing this publication, and the editors/authors, do not offer any warranty or guarantee and do not assume any liability for crop loss, animal loss, health, safety, or environmental hazard caused by the use of any pesticide, advice, or recommendation in this schedule. Pesticides used in this schedule are products labeled for the target and crop. This information was retrieved from the Pest Management Regulatory online Registered Products Database. The list of products presented in this schedule is intended to be complete, based on products known to be available in the region, but in no way is guaranteed to be complete. Some of the products listed may not be available. Trade names are given as a convenience to producers and are neither an endorsement of the product nor a suggestion that similar products are not available or effective.

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## PESTICIDE EMERGENCY CONTACT INFORMATION

<b>Poison Control Centres</b>		
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

<b>Environmental Emergencies (Pesticide Spills)</b>	
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

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

<b>Label Abbreviations</b>	
PHI	Pre-Harvest Interval
REI	Restricted Entry Interval

<b>Helpful Conversions*</b>	
kPa X 0.14 = pounds per square inch (psi) hectares X 2.47 = acres kilograms X 2.2 = pounds kilograms per hectare X 0.89 = pounds per acre kilograms per hectare X 0.40 = kilograms per acre	millilitres X 0.035 = fluid ounces litres X 35 = fluid ounces litres X 0.22 = imperial gallons litres per hectare X 14.17 = fluid ounces 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 <sub>50</sub> (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).

## Strawberry Insect & Disease Management Schedule

### Site Selection & Preparation

Insect/Disease	Note
<b>White Grubs Wireworms</b>	Summer fallow or crop rotation recommended between planting years. Do not plant strawberries following sod. White grubs and wireworms can be numerous in sod and even after tillage and soil preparations, residual populations of these insects may still be present to harm the newly planted strawberry plants. To minimize the risk, prepare soil at least one year in advance.
<b>Root Weevils</b>	Several weevil species are root feeders that can be a problem in older plantings and may pose a threat to nearby newer plantings. Avoid planting next to old plantings to isolate the new plantings from land migration of the flightless root weevils. If this is not possible, it may be necessary to manage emerging weevil adults in older plantings with crop protection products. See OCCASIONAL PESTS section.
<b>Strawberry Bud Weevil</b>	Start monitoring for strawberry bud (clipper) weevil early by checking the edges of fields for clipped buds. At the first sign of clipped buds, consider using a registered crop protection product. If new damage occurs 7 days after the first application, then a second application may be warranted.
<b>Red Stele</b>	Plant only certified transplants. Improve drainage. Use resistant varieties. Several races of the red stele fungus occur in Nova Scotia. Some of these races will attack resistant varieties. Where these races occur consider using 30 cm high raised beds. Aliette or Ridomil may be used. See NEW PLANTING and FRUITING FIELD sections for details.
<b>Verticillium Wilt</b>	Do not plant strawberries following potatoes, alfalfa or where Verticillium is known to occur. Effective control can be achieved with soil fumigation. Root lesion nematodes increase the susceptibility of strawberry plants to Verticillium wilt.
<b>Black Root Rot</b>	Ensure that fields have good drainage. Use sub-soiling to break hardpans. Practice crop rotations that maintain soil structure and organic matter content. Reduce nematode levels. Mulch to prevent winter damage. Consider using raised beds. Fumigation helps suppress this disease complex.
<b>Nematodes</b>	The root lesion nematode is the most important nematode of strawberry in Nova Scotia. The threshold for root lesion is 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. There are some nematode-suppressing cover crops i.e. oil seed radish, certain oriental mustard cultivars, some sorghum-sudan grass hybrids, African marigold and Canadian forage pearl millet 101. Effective control of nematodes can also be achieved with soil fumigation. See below.

## Products for Management of Nematodes and other Soil-borne Pests (diseases, weeds, etc)

These products can only be used in conjunction with a detailed Fumigation Management Plan. Prior to the start of application, the applicator must verify that a site-specific Fumigation Management Plan exists for each application block.

Product	Active ingredient	Rate / ha	Pests controlled <sup>4</sup>		
			Nematodes	Diseases	Weeds
<b>Busan 1020<sup>1</sup></b>	33% metam sodium	375-935 L/ha Shank injection	X	X	X
<b>Busan 1180<sup>1</sup></b>	54% metam potassium	231-576 L/ha Shank injection	X	X	X
<b>Busan 1236<sup>1</sup></b>	42% metam sodium	274-683 L/ha Shank injection	X	X	X
<b>Chloropicrin 100</b>	99% chloropicrin	93 L/ha Shank injection	X	X	
<b>Enfuse M510</b>	42% metam sodium	230-575 L/ha Surface broadcast	X	X	X
<b>MustGrow<sup>2</sup></b>	100% Oriental mustard seed meal	1121-2240 kg/ha Surface broadcast	X	X	
<b>Pic Plus<sup>3</sup></b>	85.1% chloropicrin	108 L/ha Shank injection	X	X	
<b>Vapam HL<sup>1</sup></b>	42% metam sodium	279-696 L/ha Shank injection	X	X	X

**Velum Prime** (active ingredient: fluopyram) can be used in the establishment year as a tool for nematode control, though is not classified or applied like a fumigant. Velum Prime can be applied at a rate of 500 ml/ha through drip irrigation for the suppression of root-feeding and soil-dwelling nematodes, both in juvenile and adult form. Strawberries can be planted immediately following drip application of this product. See product label for details and use patterns.

1 = May also be applied by sprinkler application. See label for rates via sprinkler.

2 = Suppression ONLY for nematodes and soil-borne diseases.

3 = Labelled for root-knot nematode only, not root-lesion nematode.

4 = Specific registrations available on product labels

Caution: Fumigants can only to be used by individuals holding an appropriate pesticide applicator certificate or license recognized by the Nova Scotia Department of Environment. This restriction applies to all fumigant handlers, as defined in the HANDLER RESTRICTIONS section of this label.

These products are very toxic and require handlers to the read the label thoroughly. Follow product label directions, closely noting instructions for handling and application.



## New Planting (Establishment Year)

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
<b>Immediately After Transplanting</b>						
<b>Exposed Roots</b>	After transplanting, check plants for exposed roots as a result of erosion and reset plants as required.					
<b>Strawberry Leafroller</b>	1B	Malathion 85E	2.75-4.25 kg	12 hrs	3 days	Works best at temperatures of 20°C or higher.
<b>Black Root Rot</b>	11	Quadris Flowable	1.1 L/ha or 6mL/100m row	12 hrs	1 day	<b>Suppression only.</b> Apply in in 1000-1500 L water/ha directed at the crown.
	12	Scholar 230SC	1.2 L/ha or 6.5 mL/100 m row	12 hrs	1 day	<b>Suppression only.</b> No more than 2 applications/year. Do not apply more than 552 g of fludioxonil/ha in a season.
<b>Starting One Month After Transplanting</b>						
<b>Insects, mites, &amp; diseases</b>	Starting one month after transplanting, scout fields every 2 weeks.					
<b>Leaf Spot</b>	Thresholds have not been developed in Nova Scotia for leaf diseases. Low levels of leaf spot, leaf scorch and leaf blight do not have a significant impact on plant growth. Kent and Mira are very susceptible to leaf spot.					
	M	Maestro 80DF or Supra Captan 80WDG	4.25 kg	48 hrs	2 days	Do not use within 14 days of oil or as a tank-mix or sequential application with products such as Exirel, Fontelia or Timorex Gold. <b>These formulations of Captan are currently under a phase-out period. The last date of use is May 10, 2021.</b>
		Folpan 50WP	2.0 kg/ha in 1000-2000 L/ha water	-	1 day	Apply before first infection and repeat at 7 day intervals. Apply maximum of 6 applications per season.
		Copper 53W	2.5-3.8 kg	48 hrs	2 days	Some varieties (Kent, Sable etc.) are injured using the high rate of copper.
	1	Senator 50 SC	700 mL/1,000 L water	12 hrs	1 day	Use no more than one application per season. Resistance known.
	3	Topas	500 ml/ha	12 hrs	1 day	Make first application when disease levels are no more than 5%. Make no more than 2 consecutive applications before switching to a fungicide with a different mode of action. Apply a maximum of 4 applications per season.
		Tilt 250 E				
		Jade				
		Bumper 432 EC				
	7 & 11	Pristine WG	1.3-1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel.
7, 9	Luna Tranquility	1200 ml/ha	12 hrs	1 day	Rotate with fungicides from different groups.	

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Leaf Spot	19	Diplomat 5SC	463-926 mL/ha	Why dry	0 days	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.
Powdery mildew	M	Cueva	0.5-2% solution,	4 hrs	1 day	Use a 1% solution v/v in 470-940 L/ha
		Fracture	1.5-3.3 L/ha	12 hrs	0 days	<b>Suppression only.</b> Maintain agitation of spray mix. Do not mix with foliar fertilizers.
	3	Fullback 125 SC	512-1,024 mL/ha	12 hrs	8 days	Use with non-ionic surfactant at 2.5L/1000L water (0.25% v/v)
		Mettle 125 ME	219-365 mL/ha	12 hrs	0 days	Maximum 4 applications per year. Begin application prior to disease development and continue with spray intervals up to 21 days in low to moderate disease pressure.
		Nova	340 g/ha	12 hrs/2 days	3 days	Begin applications when disease first appears or when conditions favour disease development. Repeat applications at 14-21 day intervals. Use a maximum of 6 applications per growing season, with 14 days between applications.
	7	Fontelis	1.0-1.75 L/ha	12 hrs	0 days	Rotate with fungicides from different groups. Begin applications when conditions favour disease development. Fontelis contains mineral oil in the formulation. Tank-mixing or rotating with oil-sensitive products (e.g. captan, sulphur) may cause crop safety issues. Check label for tank-mix and product rotation restrictions.
		Sercadis	250-333 mL/ha			
	7+9	Luna Tranquility	1.2 L/ha	12 hrs	1 day	Rotate with fungicides from different groups.
	7+11	Pristine WG	1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel
	7+11	Merivon	.4-.8 l/ha	12-24 hrs	1	
	11	Flint	140 g/ha	12 hrs	0 days	Do not tank-mix or make sequential applications with Exirel
	13	Quintec	300-440 mL/ha	12 hrs	1 day	<b>Quintec is currently under a phase-out period. The last date of use for growers is June 29, 2021.</b>

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Powdery mildew cont'd	19	Diplomat 5SC	259-926 ml/ha	When dry	0 days	<b>Suppression only.</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 control or suppression.
	44	Double Nickel LC	5.0-12.5 L/ha	When dry	0 days	<b>Suppression only.</b>
	46	Timorex Gold	2.0-8.0 L/ha	4 hrs	1 day	<b>Suppression only.</b> Apply in a high-volume spray to ensure thorough coverage. Do not tank mix or rotate with Captan or Sulphur products.
	NC	Actinovate SP	425 g/ha	1 hr		<b>Suppression only.</b>
	NC	Purespray Green Spray Oil 13E	10L/1000L water	12 hrs	-	<b>Suppression only.</b> Do not apply more than 8 summer spray applications per growing season. <i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
		Tivano	1.0 to 1.4 % v/v water	When dry	-	<b>Suppression only.</b> Use a surfactant where permitted. Ensure thorough coverage with contact of underside of leaf.
		Vegol Crop Oil	2% v/v in 700-1900L water/ha	12 hrs	0 days	<b>Suppression only.</b> <i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
		MilStop	2.8-5.6 kg/ha in 1000 L/ha spray volume	4 hrs	0 days	<b>Suppression only.</b> Max 10 applications/season.
	P5	Regalia Maxx	0.125-0.25% v/v in 500-1000L water/ha	When dry	0 days	<b>Suppression only.</b>
	50	Property 300SC	90-110g a.i./ha in 200-1000L water/ha.	12 hours	0 days	<b>Suppression only.</b> Begin applications preventatively and continue as needed. Applications should be made on a 7-10 day interval. Do not make more than 2 consecutive applications of Property or another group 50.
<b>Two-spotted Spider Mite</b>	Action threshold is 25% of leaflets infested with mites. Try to avoid the need for miticides by controlling broadleaved weeds, which can harbour mites.					

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
<b>Two-spotted Spider Mite</b>	6	Agri-Mek SC	225 mL/ha 0.1-0.5% v/v non-ionic surfactant, min. 375 L/ha water	12 hrs	3 days	Maximum 2L/ha per season
	23	Oberon	880-1160 ml/ha, min. 100 L/ha spray volume	12 hrs	3 days	Maximum of 3 applications and 3480 ml/ha per season.
	25	Nealta	1 L/ha	12 hrs	1 day	Two-spotted spider mite & McDaniel spider mite. Maximum of 2 applications per growing season.
	NC	Purespray Green Spray Oil 13E	10L/1000L water	12 hrs	-	<b>Suppression only.</b> Do not apply more than 8 summer spray applications per growing season. <i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
<b>Cyclamen Mite</b>	Establish new plantings away from bearing plantings so as to provide a physical barrier that will help prevent the spread of this mite into new fields. For positive identification, contact Perennia specialist.					
	NC	Vegol Crop Oil	2% v/v in 700-1900L water/ha	12 hrs	0 days	<b>Suppression only.</b> <i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
<b>Red Stele</b>	4	Ridomil Gold 480EC	1.0L/ha	12 hrs	Up to Oct. 31	Do not apply to established plants in the spring
	33	Aliette WDG	5.6 kg/ha	When dry	30 days	Maximum of 4 applications per year - 2 in spring, 2 in fall.
<b>Strawberry Aphid</b>	For more information on strawberry aphid management please contact Perennia for the aphid spray schedule.					
	1	Cygon 480-AG	2.25 L/ha	48 hrs	7 days	Do not apply when bees are actively foraging.
		Lagon 480 E				
	4A	Admire 240	175 ml/ha	24 hrs	7 days	Do not use both soil and foliar applications of Group 4A insecticides in the same year. Maximum 2 applications of products from Group 4A per season across all pests.
		Assail 70 WP	86-86 g/ha	12 hr	1 day	
4D	Sivanto Prime	500-750 ml/ha	12 hrs	0 days	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season. Do not make a foliar application following a soil application of a Group 4 insecticide.	

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Strawberry Aphid		Altus	500-750 mL/ha	12 hrs	12 hrs	Minimum interval of 7 days between applications. Minimum spray volume is 500 L/ha. 2000 mL/ha maximum Altus allowed per crop cycle (400g ai/ha)
	28	Exirel	500-1500 ml/ha	12 hrs	1 day	<u>Will also suppress thrips</u> (rate: 1000-1500 ml/ha).
	29	Beleaf 50SG	120-160 g/ha, min. 94 L/ha water	12 hrs	0 days	Max. 3 applications per year.
	NC	Purespray Green Spray Oil 13E	10L/1000L water (1% solution)	12 hrs	-	Deters feeding by aphids. Do not apply more than 8 summer spray applications per growing season. * Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
		BotaniGard ES ( <i>Beauveria bassiana</i> Strain GHA)	2L/400L spray volume	4 hrs	0 days	<b>Greenhouse only:</b> There is no limit on the number of applications or total amount of BotaniGard ES which can be applied in one season. Do not tank mix.
		Vegol Crop Oil	2% v/v in 700-1900L water/ha	12 hrs	0 days	<b>Suppression only.</b> * Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
	4+15	Cormoran	500-750 ml/ha	12 hrs	1 days	
-	Pyganic	2.32-4.65 L/ha	12 hours	-	Do not reapply more often than every 3 days. Do not apply more than 10 times per growing season. <b>Toxic to bees.</b>	

## Fruiting Field (Bearing Year)

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
<b>Before Bud Formation (when flower buds visible in crown)</b>						
Black Root Rot	11	Quadris Flowable	1.1 L/ha or 6mL/100m row	12 hrs	1 day	<b>Suppression only.</b>
	12	Scholar 230SC	1.2 L/ha (6.5 mL/ 100m row)	12 hrs	1 day	<b>Suppression – apply as a drench application or through drip irrigation following label directions.</b>
Cyclamen Mite	Establish new plantings away from bearing plantings so as to provide a physical barrier that will help prevent the spread of this mite into new fields. For positive identification, contact Perennia specialist.					
	6	Agri-Mek 1.9% EC	1 L/ha	12 hrs	3 days	Maximum 2 L/ha per season

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Cyclamen Mite	NC	Vegol Crop Oil	2% v/v in 700-1900L water/ha	12 hrs	0 days	<b>Suppression only.</b> * Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
Botrytis Fruit Rot	Disease-causing organisms are capable of developing resistance to pesticides, especially when products with the same mode of action are used. To minimize the likelihood of resistance development against your product of choice, a) only use the product when necessary, b) use the appropriate product that targets the desired pest, c) use the recommended rate according to the product label, and d) if more than one treatment is required for the pest, rotate pesticides between fungicide groups.					
	M	Granuflo-T	2.25-2.5kg, 1000-2000 L water	24 hrs	3 days	Make 3 to 5 applications at 10 day intervals, beginning in the early blossom stage.
		Bravo ZN	3.5 L/ha	48 hrs	30 days	Do not use within 10 days of oil. Do not tank-mix or make sequential applications with Exirel. Maximum number of applications per year: 3 (2 (Spring) + 1 (Post-harvest))
		Echo 90DF Echo 720	1.9 kg/ha 2.5 L/ha	12 hrs		
	7	Fontelis	1-1.75 L/ha	12 hrs	0 days	Do not make more than 2 sequential applications before switching to a product with another mode of action. Maximum seasonal rate is 5.25 L/ha.
		Kenja 400SC	0.987-1.24 L/ha	12 hrs	0 days	Max 5 applications/year.
	7 & 11	Pristine WG	1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel
	9	Scala SC	2.0 L	12 hrs	1 day	Apply maximum of 3 applications.
	7+12	Miravis Prime	1 l/ha	12 or 24 hrs	1 day	<b>Max 2 consecutive applications then rotate to a non 7 or 12 fungicide.</b>
	7+11	Merivon	.4-.9 l/ha	12 or 24 hrs	1 day	
	9 & 12	Switch 62.5 WG	975 g/ha	12 hrs	1 day	<b>One of the actives in this product is persistent and may carryover. It is recommended that any products containing fludioxonil not be used in areas treated with this product during the previous season.</b> There is a rotation restriction on crops where this product is not registered.
19	Diplomat 5SC	463-926 ml/ha	When dry	0 days	<b>Suppression only.</b> Begin as a preventative application when conditions favor disease development and continue on a 7-14 day interval as needed to maintain control.	

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
<b>Botrytis Fruit Rot</b>	44	Double Nickel LC (1x10 <sup>10</sup> spores/mL)	Foliar: 5-12.5 L/ha	When dry	0 days	<b>Suppression only.</b> Apply at or just before flowering until fruit maturity. Repeat application every 3-10 days for as long as conditions favour disease development.
		Double Nickel 55 (5x10 <sup>10</sup> spores/g)	Foliar: 1-2.5 kg/ha	When dry	0 days	<b>Suppression only.</b> At or just before flowering, until fruit maturity. Repeat applications every 7-10 days
		Serenade Opti	1.7-3.3 kg/ha	-	0 days	<b>Suppression only.</b> Begin applications prior to disease development and repeat on 7-10 day intervals.
	46	Timorex Gold	1.5-2.0 L/ha in 400-800 L/ha spray volume	4 hrs	2 days	<b>Suppression only.</b>
	NC	Actinovate SP	425g/1100L	1 hr	-	<b>Suppression only.</b> Make the first application when conditions are conducive to disease development. Apply to foliage and blossoms. Repeat application every 7-14 days.
		RootShield HC	10g / L of water			<b>Biopesticide - Apply in sufficient spray volume to cover leaves.</b> Agitation is required to maintain suspension. Organism does not work well when soils are below 10°C.
	P5	Regalia Maxx	0.125 – 0.25 % v/v in 500 – 1000 L water per ha	12 hrs	0 days	Apply preventatively or when disease symptoms first appear.
BM02	Serifel	0.25-.5 kg/ha	4 hrs	0	Thorough coverage is important. Maintain Agitation, so not store in solution overnight, apply directly after mixing.	
<b>Two-spotted spider mite</b>	Destroy the alternate hosts of this mite through an effective weed management program that eliminates broadleaf weed species in the field. Consult a weed specialist to determine the best strategy of weed control for specific situations. For management of two-spotted spider mite at this time in the season, Apollo or Nexter are good choices as their PHI prevents them from being used closer to harvest.					
	10	Apollo SC	500 ml/ha	12 hrs	15 days	Apply at first sign of mite activity.
	21	Nexter	600 g/ha	24 hrs	10 days	Do not spray when bees are active.
<b>Red Stele</b>	33	Aliette WDG	5.6 kg/ha	When dry	30 days	Maximum of 4 applications per year - 2 in spring, 2 in fall.

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Strawberry Aphid	1B	Cygon 480AG	2.25 L/ha	48 hrs	7 days	Apply as a foliar spray
		Lagon 280 E				
	4	Admire 240	7.5 – 12 mL /100 m row in 2000 L/ha water	24 hrs	30 days	<b>Apply to established plantings as a soil drench when growth begins in the spring.</b> Max. 1 application per season.
		Admire 240	175 ml/ha	24 hrs	7 days	<b>Foliar Application</b> - Maximum of 2 applications per crop per season. <b>Not for use on day neutral varieties.</b>
		Assail 70 WP Aceta 70 WP	56-86 g/ha, minimum 187 L/ha spray volume	12 hrs	1 day	Do not make more than 2 applications per season. Do not use in sequence with Admire or other Group 4 insecticides.
	4D	Sivanto Prime	500-750 ml/ha	12 hrs	0 days	Toxic to certain beneficial insects. Maximum 2 applications of products from Group 4 per season.
	4+14	Cormoran	500-750 ml/ha	12 hrs	1 days	
	28	Exirel	500-1500 ml/ha	12 hrs	1 day	<u>Will also suppress trips</u> (rate: 1000-1500 ml/ha).
	29	Beleaf 50SG	120-160 g/ha, minimum 94 L/ha water	12 hrs	0 days	Max 3 applications per year.
	NC	Purespray Green Spray Oil 13E	Apply 10L in 1000L water (1% solution)	12 hrs	-	Deters feeding by aphids. Do not apply more than 8 summer spray applications per growing season. <i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
		Vegol Crop Oil	2% v/v in 700-1900L water/ha	12 hrs	0 days	<i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
		BotaniGard ES ( <i>Beauveria bassiana</i> Strain GHA)	2 L/400 L of spray volume	4 hrs	0 days	<b>Greenhouse only.</b> There is no limit on the number of applications or total amount of BotaniGard ES which can be applied in one season. DO NOT tank mix with any fungicide, insecticide or adjuvant.
	-	Pyganic	2.32-4.65 L/ha	12 hours	-	Do not reapply more often than every 3 days. Do not apply more than 10 times per growing season. <b>Toxic to bees.</b>



Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
<b>Buds Extend from Crown</b>						
<b>Strawberry Bud (Clipper) Weevil</b>	4+15	Cormoran	900 ml/ha	12	1	This group of chemicals is LESS EFFECTIVE at temperatures ABOVE 25°C. Use of these products disrupts natural control of mite pests and can result in mite outbreaks. <u>Warrior</u> - Maximum 3 applications per year
	3	Warrior	104 mL/ha	24 hrs	7 days	
		Matador 120EC or Silencer 120 EC or Labamba				
		Mako (prev. Ripcord)	175 mL/ha	12 hrs		
UP-Cyde 2.5EC	280 mL/ha					
<b>Botrytis Fruit Rot</b>	M	Bravo ZN	3.5 L/ha	12 hrs	30 days	Bravo reduces Botrytis inoculum and fungal sporulation on senescing leaves.
		Echo 90DF	1.9 kg/ha	48 hrs	30 days	DO NOT exceed 3 applications per year.
		Echo 720	2.4 L/ha			
	1	Senator 50 SC	700 mL/1000 L of water (1.54 L/ha)	-	1 day	Only use one application per season. Known resistance.
	7,11	Merivon	0.6-0.8 L/ha	1 day	0 days	Begin applications prior to onset of disease development. Re-entry depends on activity, check the label. Maximum 3 applications per year.
<b>Leaf Spot Leaf Scorch Leaf Blight</b>	Thresholds have not been developed in Nova Scotia for leaf diseases. Low levels of leaf spot, leaf scorch and leaf blight do not have a significant impact on plant growth. Kent, Micmac and Mira are very susceptible to leaf spot.					
	M	Maestro 80DF	2.75-4.25 kg	48 hrs	7 days	Make first application when new growth starts before fruit forms, repeat at weekly intervals.
		Captan 80WDG	2.8-4.2kg	48 hrs	2 days	Tank-mix and sequential application restrictions.
		Folpan 50WP	2.0 kg / 1000-2000 L/ha water	-	1 day	Apply before first infection and repeat at 7 day intervals to protect crop until harvest.
		Copper 53W	2.5-3.8 kg	48 hrs	2 days	Some varieties (Kent, Sable etc.) are injured using the high rate of copper.
	1	Senator 70WP	1.1 kg	-	1 day	Repeat every 7-10 days as required to protect the crop.
	3	Topas 250E	500 ml/ha	12 hrs	1 day	Make no more than two consecutive applications before switching to a fungicide with a different mode of action. Apply a maximum of 4 applications per season.
		Tilt 250				
Propi Super 25EC						
Bumper 432 EC		300 mL/ha				

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Leaf Spot Leaf Scorch Leaf Blight	7 & 11	Pristine WG	1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel
	7, 9	Luna Tranquility	1200 ml/ha	12 hrs	1 day	Begin fungicide applications preventatively.
Powdery mildew	M	Cueva	5L in 500L water/ha	4 hrs	1 day	
	7	Velum Prime	500 ml/ha	12 hrs	0 days	Apply through drip irrigation system preventatively.
	7 + 11	Merivon	0.4-0.6 L/ha	12 hrs	0 days	Do not apply during periods of dead calm. Use on a spray interval of 7-14 days. Maximum 3 applications per year.
	19	Diplomat 5SC	259-926 ml/ha	When dry	0 days	<b>Suppression.</b>
	46	Timorex Gold	2.0-8.0 L/ha, 400-800 L/ha spray volume	4 hrs	2 days	<b>Suppression only.</b>
	NC	MilStop	2.8-5.6 kg/ha, 1000 L/ha spray volume	4 hrs	0 days	Max 10 applications/season.
<b>Bloom - WARNING – Spraying insecticides during bloom is hazardous to bees. Spray in the evening or when bees are not working</b>						
<b>10% Bloom (50% of primary blossoms open)</b>						
Leather Rot	Leather rot persists in the soil and can be transferred to plants by splashing. Use a thick layer of straw mulch between rows to help prevent berries from touching the soil. Berries grown on plastic may also be less likely to come in contact with infectious spores.					
	33	Phostrol	2.9-5.8 L/ha	12 hrs	3 days	Maximum 4 applications per season.
		Confine Extra	4-5L/ha	When dry	1 day	<b>Suppression only.</b>

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
<b>Botrytis Fruit Rot</b>	Disease-causing organisms are capable of developing resistance to pesticides, especially when products with the same mode of action are used. To minimize the likelihood of resistance development against your product of choice, a) only use the product when necessary, b) use the appropriate product that targets the desired pest, c) use the recommended rate according to the product label, and d) if more than one treatment is required for the pest, rotate pesticides between fungicide groups.					
	M	Maestro 80DF	2.75-4.25 kg	48 hrs	2 days	If conditions favour fruit rot, make continuous applications through harvest, treat immediately following picking.
		Captan 80WDG	2.8-4.2kg	48 hrs	2 days	Tank-mix and sequential application restrictions.
		Folpan 50WP	2.0 kg / 1000-2000 L/ha water	-	1 day	Apply at first infection and repeat at 7-day intervals.
		Fracture	1.5-3.3 L/ha, minimum 450 L/ha	When dry	0 days	Fracture requires 2-4 hours drying time on foliage for the active ingredient to absorb into the plant tissue before rain or irrigation occurs. Do not make more than five foliar applications per harvest cycle.
		Granuflo T	2.25-2.5 kg/ha in 1000-2000 L/ha water	24 hrs	3 days	Make 3-5 applications at 10-day intervals beginning early in the blossom stage. Ensure coverage of buds, blossoms and developing fruit.
	1	Senator 50 SC	700 mL/ 1000L water	12 hrs	1 day	Resistance develops rapidly. Tank-mix with compatible group M fungicide.
	2	Rovral 50WP	2.0 kg/ha	12 hrs	1 day	To reduce the possibility of disease resistance to Rovral and Cantus, alternating with other fungicides is recommended.
	7	Fontelis	1-1.75 L/ha	12 hrs	0 days	Max seasonal rate 5.25 L/ha.
		Cantus WDG	0.56 kg/ha			Apply on 7-14-day schedule.
		Kenja 400 SC	0.987-1.24 L/ha			Do not make more than 2 sequential applications of group 7 fungicides.
		Sercadis	500-666 mL/ha			<b>Suppression only.</b>
	7 + 9	Luna Tranquility	1200 ml/ha	12 hrs	1 day	Maximum 2 applications per season.
	7 + 11	Pristine WG	1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel
7+12	Miravis Prime	1 l/ha	12 or 24 hrs	1 day	<b>Max 2 consecutive applications then rotate to a non 7 or 12 fungicide .</b>	

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Botrytis Fruit Rot	7+ 11	Merivon	0.6-0.8 L/ha	1 day	0 days	Begin applications prior to onset of disease development. Re-entry depends on activity, check the label. Maximum 3 applications per year.
	9	Scala SC	2 L/ha	12 hrs	1 day	Maximum of 3 applications per growing season.
	9 + 12	Switch 62.5 WG	975 g/ha	12 hrs	1 day	<b>One of the actives in this product is persistent and may carryover. It is recommended that any products containing fludioxonil not be used in areas treated with this product during the previous season.</b> There is a rotation restriction on crops where this product is not registered.
	11	Intuity	439-877 mL/ha	12 hrs	0 days	Do not make more than 2 sequential applications. So not tank-mix or make sequential applications with Exirel.
	17	Elevate 50WDG	1.7 kg/ha	4 hrs	1 day	Do not make more than 4 applications per season.
	44	Double Nickel LC	5.0-12.5 L/ha	When dry	0 days	<b>Suppression only.</b>
		Serenade Opti	1.7-3.3 kg/ha	When dry	0 days	<b>Suppression only.</b>
	46	Timorex Gold	2.0-8.0 L/ha, 400-800 L/ha spray volume	4 hrs	2 days	<b>Suppression only.</b>
	NC	RootShield HC	10g / L of water			<b>Biopesticide - Apply in sufficient spray volume to cover leaves.</b> Agitation is required to maintain suspension. Organism does not work well when soils are below 10 degrees C.
		Actinovate SP	425g/1100L	1 hr		<b>Suppression only.</b>
	NC	Botector	1 kg in 500- 2000L water/ha	4 hrs	0 days	<b>Suppression only.</b>
	P5	Regalia Maxx	0.25% v/v in 500-1000L/ha water	12 hrs	0 days	<b>Suppression only.</b>

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Anthracnose	7 + 11	Pristine WG	1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel.
		Merivon	0.4-0.8 L/ha	12 hrs	0 days	Apply on a 7-14-day interval. Apply subsequent applications if disease persists or weather conditions favor disease development. Maximum 3 applications per year.
	9 +12	Switch 62.5 WG	975 g/ha	12 hrs	1 day	<b>One of the actives in this product is persistent and may carryover. It is recommended that any products containing fludioxonil not be used in areas treated with this product during the previous season.</b> There is a rotation restriction on crops where this product is not registered.
	11	Cabrio 20 EG	0.56 – 1 kg/ha	12 hrs	1 day	Do not apply Cabrio 20 EG more than twice in a row to decrease the risk of resistance development.
	NC	Actinovate SP	425g/1100L	1 hr		<b>May reduce symptoms but does not provide control or suppression.</b>
		Botector	1 kg in 500-2000L water/ha	4 hrs	0 days	<b>Suppression only.</b>
	19	Diplomat 5SC	463-926 ml/ha	-	0 days	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 control or suppression.
Powdery Mildew	M	Fracture	1.5-3.3 L/ha, minimum 450 L/ha	When dry	0 days	Fracture requires 2-4 hours drying time on foliage for the active ingredient to absorb into the plant tissue before rain or irrigation occurs. Do not make more than five foliar applications per harvest cycle.
		Cueva	5L in 500L water	4 hrs	1 day	Apply on 7-day intervals.
	3	Mettle 125 ME	219-365 ml/ha	12 hrs	0 days	Begin application prior to disease development.
		Fullback 125 SC	512-1024 mL/ha	12 hrs	8 days	Non-ionic surfactant at 0.25% v/v may be added to the spray solution.
		Nova	340 g/ha	12 hrs-2 days	3 days	Use a maximum of 6 applications per year with 14 days between applications.
	7	Sercadis	0.250-0.333 L/ha	12 hrs	0 days	Begin applications no later than 10% Also for <b>suppression of Botrytis</b> gray mold at 0.50-0.666 L/ha.
		Fontelis	1.0-1.75 L/ha			Contains mineral oil; in formulation. Tank-mix restrictions.

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Powdery Mildew		Velum Prime	500 ml/ha			Apply through drip irrigation system preventatively.
	7 + 9	Luna Tranquility	1200 ml/ha	12 hrs	1 day	Begin fungicide applications preventatively.
	7 + 11	Pristine WG	1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season. Do not tank-mix or make sequential applications with Exirel
	7 + 11	Merivon	0.6-0.8 L/ha	1 day	0 days	Begin applications prior to onset of disease development. Re-entry depends on activity, check the label. Maximum 3 applications per year.
	13	Quintec	300-440 ml/ha	12 hrs	1 day	<b>Preventative only.</b> Maximum 4 applications per year. <b>Toxic to bees exposed to direct treatment, drift, or residues on crops or weeds.</b>
	19	Diplomat 5SC	259-926 ml/ha	When dry	0 days	<b>Suppression only.</b>
	44	Double Nickel LC (1x10 <sup>10</sup> spores/mL)	Foliar: 5-12.5 L/ha	When dry	0 days	<b>Suppression only.</b>
		Double Nickel 55 (5x10 <sup>10</sup> spores/g)	Foliar: 1-2.5 kg/ha			
	46	Timorex Gold	2.0-8.0 L/ha, 400-800 L/ha spray volume	4 hrs	2 days	<b>Suppression only.</b>
	P5	Regalia Maxx	0.125–0.25 % v/v in 500–1000 L/ha water	When dry	0 day	Apply preventatively or when disease symptoms first appear.
	NC	Purespray Green Spray Oil 13E	Apply 10L in 1000L water (1% solution)	12 hrs	0	Do not apply more than 8 summer spray applications per growing season. <i>* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product.</i> <i>* Do not use when temperatures are high.</i>
		Actinovate SP	425g/1100L	<b>1 hr</b>	-	<b>Suppression only.</b>
		Tivano	8 or 12 % dilution in water solution, 200 L/ha spray volume	When dry	-	<b>Suppression only.</b>

Insect / Disease	Group	Product	Rate / ha	REI	PHI	Note
Powdery Mildew		Vegol Crop Oil	2% v/v in 700-1900 L/ha water	12 hrs	0 days	<b>Suppression only.</b>
		MilStop	2.8-5.6 kg/ha, 1000 L/ha spray volume	4 hrs	0 days	Max. 10 applications/season.

Tarnished Plant Bug	Tap 30 blossom clusters per field. The action threshold is 15 per 30 clusters. Controlling weed species will also contribute to reduced incidence of tarnished plant bug. Crop protection products used for tarnished plant bug management will also suppress flower thrips.					
	1B	Cygon 480AG	2.75 L/ha	48 hrs	7 days	Do not use when bees are active
		Lagon 480E	1.25 L/ha			
	3	Decis 5EC	200 mL/ha	12 hrs	14 days	DO NOT apply more than 2 times per year. Do not apply when temperatures are over 25°C.
		UP-Cyde 2.5 EC	400 mL/ha	12 hrs	7 days	Do not use more than 3 times per year.
		Matador 120EC or Labamba	104 mL/ha	24 hrs		Allow 7 days in between applications. Apply 7-10 days after first bloom. Max 3 applications per year.
		Mako	250 mL/ha in 300-500 L/ha water	12 hrs		Apply at early bloom and repeat in 10 to 12 days at the end of full bloom.
		Poleci 2.5 EC	400 ml/ha	12 hrs	14 days	Max 2 applications/season.
	4	Assail 70 WP Aceta 70 WP	84-210 g/ha, min. 187 L/ha spray volume	12 hrs	1 day	Do not make more than 2 applications per season.
	4+15	Cormoran	900 ml/ha	12	1	
	4A	Clutch	448 g/ha	12 hrs	1 day	Time the single application per year to target pest activity prior to the start of bloom. <b>This product is toxic to bees exposed to direct treatment or residues on blooming crops. Do not apply during bloom or when bees are present.</b>
15	Rimon 10 EC	835 ml/ha in 450-1400 L/ha water	12 hrs	1 day	Do not apply more than 3 applications per crop season. Do not apply more than 2.5 Litres of product per hectare per season. For control of Nymphs of Lygus.	

<b>Tarnished Plant Bug</b>	29	Beleaf 50SG	200 g/ha	12 hrs	0 days	<b>Suppression only.</b> Max 3 applications per year.
<b>Leafrollers, Aphids, Leafhoppers</b>	1B	Malathion 85E	2.75-4.25 kg	12 hrs	3 days	Works best at temperatures of 20°C or higher. Highly toxic to bees.
	5	Entrust 80W	80-109 g/ha	When dry	1 day	<b>Control of oblique banded leafroller, cabbage looper, and winter moth.</b> Apply a maximum of three applications per year.
		Entrust SC	267-364 ml/ha			
	4+15	Cormoran	900 ml/ha	12	1	
	11	Bioprotec 3P	0.72-1.45 kg/ha in 600 L/ha water	-	1 day	Minimum re-application interval is 7 days.
	28	Exirel	500-1500 ml/ha	12 hrs	1 day	<u>Will also suppress thrips</u> (rate: 1000-1500 ml/ha).
	29	Beleaf 50SG	120-160 g/ha	12 hrs	0 days	Max. 3 applications per year.
	NC	Purespray Green Spray Oil 13E	Apply 10L in 1000L water (1% solution)	12 hrs	-	Deters feeding by aphids. Do not apply more than 8 summer spray applications per growing season. * Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
		BotaniGard ES ( <i>Beauveria bassiana</i> Strain GHA)	2 L/400 L of spray volume	4 hrs	0 days	<b>Greenhouse only:</b> There is no limit on the number of applications or total amount of BotaniGard ES which can be applied in one season. DO NOT tank mix with any fungicide, insecticide or adjuvant.
Surround WP		12.5-25 kg/ha in 500 L/ha water	-	0 day	<b>This is an OMRI listed control product and is suitable for organic production.</b> Do not exceed 25 kg/ha per application. <b>Aster Leafhoppers only.</b>	
11	Dipel 2X DF	525-1125 g/ha	-	0 day	<b>Fruittree leafroller, European leafroller, Obliquebanded leafroller, Three-lined leafroller.</b> Treat when larvae are young (early instar) before the crop is damaged. Repeat applications at an interval sufficient to maintain control, usually 3 – 14 days.	



<b>Leafrollers, Aphids, Leafhoppers</b>	-	Pyganic	2.32-4.65 L/ha	12 hours	-	Do not reapply more often than every 3 days. Do not apply more than 10 times per growing season. <b>Toxic to bees.</b>
<b>Thrips</b>	5	Delegate WG	0.2-0.28 kg/ha	12 hrs	1 day	<b>Suppression only.</b> Maximum of three applications per year.
	28	Exirel	1.0-1.5 L/ha	12 hrs	1 day	<b>Suppression only.</b> See label for tank-mix restrictions.
<b>50% Bloom (or 7- 10 days after 10% bloom spray)</b>						
<b>Botrytis Fruit Rot</b>	Disease-causing organisms are capable of developing resistance to pesticides, especially when products with the same mode of action are used. To minimize the likelihood of resistance development against your product of choice, a) only use the product when necessary, b) use the appropriate product that targets the desired pest, c) use the recommended rate according to the product label, and d) if more than one treatment is required for the pest, rotate pesticides between fungicide groups.					
	<b>Same as for 10% BLOOM</b>					
<b>Tarnished Plant Bug</b>	<b>Same as for 10% BLOOM</b>					
<b>Slugs</b>	NC	Sluggo	25-50 kg/ha	12 hrs	-	Apply selectively, by hand, between the furrows near the base of the plants.
<b>Leafrollers, Aphids, Leafhoppers</b>	<b>Same as for 10% BLOOM</b>					
<b>90% Bloom (or 7-10 days after 50% bloom spray)</b>						
<b>Botrytis Fruit Rot</b>	Disease-causing organisms are capable of developing resistance to pesticides, especially when products with the same mode of action are used. To minimize the likelihood of resistance development against your product of choice, a) only use the product when necessary, b) use the appropriate product that targets the desired pest, c) use the recommended rate according to the product label, and d) if more than one treatment is required for the pest, rotate pesticides between fungicide groups.					
	<b>Same as for 10% BLOOM</b>					
<b>Tarnished Plant Bug</b>	<b>Same as for 10% BLOOM</b>					

Leafrollers, Aphids, Leafhoppers	Same as for 10% BLOOM					
<b>Preharvest</b>						
<b>Botrytis Fruit Rot</b>	Disease-causing organisms are capable of developing resistance to pesticides, especially when products with the same mode of action are used. To minimize the likelihood of resistance development against your product of choice, a) only use the product when necessary, b) use the appropriate product that targets the desired pest, c) use the recommended rate according to the product label, and d) if more than one treatment is required for the pest, rotate pesticides between fungicide groups.					
	<b>Same as for 10% BLOOM</b> If wet weather persists during fruit enlargement and coloring or if fruit rot appears in the field.					
<b>Two-spotted spider mite</b>	6	Agri-Mek 1.9% EC	1 L/ha, min 375 L/ha water 225 mL/ha	12 hrs	3 days	Maximum 2 L/ha per season.
		Agri-Mek SC	0.1-0.5% v/v non-ionic surfactant, min 375 L/ha water	12 hrs	3 days	
	23	Oberon	880-1160 ml/ha, min 100 L/ha spray volume	12 hrs	3 days	Maximum of 3 applications and 3480 ml/ha per season. PHI = 3 days.
	25	Nealta	1 L/ha	12 hrs	1 day	Two-spotted spider mite & McDaniel spider mite. Maximum of 2 applications per growing season.

<b>Two-spotted spider mite</b>	NC	Purespray Green Spray Oil 13E	Apply 10L in 1000L water (1% solution)	12 hrs	-	Suppression of spider mites. Do not apply more than 8 summer spray applications per growing season. * Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
		Vegol Crop Oil	2% v/v in 700-1900 L/ha water	12 hrs	0 days	* Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
<b>Leafrollers, Aphids, Leafhoppers</b>	<b>Same as for 10% BLOOM</b> Continue monitoring.					
<b>Spotted wing <i>Drosophila</i></b>	Look for annual release of emergency registrations on products for the control of spotted wing <i>Drosophila</i> . See the strawberry page on the Perennia website for emergency registrations.					
	1B	Malathion 85E	1000 ml/ha	12 hrs	3 days	Suppression. Apply in 1000 l/ha of water.
	3	Up-Cyde	245-285 ml/ha	12 hrs	7 days	
	3	Mako	150-175 ml/ha	12 hrs	2 days	
	28	Exriel	1-1.5 l/ha	12 hrs	1 day	Use the high rate under high pest pressure. Use of surfactant will enhance control.
	28	Harvarta	1.2-1.6 l/ha	12 hrs	1 day	
	5	Delegate	280 g/ha	12 hrs	1 day	Maximum of three applications per year.
	Entrust SC	292-364 ml/ha	When dry	1 day	Maximum of three applications per year. <b>Do not make more than 2 consecutive applications of Group 5 insecticides (spinosad and spinetoram).</b>	
	Success	165-220 mL/ha				
<b>Post Renovation</b>						
<b>Cyclamen Mite</b>	After mowing.					
	6	Agri-Mek 1.9% EC	1 L/ha	12 hrs	3 days	Maximum 2 L/ha per season
	NC	Vegol Crop Oil	2% v/v in 700-1900L water/ha	12 hrs	0 days	<b>Suppression only.</b> * Do not use chlorothalonil, captan, sulphur or dimethoate in a spray program with this product. * Do not use when temperatures are high.
<b>Two-spotted spider mite</b>	<b>Same as for PREHARVEST</b> After new growth appears.					
<b>Black Root Rot</b>	After mowing.					
	11	Quadris Flowable	1.1 L/ha or 6mL/100m row	12 hrs	1 day	<b>Suppression only.</b>
	12	Scholar 230SC	1.2 L/ha (6.5 mL/ 100m row)	12 hrs	1 day	<b>Suppression – apply as a drench application or through drip irrigation following label directions.</b>

Fall						
<b>Leaf Spot</b> <b>Leaf Scorch</b> <b>Leaf Blight</b>	Thresholds have not been developed in Nova Scotia for leaf diseases. Low levels of leaf spot, leaf scorch and leaf blight do not have a significant impact on plant growth. Kent and Mira are very susceptible to leaf spot.					
	M	Maestro 80DF	2.75-4.25 kg	48 hrs	2 days	
		Captan 80WDG	2.8-4.2kg	48 hrs	2 days	Tank-mix and sequential application restrictions.
	M	Folpan 50WP	2.0 kg / 1000-2000 L/ha water	-	1 day	Maximum 6 applications per season.
		Copper 53W	2.5-3.8 kg	48 hrs	2 days	Some varieties (Kent, Sable etc.) are injured using the high rate of copper.
	1	Senator 70WP	1.1 kg	-	1d	Can be repeated every 7-10 days as needed.
	3	Topas 250E	500 ml/ha	12 hrs	1 day	Make no more than two consecutive applications before switching to a fungicide with a different mode of action. Apply a maximum of 4 applications per season.
		Tilt 250				
		Propi Super 25EC				
		Bumper				
	7 & 11	Pristine WG	1.3-1.6 kg/ha	24 hrs	1 day	Maximum 5 applications per growing season.
7, 9	Luna Tranquility	1200 ml/ha	12 hrs	1 day	Begin fungicide applications preventatively.	
<b>Botrytis Fruit Rot</b>	M5	Bravo ZN	3.5 L/ha	12 hrs	30 days	Apply once in the fall and twice in the spring when new growth appears and 10-12 days later. Bravo reduces Botrytis inoculum and fungal sporulation on senescing leaves.

## Occasional Pests

Insect / Disease	Note
<b>Diseases</b>	
<b>Angular Leaf Spot</b>	<p>A bacterial disease that causes small angular, translucent spots on the leaves and brown-black necrosis of the hulls of the fruit. Most damage occurs when the disease spreads extensively during bloom and the pre-harvest period. Varieties differ in susceptibility. No pesticides are registered for control of this disease. Avoid irrigation under poor drying conditions. Copper 53W applied for leaf spot as under NEW PLANTING may help suppress angular leaf spot. Copper may burn varieties such as Kent, Mohawk, and Sable. Use lower rate and test varieties for sensitivity to copper.</p> <p><b>Tivano.</b> Apply at 8 or 12 % dilution in water solution. Foliar spray volume of 200 L/ha. Begin applications when conditions are conducive to disease development. Application interval of 5-10 days.</p>
<b>Insects</b>	
<b>Root Weevils</b>	<p>There are at least four different species of root weevils that can damage strawberry plants. They are the strawberry root weevil, <i>Otiorhynchus ovatus</i>, black vine weevil, <i>O. sulcatus</i>, rough strawberry weevil, <i>O. rugosostriatus</i>, and obscure root weevil, <i>Sciopithes obscurus</i>. More survey work needs to be done to confirm the presence of all of these species, and possibly others, in strawberry</p>

<b>Root Weevils</b>	<p>plantings in Nova Scotia. The most common species are considered to be the black vine weevil and the strawberry root weevil. Larvae feed on roots and crowns in the spring. In late summer and fall, adult weevils eat C-shaped notches in strawberry leaves. The leaf feeding is not serious; however, it does indicate weevil activity in the field. Unfortunately, there are very few options for effective root weevil control.</p> <p><b>Actara 25WG</b> is applied at a rate of 210-280 g/ha in a minimum of 200L/ha. Apply as a foliar application before pests reach damaging levels. Maximum 2 applications per season with an application interval of 7 days. Do not apply within 3 days of harvest. HIGHLY toxic to bee, do not apply to blooming crops or weeds. <b>Suppression of black vine weevil &amp; strawberry root weevil:</b> 560g/ha. Apply as a soil drench post renovation only. Max 1 application/season.</p> <p><b>Warrior</b> is applied at a rate of 104 ml/ha for black vine weevil adults. Application should be made as soon as weevils appear but not until after the final harvest. Maximum of three applications per season. Re-application interval of seven days. Apply in 300-400 l of water /ha. PHI 7</p> <p>Probably the best strategy is to isolate new plantings of strawberries from infested fields. Because the adult stage of all root weevil species cannot fly, they will spread much more slowly if there is a land barrier between fields.</p>
<b>Spittle Bugs</b>	<p>Do not cause significant damage to strawberries in Nova Scotia; however, they are a nuisance in U-Pick operations. Weed control, and sprays for tarnished plant bug should provide adequate control.</p>
<b>Brown marmorated stink bug</b>	<p>At the time of publication, there were no pesticides registered for use on brown marmorated stink bug in strawberries.</p>
<b>Strawberry cutworm (crown borer)</b>	<p><b>Warhawk 480EC (Chlorpyrifos)/Pyrinex 480EC</b></p> <p>Do not apply more than once per season. Ground application only. Apply 1.2 litres in 2000 L/ha. Apply once as a foliar spray between June 1 and June 15. Large volumes of water are desirable to ensure full wetting of the crown area of the plants.</p> <p>REI: 24 hours. PHI: 20 days.</p>

## 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
<b>Products used for insect and mite control or suppression</b>						
Actara	thiamethoxam	7	mod	high	mod	mod
Admire	imidacloprid	30 (soil) 7 (foliar)	mod	high	low	low
Agri-Mek	abamectin	3	low	high	high	mod
Apollo	clofentezine	15	low	low	low	low
Assail	acetamiprid	1	-	high	low	low
Altus	Flupyradifurone		-	high	Mod	mod
Beleaf 50SG	flonicamid	0	-	low	low	low
Bioprotec	<i>Bacillus thuringiensis</i>	0	low	low	low	low
BotaniGard	<i>Beauveria bassiana</i>	0	low	low	low	low
Clutch, Clothianidin	clothianidin	1	***	high	low	low
Cygon 480AG	dimethoate	7	low	high	low	low
Decis	deltamethrin	14	high*	high	low	low
Delegate**	spinetoram	1	-	high	low	low
Dipel 2X DF	<i>Bacillus thuringiensis</i>	0	low	low	low	low
Entrust	spinosad	1	low	high	low	low
Exirel	cyantranilprole	1	-	high	low	low
Lagon	dimethoate	7	mod*	mod	mod	mod
Mako	cypermethrin	7	-	high	low	low
Malathion	malathion	3	low	high	low	low
Matador, Warrior, Labamba	cyhalothrin-lambda	7	high*	high	low	low
Nealta	cyflumetofen	1	high	?	low	low
Nexter	pyridaben	10	mod	high	mod	low
Oberon	spiromesifen	3	low	mod	low	low
Purespray Green Spray Oil 13E	mineral oil	-	low	-	low	low
Poleci	Deltamethrin	14	high	high	low	low
Pyrinex 480EC	chlorpyrifos	20	-	high	mod	low
Rimon	novaluron	1	?	mod	low	low
Silencer 120EC	lambda-cyhalothrin	7	-	high	mod	low
Sivanto Prime	flupyradifurone	0	low	mod	high	low
Sluggo	ferric phosphate	-	-	low	low	low
Surround	kaolin	-	low	low	low	low
UP-Cyde, Ripcord	cypermethrin	7	high	high	low	low
Vegol Crop Oil	cypermethrin	7	low	-	low	low
Warhawk 480EC	chlorpyrifos	20	-	high	low	low
<b>Products used for disease control or suppression</b>						
Actinovate SP	<i>Streptomyces lydicus</i>	?	?	low	low	low

Aliette	fosetyl-al	30	-	low	low	low
Botector	<i>Aureobasisdium pullulans</i>	0	low	low	low	low
Bravo, Echo 720, Echo 90DF	chlorothalonil	30	-	low	low	low
Bumper 432EC	propiconazole	1	low	low	low	low
Cabrio	pyraclostrobin	1	-	low	low	low
Diplomat	Polyoxin D Zinc salt	0	low	low	low	low
Lance, Cantus	boscalid	0	-	low	low	low
Captan, Maestro	captan	2	low	mod	low	low
Confine Extra	Phosphorous acid, mono- and di-potassium salts of phosphorous acid	1	low	low	low	low
Copper 53W	tri-basic copper sulphate	1	low	mod	mod	low
Cueva	copper	1	?	low	low	low
Double Nickel LC	<i>Bacillus amyloliquefaciens</i>	0	low	low	low	low
Bravo, Echo 720, Echo 90DF	chlorothalonil	30	-	low	low	low
Elevate	fenhexamid	1	-	low	low	low
Equal	dodine	7	low-mod	low	low	low
Fitness	propiconazole	1	low	low	low	low
Flint	trifloxystrobin	0	mod	low	low	low
Folpan	folpet	1	-	low	Low	low
Fontelis	pentiopyrad	0	low	low	low	low
Fracture	BLAD polypeptide	0	low	low	low	low
Fullback	flutriafol	8	-	mod	low	low
Granuflo T	thiram	3	-	low	mod	low
Intuity	mandestrobin	0	-	low	low	low
Jade	propiconazole	1	low	low	low	low
Kenja 400SC	isofetamid	0	?	low	low	low
Luna Tranquility	fluopyram + pyrimethanil	1	low	low	low	low
Captan, Maestro	captan	2	low	mod	low	low
Mettle	tetraconazole	0	?	?	?	?
Merivon	Pyraclostrobin + fluxapyroxad	0	-	Mod	Mod	mod
MilStop	Potassium bicarbonate	0	low	low	low	low
Nova	myclobutanil	3	low-mod	low	low	low
Phostrol	mono- and dibasic sodium, potassium, and ammonium phosphites	3	low	low	low	low
Pristine	boscalid, pyraclostrobin	1	-	low	low	low

Property 300SC	Pyriofenone	0	-	Low	Low	low
Propi Super	propiconazole	1	low	low	low	low
Purespray Green Spray Oil 13E	mineral oil	-	low	-	low	low
Quadris, Azoshy	azoxystrobin	>365	low	low	low	low
Quintec	quinoxifen	1	?	high	low	low
Regalia Maxx	<i>Reynoutria sachalinensis</i>	0	low	low	low	low
Ridomil Gold	metalaxyl-M	In fall of bearing year	-	low	low	low
RootShield	<i>Trichoderma harzianum</i> strain KRL-AG2	1	low	low	low	low
Rovral	iprodione	1	-	low	low	low
Scala	pyrimethanil	1	-	low	low	low
Scholar 230SC	fludioxonil	1	-	low	low	low
Senator	thiophanate-methyl	1	-	low	low	low
Sercadis	fluxapyroxad	0	low	low	low	low
Serenade Max	<i>Bacillus subtilis</i>	0	-	low	low	low
Serenade OPTI	<i>Bacillus subtilis</i>	0	low	low	low	low
Switch	cyprodinil, fludioxonil	1	-	low	low	low
Tilt 250E	propiconazole	1	low	low	low	mod
Timorex Gold	tea tree oil	2	low	low	low	low
Tivano	citric acid + lactic acid	-	?	low	low	low
Topas	propiconazole	1	-	low	low	low
Vapam	metam	Preplant in the fall	-	-	high	high
Velum prime	fluopyram	1	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. Also some strains are pyrethroid resistant.

\*\*Once this product is dry, it has very low toxicity to pollinators.

\*\*\* toxic to certain beneficial insects

## 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 strawberries. 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 strawberries. 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 effects 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, Lance, Switch, Nova 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... If Cabrio is used for anthracnose, do not apply more than two applications before alternating to another fungicide with different mode of action. Refer to the labels for more detailed information on resistance management.

**SPRAY VOLUME AND PRESSURE** - For control of Fruit Rot, insects, mites and leaf diseases, good spray penetration and coverage is essential. For bearing fields with a dense crop canopy a spray volume of 1000 L/ha should be considered a minimum and increasing the volume to 2000 L/ha should improve the control achieved with a conventional boom sprayer. Drop nozzles provide improved control. For Cyclamen Mites the label recommends spray volumes up to 8000 L/ha. High pressure is important for creating a droplet size which will result in good coverage on the underside of leaves. Pressures of 1000 to 2000 kPa are required for good control. Wetting agents can improve the control obtained by some products. Consult the label and use the wetting agent recommended.

**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 strawberry pests, diseases and 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 plants from the field. For example, roguing green petal infected plants removes an important source of infection for healthy plants.
- 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 carefully.
- Use resistant varieties of strawberries if possible. Varieties differ greatly in susceptibility to diseases. See the Agriculture and Agri-Food Canada publication "Strawberry Variety Selection" ([http://res2.agr.ca/kentville/pubs/fact00-02/index\\_e.htm](http://res2.agr.ca/kentville/pubs/fact00-02/index_e.htm)).
- Choose the planting site carefully. Wet, poorly drained soils can lead to root problems. The crops that had been previously planted in the field can potentially cause disease and pest problems. Planting strawberries in a field which has recently been in sod can lead to a white grub or wireworm problem. Planting after potatoes or alfalfa can lead to Verticillium wilt. Consider using raised beds, at least 25-30 cm high, where red stele races are attacking resistant varieties.