

2023



EXTENSION AND ADVISORY TEAM

SPRAY GUIDE FOR PUMPKIN & SQUASH

Nova Scotia Vegetable Crop Spray Guide 2023
[PUM1-23]



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LIABILITY STATEMENT

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PESTICIDE EMERGENCY CONTACT INFORMATION

Poison Control Centres		
Nova Scotia	800.565.8161 or 902.470.8161	IWK, Halifax, NS
New Brunswick	911	Ask for Poison Information
Prince Edward Island	800.565.8161 or 902.470.8161	IWK, Halifax, NS
Newfoundland	709.722.1110	Dr. Charles A. Janeway Child Health Care Centre, St. John's, NF

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

ABBREVIATIONS & CONVERSIONS

Formulation and Measurement Abbreviations			
FORMULATIONS		MEASUREMENTS	
DF	Dry flowable	mL	millilitre
EC, E	Emulsifiable concentrate	kPa	kilopascal
L	Liquid	kg	kilogram
Sn / Su	Suspension	g	gram
WP/W	Wettable powder	L	litre
		BIU	Billions of International Units
		ppm	parts per million (1000 ppb)
		ppb	parts per billion (1/1000 ppm)

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

¹ Pesticide Units of Measurement

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

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
WEEDS:							
Preplant <i>Perennial weeds including quackgrass</i>	9	Glyphosate	Roundup Transorb HC	1.67-4.67 L/ha	12 hours	7	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control, apply it to actively growing quackgrass when at least 4 new leaves are present. The low rate (1.67 L/ha) will provide a minimum of one season control, while higher rates (1.67-4.67 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used, add a suitable surfactant. Allow 3 or more days after treatment before tillage. Best control of quackgrass is obtained when these herbicides are applied in the fall.
			Roundup WeatherMAX	1.67-4.67 L/ha			
			Touchdown Total	1.8-5.0 L/ha			
	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	-	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume. Max 2 applications per year (preplant burndown, hooded sprayer). Maximum 234 mL/ha per year.
Preemergence <i>Germinating annual grasses and some broadleaves</i>	3	Chlorthal dimethyl	Dacthal W-75	6.75-15.5 kg/ha	12 hours	-	Do not use it on Pumpkins. Apply when plants have 4-5 true leaves but before weed seed germination (prior cultivation may be required). Do not apply more than 15.5 kg/ha.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Preemergence <i>Germinating annual grasses and some broadleaves (cont.)</i>	13	Clomazone	Command 360 ME	0.78-1.17 L/ha	12 hours	30	Apply as a pre-emergent application before emergence of the crop or weeds. Apply in 95-375 L/ha of spray volume. Apply low rate on coarse soils, high rate on fine textured soils. Do not apply it on sandy soils. Apply once per season. Do not incorporate. Do not use on Jack-O-Lantern pumpkins or the following cultivars as unacceptable whitening of the fruit may occur: NK530, NK580, Turks Turban, Golden Delicious, all Banana Types, and all other <i>Cucurbita maxima</i> that have a pink or burnt coloration at harvest.
	15	Napropamide	Devrinol DF	2.24-4.5 kg/ha	12 hours	-	Use on direct seeded pumpkin and squash only. 1 application per season, apply in 200-900 L water/ha. Application should be timed to take advantage of rainfall if irrigation (5-10cm soon after application) is not available.
		S-Metolachlor and R-enantiomer	Dual II Magnum or Komodo	Broadcast: 1.15 L/ha Banded to row middles post mulch: 1.15-1.56L	12 hours	30	One application per year. Can be applied before weed emergence, pre-emergence, or early post emergence of direct seeded crop (1-2 leaf stage). Apply pre-transplant or within 48 hours of transplanting. Risk of crop injury with application of this herbicide.
Postemergence <i>Inter-row shielded</i>	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	-	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume. Maximum 234 mL/year, or 2 applications.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Postemergence <i>Inter-row shielded (cont.)</i>	26	Pelargonic acid	Beloukha	16-27 L/ha	Until Dry	1	Use a directed or shielded sprayer to avoid damage to crops. Acts on contact. Apply in 200 – 300 L of water/ha. Use minimum effective rate for weed control, with higher rates/repeat applications for harder to control weeds. Growth stage is <10 cm.
Postemergence <i>Grass weeds</i>	1	Sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha 0.5 -2 L/ha	12 hours	30	Apply to actively growing grasses at the 1-6 leaf stage.
Postemergence Direct-seeded and Transplant. <i>Broadleaf weeds & nutsedge</i>	2	Halosulfuron	Sandea WG	35-70 g/ha	12 hours	30	<i>See label for application instructions and timing.</i> Max. 2 applications per season, with a minimum of 21 days between applications. Apply 3-5 cm irrigation to settle soil after planting and prior to application where possible.
Postemergence <i>Grass and broadleaf weeds</i>	-	Acetic Acid	Serene NEW 2023	179-219.5 L/ha	When residue is dry	-	Field or greenhouse use. Apply as a uniform band or spot application directed at weeds on the ground between crops. Use hooded or shielded application equipment. Do not spray the crop directly, or when plants are under stress. Retreatment required for weed regrowth.
Post-Harvest Burndown	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	12 hours	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume. Considered to be one of the two permitted applications in a single year.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS:							
Cucumber Beetle and Flea Beetle	1A	Carbaryl	Sevin XLR	2.5 L/ha	Low contact: 12 hours High contact: 2 days	5	Do not apply when a field is in bloom or adjacent fields are in bloom. Max. 2 applications per year, with a 7-day interval. Do not apply it when foliage is wet. High contact activities include hand-line irrigation. Low contact activities include hand harvest, turning, tying, staking, scouting, weeding.
	3	Lambda-cyhalothrin	Matador 120 EC or Labamba, Warrior	187-233 ml/ha	48 hours	1	Cucumber beetle. Base timing/frequency of applications upon insect populations reaching local economic thresholds. Reapply after minimum of 7 days if monitoring indicates necessary. Max. 3 applications per year, apply in 100-200 L of water /ha. Also controls Squash bug.
	3, 28	Lambda-cyhalothrin, chlorantraniliprole	Voliam Xpress	500 mL/ha	24 hours	1	Cucumber beetle. Max. 3 applications per growing season, with a minimum 7-day interval. Do not make a foliar application for a minimum of 60 days following an in-furrow or soil application or planting of seed treated with any Group 28 insecticide.
	28	Cyclaniliprole	Harvanta 50SL	1.2 L/ha	12 hours	1	Suppression of cucumber beetles. Avoid another Group 28 insecticide consecutively >2 times within a 30-day period. Maximum 3 applications/crop/year. The minimum interval between treatments is 7 days. TOXIC to bees. Avoid application during the crop blooming period. If applications must be made during the crop blooming period, restrict to evening.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Cucumber Beetle and Flea Beetle <i>(cont.)</i>	28	Cyclaniliprole	Cyclaniliprole 50SL	1.2 L/ha	12 hours	1	Suppression of cucumber beetles. Avoid another Group 28 insecticide consecutively >2 times within a 30-day period. Maximum 3 applications/crop/year. The minimum interval between treatments is 7 days. TOXIC to bees. Avoid application during the crop blooming period. If applications must be made during the crop blooming period, restrict applications to the evening.
	NC	Kaolin	Surround WP	12.5-25 kg/ha	-	0	Suppression of cucumber beetle. Apply at 5–7-day intervals, starting prior to infestation of adult beetles, with the first two applications 3 days apart. Maximum spray volume of 500L water/ha recommended, apply to near drip. May delay maturity. Max. 5 applications/yr.
Aphids	1B	Malathion	Malathion 500 E	1.4-3 L/ha	1 day	3	Squash only. Max. 1 application per season.
	28	Cyantraniliprole	Exirel	500-1500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. For optimum control, apply Hasten NT Spray Adjuvant* at an application rate of 0.25% v/v or MSO Concentrate with Leci-Tech* at an application rate of 0.5% v/v. Maximum 4 applications/season.
	29	Fonicamid	Beleaf 50SG	0.12-0.16 kg/ha	12 hrs	0 days	Thorough spray coverage of plant foliage is essential. Minimum of 94 L of water/ha. Max. 3 applications per season, allow 7 days between applications. Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier and do not use adjuvants.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Aphids and Whiteflies	4D	Flupyradifurone	BYI 02960	<u>Aphids (foliar):</u> 500-750 mL/ha <u>Whitefly (foliar):</u> 750-1000 mL/ha <u>Soil rate:</u> 750-1000 mL/1000 plants	12 hours	1 (foliar) 21 (soil)	<p>Foliar: Apply as a directed spray ensuring thorough coverage. Minimum interval between application is 7 days. Minimum ground application volumes: 100 L/ha.</p> <p>Soil: See label for soil application rate. Apply specified dosage via</p> <ol style="list-style-type: none"> Chemigation into root-zone through low-pressure drip, trickle, micro-sprinkler, or equivalent equipment. Do not apply via irrigation system. Injection below the eventual seed-line prior to planting. <p>Maximum allowed per crop season, regardless of application method: 2000 mL/ha.</p>
	9D	Afidopyropen	Versys	<u>Aphid:</u> 0.1 L/ha <u>Whitefly:</u> 0.35-0.5 L/ha	12 hours	0	Do not apply in greenhouses. Melon and green peach aphids, silverleaf and sweet potato whitefly. Application during the crop blooming period may be made only in the evening when most bees are not foraging. Max. 4 applications per year, with minimum 7 days between applications. Use minimum of 100L/ha spray volume.
		Afidopyropen	Sefina® NEW 2023	Aphids: 0.2 L/ha Whiteflies: 0.7-1.0L/ha	12 hours	0	Melon and green peach aphid, Sweet potato and silverleaf whitefly. Don't apply more than 4 applications per year, maintaining 7 days between applications. Minimum spray volume of 100-200L/ha is recommended. Application during bloom limited to evening when most bees are not foraging.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Aphids and Whiteflies <i>(cont.)</i>	23	Spirotetramat	Movento 240 SC	220-365 ml/ha	12 hours	1	Minimum of 7 days between applications. Maximum of 730 ml/ha of product applied/season. Movento is TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply during crop flowering period or when flowering weeds are present in the field.
			Movento 150 OD	347-585 ml/ha	12 hours	1	Minimum of 7 days between applications. Maximum of 1.17 L/ha of product applied per season. TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply during crop flowering period or when flowering weeds are present in the field.
	NC	Potassium salts of fatty acids	Kopa Insecticidal Soap	8L in 400L water	-	0	Apply diluted solution at a rate of 700-1900 L/ha. Do not spray when plants are under stress. Avoid spraying in full sun. spray early in the morning or in the evening when it is overcast. Repeat treatment every 1-2 weeks as needed, to a maximum of 3 consecutive.
Whitefly	-	<i>Beauveria bassiana</i> strain R444	BASSIDOR NEW 2023	0.5-1.0g in 1L of water	4 hours	0	For greenhouse. Apply every 3-7 days depending on pest pressure. Ensure to use enough water to sufficiently cover the crop. Avoid use of fungicides 3 days before/after.
Cutworms	1A	Carbaryl	Sevin XLR	2.5 L/ha	Low contact: 12 hours High contact: 2 days	5	Climbing cutworms. Do not apply when a field is in bloom or adjacent fields are in bloom. Max. 2 applications per year, with a 7-day interval. Do not apply it when foliage is wet. High contact activities include hand-line irrigation. Low contact activities include hand harvest, turning, tying, staking, scouting, weeding.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Cutworms <i>(cont.)</i>	6, 28	Abamectin, cyantraniliprole	Minecto Pro	385-556 mL/ha	12 hours	7	Apply with a non-ionic surfactant (0.1-0.5% v/v). For early season cutworm control, apply it to foliage when rain is not expected in the next 24 hours. For optimal control, apply to smaller plants or when lower portions of plant can receive adequate coverage. Thorough coverage is important to obtain optimum control.
	28	Cyantraniliprole	Exirel	500-750 ml/ha	12 hours	1	Begin applications when treatment thresholds are reached. Thorough coverage is important to obtain optimum control. For early season cutworm control, apply to foliage when rain is not expected in the next 24 hours. For optimal control, apply to smaller plants or when lower portions of plant can receive adequate coverage. Max. 4 applications/season, with 7-day intervals
Mites	1B	Malathion	Malathion 500 E	1.4-3 L/ha	1 day	3	Squash only. Max. 1 application per season.
	6, 28	Abamectin, cyantraniliprole	Minecto Pro	385-670 mL/ha	12 hours	7	Apply with a non-ionic surfactant (0.1-0.5% v/v). Apply when mites are first observed and repeat application as needed, to maintain control within constraints of resistance management. Thorough coverage is important to obtain optimum control.
	20B	Acequinocyl	Kanemite 15SC	2.07 L/ha	12 hours	1	Summer squash: Two-Spotted Spider and Broad Mite. Apply as a full coverage spray to the foliage to drip as soon as mite population reaches economic infestation levels. Allow a minimum of 21 days between applications.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Mites <i>(cont.)</i>	23	Spiromesifen	Oberon	500-600 ml/ha	12 hours	1	Max. 3 applications/season. Minimum application volume of 100 L/ha. Also controls whiteflies (including silverleaf, sweet potato and greenhouse) See label for buffer zone restrictions.
	25	Bifenzate	Acramite 50WS	851 g / ha (15 pouches/4ha)	12 hours	3	Two Spotted Spider Mite. Minimum of 500 L/ha water to ensure thorough leaf coverage. Keep product dry prior to use. 1 spray/year.
	NC	Mineral oil	Purespray Green Spray Oil 13E	10 L in 1000 L water (1% solution)	12 hours	-	Field and greenhouse use. Suppression. Use sufficient spray volume (up to 1000 L/ha) to ensure thorough crop coverage. Begin when mites appear. Apply at 7– 14-day intervals. Apply no more than 8 summer spray applications per growing season.
Cabbage looper	18	Methoxyfenozide	Intrepid	0.3 – 0.6 L/ha	12 hours	3	Apply at the first sign of feeding damage or when infestations reach threshold levels as determined by monitoring. Repeat applications after 7-14 days if required based on population monitoring. Use the higher rate for heavy infestations or advanced growth stages of the target pest.
	28	Cyantraniliprole	Exirel	250-500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more than 4 applications per season, maintaining 7-day intervals between sprays.
Squash Bug Nymphs, Tarnished Plant Bug Nymphs	1A	Carbaryl	Sevin XLR	2.5 L/ha	Low contact: 12 hours High contact: 2 days	5	Squash bug: Apply for thorough coverage when insects or damage appear. To avoid possible injury on tender foliage, do not apply it when foliage is wet or when rain or excessive humidity is expected during the next 2 days. Maximum 2 applications.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Squash Bug Nymphs, Tarnished Plant Bug Nymphs (cont.)	3	Lambda cyhalothrin	Warrior/Matador 120 EC or Labamba	187-233 ml/ha	24 hours	1	Squash bug. Timing and frequency of applications should be based upon insect populations reaching locally determined economic thresholds. Reapply after a minimum of 7 days if monitoring indicates it is necessary. Max. 3 applications per growing season.
	3, 28	Lambda cyhalothrin-Cyantraniliprole	Voliam Xpress	500 ml/ha	24 hours	1	Squash bug. Timing and frequency of applications based upon insect populations reaching local economic thresholds. Reapply after a minimum of 5-7 days if monitoring indicates it is necessary. Max. 3 applications/season. 100-200L water/ha recommended for thorough coverage.
	4A	Clothianidin	Clutch 50 WDG or Clothianidin	140 g/ha	12 hours	7	Suppression only. Apply when target pest(s) threshold populations are observed. Do not wait until the population beyond threshold has been established. Monitor pest populations and make repeat applications at a minimum interval of 7 days if monitoring indicates that they are necessary. Max. 1 application/year.
Armyworm Fall armyworm	28	Cyantraniliprole	Exirel	500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more than 4 applications per season, maintaining a 5-day interval for (leafminers) and 7-day interval for armyworm/fall armyworm and corn earworm.
Corn earworm				750 ml/ha			
Dipteran leafminers (larvae)				750-1000 ml/ha			

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
DISEASES:							
Alternaria blight	7	Boscalid	Cantus WDG	460 g/ha	12 hours	0	Max. 4 applications/yr. Do not make more than 2 applications before rotating to a different fungicide group.
		Benzovindiflupyr	Aprovia	500-750 ml/ha	12 hours	1	Begin applications prior to disease development; continue throughout season on a 7-day interval. If disease pressure is high, use the highest rate. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.
	7, 3	Benzovindiflupyr & Difenoconazole	Aprovia Top	761-967 ml/ha	12 hours	1	Begin applications prior to disease development and continue throughout the season on a 7-day interval. If disease pressure is high, use the highest rate. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.
		Pydiflumetofen, difenoconazole	Miravis Duo	1 L/ha	12 hours	0	Apply on a 14-day interval, starting prior to disease establishment. Apply as a broadcast spray in sufficient water (minimum of 150 L/ha) for thorough coverage. Max. 2 applications per season.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Alternaria blight <i>(cont.)</i>	7, 11	Pyraclostrobin & Fluxapyroxad	Merivon	0.4 L/ha	12 hours <u>Hand harvesting, thinning, pruning, turning:</u> 3 days	0	Begin applications prior to onset of disease development. Max 3 applications/year, with 7–14-day intervals. Use the higher rate, where applicable, when disease pressure is high. Subsequent applications may be applied if disease persists, or weather conditions are favourable for disease development. DO NOT apply to as a tank mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	11	Pyraclostrobin	Cabrio EG	560-840 g/ha	12 hours	3	Max. 4 applications/yr. with 7–14-day interval. Do not make more than 1 application before rotating to a different fungicide group.
	M1	Copper	Cueva	0.5% to 2% solution	4 hours	1	Re-apply using 5–10-day intervals. Apply solution at a rate of 470-940 L/ha.
	M3	Mancozeb	Dithane Rainshield Manzate Pro-Stick	3.25 kg/ha 1.1-3.25 kg/ha	12 hours	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals. Max 3 applications per year.
Anthracnose and Downy Mildew	7	Benzovindiflupyr	Aprovia	750 ml/ha	12 hours	1	Anthracnose , Begin applications prior to disease development; continue throughout the season on a 7-day interval. If disease pressure is high, use the highest rate. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Anthracnose and Downy Mildew (cont.)	7, 3	Benzovindiflupyr & Difenoconazole	Aprovia Top	967 ml/ha	12 hours	1	Anthracnose. Begin applications prior to disease development; continue throughout the season on a 7-day interval. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.
	7, 11	Pyraclostrobin & Fluxapyroxad	Merivon	0.4 L/ha	<u>Mechanical harvesting:</u> 12 hours <u>Hand harvesting, thinning, pruning, turning:</u> 3 days	0	Anthracnose and Downy Mildew. Begin applications prior to onset of disease development. Use the higher rate, where applicable, when disease pressure is high. Subsequent applications may be applied if disease persists, or weather conditions are favourable for disease development. DO NOT apply to cucurbit vegetables as a tank mix with anything other than water. Max. 3 applications per year, with a minimum of 7–14-day intervals.
	11	Pyraclostrobin	Cabrio EG	560-840 g/ha	12 hours	3	Max 4 applications/yr. with 7 intervals prior to disease development. Do not make more than 1 application before rotating to a different fungicide group.
	19	Polyoxin D Zinc Salt	Diplomat 5SC	463-926 ml/ha	When dry	0	Field and greenhouse use. Suppression of Downy mildew, control of Anthracnose. 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 a 7–10-day (anthracnose) or 5-8-day (downy mildew) interval as needed to maintain control.
	M	Copper sulfate	Copper 53W	2.5-3 kg/ha	48 hours	2	Apply in 1000 L of water per ha. Max. 5 applications per year, with a 5-day interval.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Anthracnose and Downy Mildew <i>(cont.)</i>	M1	Copper	Cueva	0.5% to 2% solution	4 hours	1	Re-apply using 5–10-day intervals. Apply at a rate of 470-940 L/ha.
	M3	Mancozeb	Dithane Rainshield	3.25 kg/ha	12 hours	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals. Max 3 applications
			Manzate Pro-Stick	1.1-3.25 kg/ha			
	M5	Chlorothalonil	Bravo ZN	3.2 L/ha	12 hours	2	Anthracnose. Max 2 applications. Repeat at 7-day intervals. Also controls scab.
			Echo 90WSP	1.8 kg/ha	12 hours	1	Anthracnose. Begin applications when plants are in their first true leaf stage or when conditions are favourable for disease development and repeat at 7-day intervals. Under severe conditions, shorten the spray interval. Max 2 applications per year. Also controls scab and powdery mildew.
			Echo 720	2.2 L			
Downy Mildew	11	Fenamidone	Reason 500 SC	400 ml/ha	When dry	14	Begin application as soon as crop and/or environmental conditions become favourable for disease development. Apply in 300-600 L/ha on a 5–10-day interval. Max. 4 applications per year. Plant back interval of 30 days. Do not apply more than 1 application of this or any other Group 11 fungicide before alternating with a fungicide from a different Group.
	21	Cyazofamid	Torrent 400SC and Sylgard 309 (organosilicone surfactant)	0.15-0.2 L/ha 0.15 L/ha	12 hours	1	Do not make sequential applications of Cyazofamid or products within the same group. Apply in 200 – 600 L water/ha on a 7–10-day schedule beginning at initial flowering or when disease conditions are favorable but prior to an outbreak. Plant back interval 30 days.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy Mildew <i>(cont.)</i>	40	Mandipropamid	Revus plus Non-ionic adjuvant	400-600 ml/ha Plus 0.25% v/v	12 hours	0	Suppression of Downy mildew. Begin applications prior to disease development and continue throughout the season on a 7-10-day schedule, following resistance management guidelines. Max. 4 applications/year. May be tank mixed with Bravo 500 for any field cucurbits listed on that label.
	40, 45	Ametoctradin, dimethomorph	Zampro	0.8-1.0 L/ha	<u>Hand harvesting:</u> 1 day <u>All other activities:</u> 12 hours	1	Do not use less than 200L water/ha for ground application. To reduce the risk of the development of resistance, must be used in rotation with other fungicides having a different mode of action active against downy mildew. Begin applications prior to disease development and continue a 5-7-day interval. Max. 3 applications.
	43	Fluopicolide	Presidio	292 ml/ha	12 hours	2	Max. 2 applications/season. Apply with 200-1000L water/ha. Must be tank-mixed with another registered fungicide with a different mode of action. Do not make sequential applications. Begin when conditions favour disease and repeat on a 7–10-day interval. Use the higher rate and shorter interval if disease is present. Use lower rate and longer intervals as preventive applications.
	U15	Oxathiapiprolin	Zorvec Enicade	0.0875-0.35 L/ha	12 hours	0	Begin applications prior to disease development and continue a 5-14-day interval. Use higher rate and shorter interval when disease pressure is high or for susceptible varieties.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy Mildew (cont.)	P05	<i>Reynoutria sachalinensis</i>	Regalia RX	Greenhouse: 1.0% v/v	When dry	0	Suppression. Apply preventatively beginning soon after transplant. Repeat applications in 7–10-day intervals. Do not apply in a spray volume of more than 1500 L/HA.
	P07	Mono and dibasic sodium and potassium and ammonium phosphites	Phostrol	2.9-5.8 L/ha	12 hours	1	For preventative suppression, begin foliar applications when conditions favouring disease development exist and continue a 7–14-day interval. Apply in a minimum of 225L water/ha for coverage. May be tank mixed with Bravo 500, Bravo 720, or Bravo Ultrex. Read and follow the use directions on the individual product labels. Maximum 7 applications/season.
	BM02	<i>Bacillus subtilis</i>	Serenade Opti	0.6-1.7 Kg/ha	4 hours	0	Begin application soon after emergence or transplant when conditions are conducive to disease development. Repeat as necessary on 7–10-day intervals. When environmental conditions and plant stage are conducive to rapid disease development, use in a rotational program with other registered fungicides.
		<i>Bacillus amyloliquefaciens</i> strain MBI 600	Serifel	0.25 – 0.5 kg/ha	4 hours, or until dry	0	Begin applications prior to infection and continue with 7-10-day intervals if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Powdery Mildew	7	Benzovindiflupyr	Aprovia	500-750 ml/ha	12 hours	1	Begin applications prior to disease development; continue throughout season on a 7-day interval. If disease pressure is high, use the highest rate. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.
		Fluopyram	Velum Prime	500 mL/ha	12 hours	0	Do not apply more than 500 g fluopyram/ha per year, regardless of formulation or method of application (soil or foliar). Disease pressure should be monitored throughout the growing season. Minimum 5-day interval between soil applications.
		Fluopyram	FPY 500	500 mL/ha	12 hours	0	Do not apply more than 500 g fluopyram/ha per year, regardless of formulation or method of application (soil or foliar). Disease pressure should be monitored throughout the growing season. Minimum 5-day interval between soil applications.
		Penthiopyrad	Fontelis	1.25L/ha	12 hours	1	Begin applications prior to disease development; continue a 7–14-day interval. Use higher rate and shorter intervals when disease pressure is high. Max seasonal rate is 4.9 L/ha. Make no more than 2 sequential applications before switching to another mode of action.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Powdery Mildew <i>(cont)</i>	7, 3	Benzovindiflupyr & Difenoconazole	Aprovia Top	761-967 ml/ha	12 hours	1	Begin applications prior to disease development; continue throughout season on a 7-day interval. If disease pressure is high, use the highest rate. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in a minimum of 150 L/ha of water for thorough coverage.
	7, 11	Pyraclostrobin & Fluxapyroxad	Merivon	0.3 - 0.4 L/ha	<u>Mechanical harvesting:</u> 12 hours <u>Hand harvesting, thinning, pruning, turning:</u> 3 days	0	Begin applications prior to onset of disease development. Use the higher rate, where applicable, when disease pressure is high. Subsequent applications may be applied if disease persists, or weather conditions are favourable for disease development. DO NOT apply to cucurbit vegetables as a tank mix with anything other than water. Max. 3 applications per year, with a 7–14-day interval
	11	Pyraclostrobin	Cabrio EG	560-840 g/ha	12 hours	3	Max. 4 applications/yr with a 7–14-day interval. Do not make more than 1 application before rotating to a different fungicide group.
	19	Polyoxin D Zinc Salt	Diplomat 5SC	463-926 ml/ha	When dry	0	For greenhouse or field. Control. 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 a 7–14-day interval as needed to maintain control.
	M1	Copper	Cueva	0.5% to 2% solution	4 hours	1	Re-apply using 5–10-day intervals. Apply solution at 470-940 L/ha.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Powdery Mildew <i>(cont)</i>	M5	Chlorothalonil	Echo 720	3.3 L/ha	12 hours	1	Begin applications at first true leaf stage and repeat on 7-day intervals. Shorten the spray interval under severe disease pressure. Max. 2 applications per season. Also works for anthracnose and scab.
			Bravo ZN	4.8 L/ha	12 hours	2	
	U8	Metrafenone	Vivando SC	0.75-1.12 L/ha	12 hours	0	Begin applications prior to onset of disease. Apply at 7–14-day intervals. Use shorter intervals if conditions are conducive to high disease pressure/very rapid growth to ensure adequate protection. Do not apply more than 2 sequential applications before alternating to a different mode of action. Max. 3 applications/season.
		Pyriofenone	Property 300SC	0.3-0.366 L/ha	12 hours	0	Initiate applications prior to disease development and continue a 7-10-day interval beginning with initial flowering or when conditions are favorable for disease. Spray volumes range from 200-1000L/ha
	U13	Flutianil	Gatten® <i>NEW 2023</i>	400-690 mL/ha	12 hours	0	Use water volumes of 280 - 935 L/ha for sprays. Repeat applications at 7- to 14-day intervals. Max 5 applications per year.
	P5	<i>Reynoutria sachalinensis</i>	Regalia Maxx	0.125 - 0.25% v/v	When dry	0	Greenhouse or field use. Suppression. Apply preventatively or when disease symptom 1 st appears. Repeat at 7-10-day intervals. Spray until just prior to run-off. Volume will vary depending on the size of plants.
			Regalia RX	Outdoor: 5-10 L/ha Greenhouse: 0.5 – 1.0% v/v	When dry	0	Greenhouse and field use. Suppression. Apply preventatively beginning soon after transplant. Repeat applications in 7–10-day intervals. Do not exceed a concentration of 1% v/v

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks	
Powdery Mildew <i>(cont)</i>	BM02	<i>Bacillus amyloliquefaciens</i> strain MBI 600	Serifel	0.25 – 0.5 kg/ha	4 hours, or until dry	0	Begin applications prior to infection and continue with 7-10-day intervals if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.	
		<i>Bacillus subtilis</i>	Serenade Opti	1.7-3.3 Kg/ha	4 hours	0	Begin applications soon after emergence or transplant when conditions are conducive for disease development. Repeat applications for an interval of 7-10 days.	
		<i>Bacillus amyloliquefaciens</i> strain D747	Double Nickel LC (1x10¹⁰spores/ml)	5-12.5 L/ha <u>Low pressure:</u> 2.5-5 L/ha	When dry	0	Growth stage: Fruit formation to end of maturity of cucurbits. Repeat application every 3-10 days for as long as conditions favor disease development. Apply every 3-7 days under high disease pressure conditions. The lower rates can be applied to low pressure scenarios or smaller (ex. newly emerged) plants.	
	Double Nickel 55 (5x10¹⁰spores/g)		1-2.5 kg/ha <u>Low pressure:</u> 0.5-1 kg/ha					
	NC	<i>Citric acid-Lactic acid</i>	Tivano	12-16 L/ha	4 hours	0		Begin applications when conditions are conducive to disease development. Application interval: 7-10 days. Apply with minimum 500-700L solution/ha.
		Mineral oil	Purespray Green Spray Oil 13E	10 L in 1000 L water (1% solution)	12 hours	-		Greenhouse and field use. Suppression. 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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Powdery Mildew <i>(cont)</i>	NC	Potassium bicarbonate	MilStop	<u>Pumpkin:</u> 5.6 kg/ha <u>Squash:</u> 2.8-5.6 kg/ha	4 hours	0	Greenhouse pumpkin, field, and greenhouse squash. Suppression only. Maximum 10 applications/yr. Apply at 7-day interval in 1000 L/ha spray solution for pumpkin. Apply 7–14-day interval in 500-1000L/ha spray solution for squash. Start application at first sign of disease.
		<i>Streptomyces lydicus</i>	Actinovate SP	420g into 470-800L water	4 hours	1	Field and greenhouse use. Spray to wet but avoid run-off. Apply it as a foliar spray to leaves and blossoms. Make first application when conditions are conducive to disease development and repeat every 7-14 days.
Scab	M	Copper sulfate	Copper 53W	2.5-3 kg/ha	48 hours	2	Apply in 1000 L of water per ha. Max. 5 applications per year, with a 5-day interval.
	M3	Mancozeb	Dithane Rainshield	3.25 kg/ha	12 hours	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals. Max 3 applications
			Manzate Pro-Stick	1.1-3.25 kg/ha			
M5	Chlorothalonil	Bravo ZN	4.8 L/ha	12 hours	2	Begin applications when plants are in the first true leaf stage or when conditions are favourable for disease development. Repeat at 7-day intervals. Maximum 2 applications.	
Gummy Stem Blight	7	Boscalid	Cantus WDG	460 g/ha	12 hours	0	Max. 4 applications/yr. Do not make more than 2 applications before rotating to a different fungicide group.
		Benzovindiflupyr	Aprovia	750 ml/ha	12 hours	1	Begin applications prior to disease development; continue throughout season on 7-day interval. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in 190 L/ha of water.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Gummy Stem Blight <i>(cont.)</i>	7, 3	Benzovindiflupyr & Difenoconazole	Aprovia Top	967 ml/ha	12 hours	1	Suppression. Begin applications prior to disease development; continue throughout season on a 7-day interval. For the best results, sufficient water volume must be used to provide thorough coverage. Apply as a broadcast foliar spray in 190 L/ha of water.
	7, 11	Pyraclostrobin & Fluxapyroxad	Merivon	0.4 L/ha	<u>Mechanical harvesting:</u> 12 hours <u>Hand harvesting, thinning, pruning, turning:</u> 3 days	0	Begin applications prior to onset of disease development. Use the higher rate, where applicable, when disease pressure is high. Subsequent applications may be applied if disease persists, or weather conditions are favourable for disease development. DO NOT apply to cucurbit vegetables as a tank mix with anything other than water. Max. 3 applications per year, with 7–14-day interval between sprays.
	11	Pyraclostrobin	Cabrio EG	840 g/ha	12 hours	3	Max. 4 applications/yr. with a 7-day schedule before disease development. Do not make more than 1 application before rotating to a different fungicide group.
	19	Polyoxin D Zinc Salt	Diplomat 5SC	463-926 ml/ha	When dry	0	For greenhouse and field use. Suppression. Apply as a foliar spray in sufficient water to provide thorough coverage of foliage (and fruit when present). Begin as a preventative application when conditions favour disease development; continue at 7–14-day intervals as needed to maintain suppression.
	M3	Mancozeb	Dithane Rainshield Manzate Pro-Stick	3.25 kg/ha 1.1-3.25 kg/ha	12 hours	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals. Max 3 applications.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Phytophthora Blight/Crown Rot	40, 45	Ametoctradin, dimethomorph	Zampro	1.0 L/ha	<u>Hand harvesting:</u> 1 day <u>All other activities:</u> 12 hours	1	Phytophthora blight. To reduce risk of developing fungicide resistance Zampro must be used in rotation with other fungicides with different modes of action active against downy mildew. Begin applications of Zampro prior to disease development and continue a 5-7-day interval. Max. 3 applications.
	43	Fluopicolide	Presidio	292 ml/ha	12 hours	2	Apply in 200-1000 L/ha. Apply as a soil or foliar application on a 7–10-day schedule beginning when conditions are favourable for disease development and prior to disease onset. For the best results, application should begin at planting or transplanting. Max. 2 applications allowed.
	U15	Oxathiapiprolin	Orondis Zorvec Enicade Zorvec Epicaltrin	<u>Foliar phase:</u> 0.175-0.35 L/ha <u>Soil phase:</u> 0.7-2.8 L/ha <u>Foliar phase:</u> 0.175-0.35 L/ha <u>Soil phase:</u> 0.7-2.8 L/ha 0.35-1.4 L/ha	12 hours	0	Use either soil or foliar, but not both. Do not make more than 4 applications per year. Foliar phase: Begin applications prior to disease development and continue a 5–14-day interval. Use higher rate and shorter intervals when disease pressure is high. Soil phase: Apply at plant, in furrow, drip or in transplant water. See specific soil application directions on label. Phytophthora Blight – soil phase: Apply at plant, in furrow, drip or in transplant water. Use the higher rates for heavier soils, longer application intervals, or susceptible varieties. <i>*Do not follow soil applications with foliar applications of Zorvec Enicade or other oxathiapiprolin-containing fungicides. Use either soil OR foliar applications but not both.</i>

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Phytophthora Blight/Crown Rot (cont.)	BM02	<i>Bacillus amyloliquefaciens</i> strain D747	Double Nickel LC (1x10 ¹⁰ spores/mL)	1-2.5 L/ha	When dry	0	Squash only. Partial suppression of soil level Phytophthora blight infection. For transplanted crops: Make preventative applications to transplants in the greenhouse or nursery before transplant. See soil application instructions on the label. For crops grown from seed: Apply at planting, following instructions for Banded/in furrow application. See soil application instructions on the label. Follow up applications can be made at 2–4-week intervals.
			Double Nickel 55 (5x10 ¹⁰ spores/g)	Soil application: 0.2-0.5 kg/ha			
		<i>Trichoderma asperellum</i> strain ICC 012, <i>Trichoderma gamsii</i> strain ICC 080	Foretryx NEW 2023	2.8-5.6 kg product/ha	4 hours	0	For suppression in squash only. Minimum of 100 L water/ha for thorough coverage. Apply once at sowing. If rainfall is not expected, follow the treatment with light irrigation of 1.5 - 3.2 mm of water per hectare.
Grey Mold	7	Penthiopyrad	Fontelis	1-1.5 L/ha	12 hours	1	Begin applications prior to disease development, continue a 7–14-day interval. Use higher rate and shorter intervals when disease pressure is high. Maximum seasonal rate is 4.9 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
Sclerotinia stem rot	7	Penthiopyrad	Fontelis	1.25-1.75 L/ha	12 hours	1	Begin applications prior to disease development; continue a 7–14-day interval. Use higher rate and shorter intervals when disease pressure is high. Max seasonal rate is 4.9 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Nematodes		Fluazaindolizine	Salibro	<p><u>Pre-plant incorporated or pre-plant/at-plant chemigation:</u> 1.12 – 1.68 L/ha</p> <p><u>Post-plant chemigation:</u> 0.56 – 1.12 L/ha</p>	12 hours	1	<p>Root-knot nematode. Do not exceed 1.68L/ha per crop year. Maximum 2 applications.</p> <p><u>Pre-plant incorporated/chemigation:</u> Broadcast with a minimum of 140 L/ha of water and thoroughly incorporate 10-15 cm into the soil. For maximum residual efficacy, pre-plant incorporates within 7 days prior to planting.</p> <p><u>Post-plant:</u> Supplemental in-season chemigation following pre-plant/at plant application. MINIMUM retreatment interval: 14 days.</p> <p>See label for more detailed instructions.</p>
		Fluensulfone	Nimitz 480EC	4 – 8 L/ha	12 hours	-	<p>Root-knot and Root lesion nematodes. Applications can be broadcast incorporated, banded, and incorporated, or applied by drip (trickle) chemigation. Add solution to a minimum of 300L/ha for uniform application. Mechanically incorporated to a depth of 15-20 cm. Light irrigation (1.25-2.5cm) 1-5 days after application may increase efficacy. Apply a minimum of 7 days before transplanting. Do not plant any crops not on label into treated land for 365 days following application.</p>

Use the following web link to search for any pesticide label mentioned in this guide, or any other pesticide registered in Canada: <http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>