

2023



EXTENSION AND ADVISORY TEAM

SPRAY GUIDE FOR BRASSICA CROPS

Nova Scotia Vegetable Crop Spray Guide 2023
[BRA1-23]



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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 of 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

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 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	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.
Pre-Transplant	3	Pendimethalin	Prowl H₂O	2.46 L/ha	24 hours	60 (broccoli) 70 (cabbage, cauliflower)	Broccoli, cabbage and cauliflower grown on mineral soils. 2-4 leaf stage for both direct seeded and transplanted crops (1-3 days after transplanting). Be sure roots of transplants are established before application. Uniformly apply the recommended rate as a directed spray to soil surface between vegetable rows. Avoid direct spray contact with foliage or stems. Will not control emerged weeds.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Pre-Transplant (cont.)	14	Oxyfluorfe	Goal 2XL	1.13-2.0 L/ha	12 hours	60 days	Applications must be made after completion of soil preparation, but prior to transplanting. Use the lower rate for pre-emergence weed control on coarse texture soils with less than 1% organic matter. Use the highest rate for pre-emergence weed control on medium to fine texture soils or soils containing greater than 1% organic matter. Apply in a minimum of 200 L water/ha. Apply only one ground application per year. Only use for broccoli, cabbage and cauliflower.
		Flumioxazin	Chateau	210 g/ha	12 hours	-	Broccoli. Apply as a hooded or shielded application to row middles prior to transplanting for pre-emergence control of the weeds. Rainfall or irrigation must occur between application and transplanting in order to activate the product.
			Chateau EZ	224 mL/ha	12 hours	-	Broccoli. Apply as a hooded or shielded application to row middles prior to transplanting for preemergence control of the weeds. Rainfall or irrigation must occur between application and transplanting to activate the product. Do not apply more than 224mL per hectare during a single growing season.
	15	Dimethenamid-P	Frontier Max	756-963 ml/ha	24 hours	60	Apply prior to transplanting and before weed emergence. Cabbage only.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Preplant Incorporated <i>Germinating annual grasses and some broadleaf weeds</i>	3	Trifluralin	Treflan EC	1.7-3.0 L/ha	12 hours	-	Preplant incorporated in direct seeded cabbage and cauliflower or transplants of cabbage, cauliflower, broccoli and Brussels sprouts. Incorporate within 24 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. See label for rate according to soil type.
			Rival EC	1.2-2.3 L/ha			
			Bonanza 480	1.7-2.9 L/ha			
Preemergence Treatments <i>Germinating grasses and some broadleaf weeds</i>	3	Chlorthal dimethyl	Dacthal W-75	9.0-15.5 Kg/ha	12 hours	-	Apply immediately after seeding or directly over transplants but before weeds emerge. Rainfall or irrigation is necessary for activity (min 1 cm). Ragweed, nutsedge, smartweed and mustards are not controlled.
	15	Napropamide	Devrinol 50 DF	2.25-4.5 Kg/ha	12 hours	60	One application per year. Apply to direct seeded and transplanted cabbage, cauliflower and broccoli only.
		S-metolachlor	Dual II Magnum or Komodo	1.25-1.75 L/ha	12 hours	-	Apply after transplanting within two days. Once per year on transplanted cabbage, cauliflower, and broccoli only. Make one application per year. Apply in 300 L water/ha.
<i>Stale seedbed technique</i>	22	Diquat	Reglone	2.3-4.6 L/ha	24 hours	-	Apply in 300 to 1100 L of water/ha to foliage of emerged weeds but before the crop has emerged.
			Dessicash				

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Postemergence <i>Grasses</i>	1	Fenoxaprop-p-ethyl	Excel Super	670 ml/ha	12 hours	35 cabbage 43 cauliflower 44 broccoli	Apply to actively growing annual grasses in the 1 to 6 leaf stage. For use on cabbage, broccoli and cauliflower. Do not apply more than one a year.
		Fluazifop-p-butyl	Venture L	0.8-2.0 L/ha	12 hours	40	Apply to annual grasses at the full 2-5 leaf stages (2-4 leaves for foxtails) use high rate on quackgrass. One application per season.
		Sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha 1-2 L/ha	12 hours	70	Use on cabbage, cauliflower and broccoli. Treat at the 1-6 leaf stage of annual grasses. Use the higher rate for control of volunteer cereals and quackgrass. Can now be used on Brussels sprouts @ 1.1 L/ha. Do not exceed 0.45 L/ha on broccoli.
Postemergence <i>Grasses and broadleaves</i>	-	Acetic Acid	Serene NEW 2023	179-219.5 L/ha	When residue is dry	-	Apply as a uniform band or spot application directed at weeds on the ground between the crops. Use hooded or shielded application equipment. Do not spray the crop directly. Do not apply it when plants are under stress. Retreatment is required for regrowth of weeds.
Postemergence <i>Seedling annual broadleaf weeds lamb's quarters and redroot pigweed</i>	4	Clopyralid	Lontrel 360	0.56 L/ha	12 hours	30	Post transplant on cabbage, cauliflower, broccoli and Brussels sprouts. One application per year. Apply in 300 L/ha of water
			Lontrel XC	0.34 L/ha			Cabbage, cauliflower, broccoli and kohlrabi (all transplanted), nappa cabbage (transplanted and seeded) and brussel sprouts. Make one application per year to control ragweed, vetch, common groundsel, Canada thistle and for suppression of sheep sorrel. Apply post planting as a ground application only. Apply in 300 L/ha water.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Postemergence <i>Seedling annual broadleaf weeds lamb's quarters and redroot pigweed (cont.)</i>	4	Clopyralid	Pyralid	0.672 L/ha	12 hours	30	Cabbage, cauliflower, broccoli and kohlrabi (all transplanted), nappa cabbage (transplanted and seeded). Make one application per year to control ragweed, vetch, common groundsel, Canada thistle and for suppression of sheep sorrel. Apply post planting as a ground application only. Apply in 300 L/ha water.
Postemergence <i>Inter-row shielded</i>	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.
	22	Diquat	Reglone Dessicash	2.3-4.6 L/ha	24 hours	-	Do not spray solution on the crop plant since it could be injured or killed.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS:							
Cabbage Maggots	1B	Chlorpyrifos FINAL USAGE 2023	Lorsban 50 W	32.5 g product/100 L water	10 days for cauliflower, 24 hours other crops	32	Do not use starter fertilizer with Lorsban 50 W. 65 g/200 L in transplant water and apply 200 mL with each plant. Apply once/season.
			Lorsban 15 G	0.6-1.0 kg / 1000m of row			Apply in furrow at planting time. Rates vary based on row spacing see label for details.
			Lorsban 4 E	At planting: 210 mL/1000 m row Post planting: 1.68 L/1000 L spray solution			At planting treatment 210ml / 1000m of row in 1000L/ha spray solution, 10 cm either side of the plant 7-10 days after seeding or 3 days after transplanting. Post planting drench: Mix 1.68 L in 1000L of spray solution. Apply 12.5 L of solution per 100m of row 10 cm on each side of the plant. Can be repeated 21 days after the transplanting drench or 28 days after the seeding drench. Do not apply to harvestable portions of the crop.
			Warhawk 480 EC	2-7 L/ha Rate varies with row spacing – see label			
	28	Cyantraniliprole	Verimark	10-15 mL/100 m row, 1100-1700 mL/ha	12 hours	-	Apply specified dosage as an in-furrow spray, in the transplant water, or as a banded surface application at the time of transplanting.
Cabbage Looper, Imported Cabbageworm & Diamondback Moth Larvae	1A	Methomyl	Lannate	270-540 g/ha	12 hours	1 cabbage 7 broccoli, cauliflower, Brussels sprouts	Apply with low pressure ground equipment. Repeat at 5-to-7-day intervals. Maximum 1 application/year. Do not apply after August 15 th .
	3	Permethrin	Pounce 384 EC	90-180 mL/ha	12 hours	3 Cabbage, cauliflower, Brussels sprouts, 7 broccoli	Apply with ground application in 400-650 L of water per hectare on a 7–10-day schedule when insects or insect damage first appears.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Cabbage Looper, Imported Cabbageworm & Diamondback Moth Larvae <i>(cont.)</i>	3	Cypermethrin	Mako	87.5-125 mL/ha	12 hours	3	Begin treatment when insects or signs of insect feeding appear. Repeat every 10 – 14 days if necessary, up to 3 applications per season. Use 300 - 500 L of water per hectare.
			UP-Cyde 2.5 EC plus Agral 90	140 ml/ha plus 0.03% (v/v)	12 hours	3	Use as needed on 2-week intervals to a maximum of 3 applications per season. Apply 100-500 L/ha.
		Deltamethrin	Decis 5 EC	150-200 ml/ha	12 hours	1 Brussels sprouts, kale 3 broccoli, cabbage, cauliflower	Apply when insects or insect damage are present. Repeat every 10 days, as necessary. Pounce and Decis are more effective than other insecticides under cool, fall conditions. Will also control late climbing cutworm. Apply in 350-550 L/ha of water. Do not apply more than 8 times a year.
			Poleci 2.5 EC	300-400 ml/ha			Apply when insects are present, or signs of insect feeding are visible. Repeat every 10 days, as necessary. Do not apply more than 8 times a year.
		Lambda-cyhalothrin	Matador 120 EC	42 - 83 mL/ha	24 hours	1 cabbage 3 broccoli, cauliflower, Brussels sprouts	Do not apply more than 3 times per season. Allow 7 days between applications. See label for rate by pest species.
			Labamba				
			Warrior				
	3 & 4	Imidacloprid, Deltamethrin	Concept	650 ml/ha	12 hours	7	Apply at threshold. Repeat on a minimum 10-day interval. Maximum 3 applications per year.
	4 & 15	Acetamiprid, Novaluron	Cormoran	440-750 mL/ha	12 hours	7	Apply in a minimum finished spray volume of 200 L/ha by ground. Repeat applications if needed to maintain control, but do not make applications less than 7 days apart. Do not apply more than 1.68 L/ha per season.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Cabbage Looper, Imported Cabbageworm & Diamondback Moth Larvae (cont.)	4A & 28	Thiamethoxam, Cyantraniliprole	Minecto Duo 40WG	750 g/ha	12 hours	-	In-furrow application at the seeding or transplant depth, or a narrow surface band above the seed line during planting.
	5	Spinetoram	Delegate WG	140-200 g/ha	12 hours	1	Target egg hatch or small larvae. Repeat at a minimum re-treatment interval of 5 days with a maximum of 3 applications per year. Use higher rate for higher infestations or larger larvae.
		Spinosad	Success 480 SC Entrust 80	182 ml/ha 109 g/ha	3 days	3	Maximum 3 applications per year. Allow 7-10 days between applications.
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> ,	XenTari WG	500-1000 g/ha	-	0	Cabbage looper, Cross-striped cabbageworm, Diamondback moth, Imported cabbageworm. Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L per ha.
	11A	<i>Bacillus thuringiensis</i>	Dipel 2X DF	55-550 g/ha	4 hours	0	Check labels for details on rates according to species.
			Thuricide HPC	2.0-4.25 L/ha	-		
	15	Novaluron	Rimon 10 EC	410-820 ml/ha	12 hours	2-4	Reapplication at a 7–10-day interval will be required to protect new growth or monitoring indicates that it is necessary. Do not apply more than 3 applications/ season. Apply in water volumes of 200-400 L/ha. Use higher rate under high insect pressure or when larvae are large.
	18	Methoxyfenozide	Intrepid	0.3 – 0.6 L/ha	12 hours	1	Apply at first sign of feeding damage or when infestations reach threshold levels as determined by insect monitoring. Tank-mix with a non-ionic surfactant such as Agral 90 or Companion at the rate of 0.25% v/v. Repeat applications after 7-14 days if required based on population monitoring. growth stages of the target pest.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Cabbage Looper, Imported Cabbageworm & Diamondback Moth Larvae <i>(cont.)</i>	28	Chlorantraniliprole	Coragen	250 ml/ha	12 hours	3	Begin applications when treatment thresholds have been reached. Maximum of 4 applications/season. Do not apply more than once every 3 days. Do not exceed 1 L or Coragen/ha per season. For optimal control, apply with a modified seed oil adjuvant such as Hasten or MSO. Apply in a finished spray volume of 100 L/ha.
		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. 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. Do not make more than 4 applications per season. Reapply on a 7 day interval.
		Tetraniliprole	Vayego 200 SC	150 mL/ha 225 mL/ha (Cabbage Looper)	12 hours	1	Suppression of cabbage looper. Control of imported cabbageworm and diamondback moth. Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum interval between applications: 5 days. Minimum application volume: 100 L/ha. Apply by ground application only.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Flea Beetles	3	Cypermethrin	Ripcord 400 EC	87.5-125 mL/ha	12 hours	3	Ground application only. Begin treatment when insects or signs of insect feeding appear. Repeat every 10 - 14 days if necessary, up to 3 applications per season.
		Cypermethrin	Ship 250 EC plus Agral 90 NEW 2023	140 ml/ha plus 0.03% (v/v)			Use as needed on 2-week intervals to a maximum of 3 applications per season.
		Deltamethrin	Decis 5.0 EC	150-200 ml/ha			Use on cabbage only. In 350-550 L water/ha.
			Poleci 2.5 EC	300-400 ml/ha			
		Lambda-cyhalothrin	Matador 120 EC	42 ml/ha	24 hours	1 Cabbage 3 broccoli, cauliflower, Brussels sprouts	Maximum 3 applications per season. Allow 7 days between applications.
			Labamba				
			Warrior				
	3 & 4	Imidacloprid Deltamethrin	Concept	650 ml/ha	12 hours	7	Apply at threshold. Repeat on a minimum 5-day interval. Maximum 3 applications per year.
	5	Spinosad	Success	182 ml/ha	12 hours	3	Apply up to a maximum of 3 applications per year. Apply at the emergence of adult flea beetles and reapply in 7–10-day intervals as necessary.
	28	Cytraniliprole	Exirel	500-1000 mL/ha	12 hours	1	For pests with a range of application rates, use the high rate under heavy pest pressure. Do not make more than 4 applications per season.
		Tetraniliprole	Vayego 200 SC	150 mL/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum interval between applications: 5 days. Minimum application volume: 100 L/ha (ground application). Apply by ground application only.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Aphids	1B	Dimethoate	Lagon 480 EC	0.7-1.0 L/ha	5 days	7 Broccoli, cauliflower 21 Brussels sprouts	Use repeat applications, as necessary. Max 2 applications per season.
	4	Acetamiprid	Assail 70 WP	56-86 g/ha	2-4 days	7	Maximum 5 applications per year and alternate with other insecticide families. Also registered for swede midge at high rate.
			Aceta 70 WP				
			Admire 240	Foliar: 200 ml/ha	12 hours	7	Maximum one application per crop per season. Do not apply a foliar application following a soil, in-furrow or seed treatment application of another group 4 insecticide.
	4C	Sulfoxaflor	Closer SC	100-150 ml/ha	12 hours	3 days	Maximum 2 applications/growing season. Do not apply during crop flowering period or when flowering weeds are present in treatment area. Minimum treatment interval = 7 days.
	28	Tetraniliprole	Vayego 200 SC	150 mL/ha	12 hours	1	Suppression. Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum interval between applications: 5 days. Minimum application volume: 100 L/ha.
		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. Do not make more than 4 applications per season. Reapplication interval = 5 days

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Aphids (cont.)	29	Flonicamid	Beleaf 50SG	0.12-0.16 kg/ha	12 hours	0	Brassica leafy Vegetables. Thorough spray coverage of plant foliage is essential. Minimum of 94 L water/ha. Maximum of 3 applications per season, allowing 7 days between applications. Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier and do not use adjuvants.
Aphids and Whiteflies	4D	Flupyradifurone	BYI 02960 200SL	500-750 mL/ha (Aphids) 750-1000 mL/ha (Whiteflies)	12 hours	1	The minimum interval between applications is 7 days. 100 L/ha minimum application volume. Maximum amount allowed per crop season: 2000 mL/ha. Apply as a directed foliar spray ensuring thorough coverage.
	9D	Afidopyropen	Versys	0.1-0.5 L/ha	12 hours	0	<u>Cabbage aphid (<i>Brevicoryne brassicae</i>)</u> <u>green peach aphid (<i>Myzus persicae</i>)</u> <u>Sweet potato whitefly (<i>Bemisia tabaci</i>) &</u> <u>silverleaf whitefly (<i>Bemisia argentifolii</i>).</u> Allow a minimum of 7 days between applications. Monitor pest population and reapply if necessary once thresholds are reached. Max 4 applications per year.
			Sefina® NEW 2023	0.2 L/ha (aphids) and 0.7-1 L/ha (whitefly)			
	23	Spirotetramat	Movento 240 SC	220-365 ml/ha	12 hours	1	Brassica leafy vegetables. The minimum interval between applications is 7 days. Product 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			

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Aphids and Whiteflies (cont.)	23	<i>Beauveria bassiana</i> strain ANT-03	Bioceres EC	2.0 – 4.0 mL/L of water	4 hours	0	Reduction in pest numbers for brassica vegetable transplants. Reapply, as necessary. Multiple applications may be required to reduce numbers of target pests. Do not mix with fungicide. If a fungicide must be used, make the application of the fungicide at least 4 days before or at least 2 days after the BIOCERES EC application.
		Potassium salts of fatty acids	Kopa Insecticidal Soap	8L in 400L water applied at 700-1900 L/ha solution	-	0	Do not spray when plants are under stress. See label for tank-mix and crop tolerance information. Avoid spraying during full sun.
Whitefly	23	Spiromesifen	Oberon	500-600 ml/ha	2 days	7	Maximum of 3 applications per season. Minimum application volume of 100 L/ha. See label for buffer zone restrictions. Spray interval = 7 days
	-	<i>Beauveria bassiana</i> strain R444	Bassidor NEW 2023	0.5-1.0g/L of water	4 hours	0	For use in greenhouses. Apply as a full cover spray without excess runoff every 3-7 days depending on the crop and the severity of the pest pressure. Do not store tank mixes for more than 6 hours.
Swede midge	3	Lambda-cyhalothrin	Matador 120 EC	83 ml/ha	24 hours	1 Cabbage 3 broccoli, cauliflower, Brussels sprouts	Maximum 3 applications per season. Allow 7 days between applications.
			Silencer 120 EC				
			Labamba				
			Warrior				
	4	Acetamiprid	Assail 70 WP Aceta 70 WP	86 g/ha	2-4 days	7	Maximum 5 applications per year and alternate with other insecticide families.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Swede midge (cont.)	4 & 15	Acetamiprid, Novaluron	Cormoran	740 ml/ha	2 days (hand weeding, scouting, tying, training) 12 hours (other activities)	7	Apply in a minimum finished spray volume of 200 L/ha by ground. Repeat applications if needed to maintain control, but do not make applications less than 7 days apart.
	5	Spinosad	Success	146 ml/ha	12 hours	3	Reduction in damage from Swede midge. Apply when local treatment thresholds have been reached as determined by monitoring. Reapply at 7-to-10-day intervals if monitoring indicates this is necessary. Apply up to a maximum of 3 applications per year.
			Entrust	292 ml/ha			
	23	Spirotetramat	Movento 240 SC	220-365 ml/ha	12 hours	1	Swede midge larvae. Minimum interval between applications is 7 days. Maximum of 730 ml/ha of product applied per season. Apply when swede midge larvae are first noticed. For swede midge larvae, use of the high rate is recommended when pest pressure is high. Product 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
	28	Cyantraniliprole	Exirel	500-750 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. Make no more than 4 applications per season.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Swede midge (cont.)	28	Cyantraniliprole	Verimark	750-1000 ml/ha	12 hours	-	Apply specified dosage as an in-furrow spray, in the transplant water, or as a banded surface application at the time of transplanting. Do not make more than 1 soil application per season.
		Chlorantraniliprole	Coragen	250 ml/ha	12 hours	3	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 LeciTech* at an application. Max 4 applications per year.
Cutworms	1B	Chlorpyrifos FINAL USAGE 2023	Warhawk 480 EC	1.2-2.4 L/ha	10 days cauliflower, 24 hours other crops	32	Soil treatment: Apply once, 3-7 days before transplanting. Do not incorporate. Also apply to a 15 m strip into adjacent fence rows. Seedling treatment: Apply once as a broadcast spray at the 2- to 5- leaf stage of the crop.
	3	Cypermethrin	Ripcord 400 EC	175 ml/ha	12 hours	21	Spray under warm moist conditions. Do not disturb the soil surface for at least 5 days.
	3 & 28	Lambda-cyhalothrin, chlorantraniliprole	Voliam Xpress	500 mL/ha	24 hours to 7 days	3 days (mechanical harvest), 8 days (hand harvest)	Apply to foliage when rain is not expected in the next 24 hours. For optimal control, make application to smaller plants or when lower portion of the plant can receive adequate spray coverage.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Cutworms (cont.)	28	Cyantraniliprole	Exirel	500-750 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. For early season cutworm control, apply to foliage when rain is not expected in the next 24 hours. For optimum control, apply to smaller plants or when lower portions of plant can receive adequate coverage. Make no more than 4 applications/ season. Reapplication interval = 7 days.
		Tetraniliprole	Vayego 200 SC	150 mL/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum interval between applications: 5 days. Minimum application volume: 100 L/ha. Apply by ground application only.
Thrips	3	Cypermethrin	Ripcord 400 EC	87.5-125 ml/ha	12 hours	3	Begin treatment when insects or signs of feeding appear. Repeat every 10-14 days if necessary, to a maximum of 3 applications/season. It is critical to control them at early head formation (3-inch leaf ball).
			UP-Cyde plus Agral 90	200 ml/ha plus 0.03% (v/v)	12 hours	3	Use as needed on two-week intervals up to a maximum of 3 applications per season.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Thrips (cont.)	3 & 28	Lambda-cyhalothrin, chlorantraniliprole	Voliam Xpress	500 mL/ha	24 hours to 7 days	3 days (mechanical harvest), 8 days (hand harvest)	For optimal control, make application to smaller plants or when lower portion of the plant can receive adequate spray coverage. Apply max 3 applications per season. Apply in 100-200 L/ha.
	4 & 28	Thiamethoxam, Cyantraniliprole	Minecto Duo 40WG	750 g/ha	12 hours	-	In-furrow application at the seeding or transplant depth, or a narrow surface band above the seedline during planting.
	5	Spinosad	Success	146 ml/ha	3 days	3	Apply when thrips first appears. Reapply at 7–10-day intervals. Max 3 applications per year. <i>Also suppresses swede midge.</i>
			Entrust 80W	87.5 g/ha			
			Entrust SC	292 ml/ha			
		Spinetoram	Delegate WG	200-336 g product/ha	12 hours	1	Max 3 applications/year. Apply when onion thrips first appear targeting egg hatch and small nymphs. Repeat in 7-10 days if needed.
	23	Spirotetramat	Movento 240 SC	365 mL/ha	12 hours	1	Onion thrip larvae. Apply when thrips are first identified. Movento 240 SC Insecticide should be used during the first half of the season when adult populations are relatively low or building. Apply in a minimum volume of 200L water/ha. Minimum interval between applications is 7 days, with a maximum 730 mL/ha allowed per crop season.
	28	Cyclaniliprole	Harvanta 50SL	1.2 L/ha	12 hours	1	Suppression only. Do not make sequential applications of any group 28 insecticide after two consecutive applications within a 30-day period. Retreatment interval is 7 days.
	28	Cyclaniliprole	Exirel®	1000-1500 mL/ha	12 hours	1	Suppression only. Do not make more than 4 applications per season. Do not apply more than once every 5 days. Apply in a minimum finished spray volume of 100 L/ha by ground. Apply in a minimum finished spray volume of 50 L/ha by air.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Thrips (cont.)	-	<i>Beauveria bassiana</i> strain ANT-03	Bioceres EC	2.0 – 4.0 mL/L of water	4 hours	0	Reduction in pest numbers for brassica vegetable transplants. Reapply, as necessary. Multiple applications may be required to reduce numbers of target pests. Do not mix with fungicide. If a fungicide must be used, make the application of the fungicide at least 4 days before or at least 2 days after the BIOCERES EC application.
Slugs (Grey Garden)	1A	Methomyl	Lannate	775 g/ha	12 hours	30	Brussels sprouts only. Apply in 1 application with ground equipment and use sufficient water volume for good coverage. Apply late in the evening when slugs are more active.
	NC	Ferric phosphate	Sluggo	12-50 Kg/ha	-	-	Use high rates on heavy infestations or after heavy rains.
Beet Armyworm Fall Armyworm	28	Tetraniliprole	Vayego 200 SC	150 mL/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum interval between applications: 5 days. Minimum application volume: 100 L/ha (ground application). Apply by ground application only.
		Cyantraniliprole	Exirel	500 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. Do not make more than 4 applications per season.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Corn earworm	28	Cyantraniliprole	Exirel	750 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. Do not make more than 4 applications per season.
Dipteran leafminers (larvae)	28	Cyantraniliprole	Exirel	1000-1500 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. Do not make more than 4 applications per season.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
DISEASES:							
Black Rot	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	Suppression. Re-apply using 5–10-day intervals. For Brussels sprouts, do not exceed 10 applications per year.
	-	-	Hot Water	-	-	-	Contact an extension specialist for methods.
Pre-plant treatment of soil borne diseases	-	Metam sodium	Vapam	Follow manufacturer's directions	-	-	Fumigate seed beds in fall prior to planting.
Damping Off	21	Cyazofamid	Torrent 400SC	30 ml/100 L water	12 hours	60	Apply as a soil drench to thoroughly wet the growing medium immediately after seeding.
	33	Fosetyl-AL	Aliette WDG	20-30g in 20L water/100 m ²	12 hours	7	Use the higher rate when heavy disease pressure is expected either in the greenhouse or later when transplanted in the field. Make the first application during the propagation stage. If pressure warrants, a second application may be made 7 days prior to transplanting to control late damping off.
	M4	Captan	Captan 50 WP	2.5 kg/1000 L of water and 50 to 85 litres of product /100m ²	48 hours	-	Work into upper 7.5 to 19 cm of soil. Do not make more than one application per year.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Damping Off (cont.)	BM02	<i>Trichoderma harzianum</i> Rifai strain T22	Triatum P	After Sowing: 1.5 g/m ² of cultivated area in 1.33 L of water. After transplanting: 6 g in 1 L of water and apply 500 L/ha of suspension.	-	-	Suppression. Starting drench application immediately after sowing seeds or transplanting, repeat every 10 weeks.
		<i>Trichoderma asperellum</i> strain T34	Asperello T34	Incorporation in the growing media: 10 g/m ³ of growing media Spray/drench: 0.5 g/m ² in sufficient water (5 L/ m ²) Chemigation after planting: 5 – 10 g/(50 – 100 L of water per m ³ of growing media)	4 hours	0	Partial suppression. Greenhouse transplants of brassica leafy vegetables. See label for specific instructions pertaining to each application type.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Clubroot (<i>Plasmodiophora brassicae</i>)	29	Fluazinam	Allegro 500F	Transplant treatment: 50 ml/100L of water. Apply 100ml of solution plant	24 hours	65 Head and stem brassica	Apply solution to plant immediately after transplanting.
				Pre-transplant treatment: 2.9 L in 500 L water/ha		30 Leafy brassica	Apply in 500 L/ha in a 25 cm band along the planting row and incorporate to a depth of 15-20 cm in the same operation. Transplant the seedlings into the treated band. If forming a bed, broadcast application should be made prior to forming the bed.
Downy mildew	7 & 11	Pyraclostrobin/Boscalid	Pristine WG	1.0 Kg/ha	4 days	4	Suppression only. Maximum of 4 applications per season. Begin prior to disease development and continue on a 7–14-day schedule. Do not make sequential applications of Pristine or other Group 11 fungicides.
	11	Fenamidone	Reason 500SC	400 – 600 ml/ha	2 days	2	Suppression of Downy Mildew. <u>Brassica Head and Stem Vegetables Group & Kohlrabi and Brassica Leafy Greens Subgroup.</u> Do not apply more than 3 applications per growing season. Begin applications as soon as conditions become favorable for disease development. Do not apply sequential applications of Reason or other group 11 fungicides.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy mildew (cont.)	21	Cyazofamid	Torrent 400 SC + Sylgard 309	0.2 L in 300 to 500 L of water per hectare + 0.15 L/ha	12 hours	1	Downy mildew, suppression only. Make applications on a 7-to-10-day schedule beginning when disease is first seen or when weather conditions are favourable for disease outbreak. Maximum 5 applications/season.
	40	Mandipropamid	Revus plus Non-ionic adjuvant	400-600 ml/ha plus 0.25% v/v	12 hours	1	Downy mildew. Applications should begin prior to disease development and continue throughout the season on a 7–10-day schedule of fungicides, following the resistance management guidelines. Maximum 4 applications per year. May be tank mixed with Bravo 500 for any Brassica crop listed on that label. Follow the most restrictive use directions of either label.
	40 & 45	Ametoctradin, dimethomorph	Zampro	0.8-1.0 L/ha	12 hours	0	Downy mildew: To reduce the risk of development of fungicide resistance Zampro must be used in rotation with other fungicides having a different mode of action active against downy mildew. Begin applications of Zampro prior to disease development and continue on a 7-day interval. Use the higher rate when disease pressure is high. The addition of a spreading /penetrating adjuvant is recommended, at a maximum rate of 0.125% v/v, to improve disease control. Maximum 3 applications.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy mildew (cont.)	43	Fluopicolide	Presidio	220-292 ml/ha	12 hours	Head and stem = 2 Root = 7	Maximum of 4 applications/season. Do not make more than 2 sequential applications. Begin when conditions favour disease and repeat on a 7–10-day interval. For resistance management, Presidio must be tank-mixed with a labeled rate of another fungicide registered for the target pathogen, but with a different mode of action. Apply Presidio in a tank mix with Bravo 500. Follow the most restrictive use directions of either label. Make foliar applications on a 7–10-day schedule beginning with initial flowering, or when disease conditions are favourable, but prior to disease development. Use lower rate and longer interval as preventive applications. Use higher rate and shorter interval if disease is present.
			Fluopicolide 4SC				
	49 & 40	Oxathiapiprolin & Mandipropamid	Orondis Ultra	0.6 L/ha	12 hours	1	Begin applications prior to disease development and continue on a 7-to-10-day interval. Use shorter interval when disease pressure is high. The use of a non-ionic (NIS) surfactant is recommended. Max. 4 applications/season.
		Oxathiapiprolin	Orondis	0.175-0.35 L/ha	12 hours	0	Head & Stem Brassica, leafy greens. Downy Mildew: Begin applications prior to disease development and continue on a 5-to-10-day interval. Use higher rate and shorter interval when disease pressure is high.
	M	Copper sulphate	Copper 53W	4 kg/ha	48 hours	2	Apply in a maximum 1000 L/ha water. Maximum 2 applications per year for Brussels sprouts.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy mildew <i>(cont.)</i>	M5	Chlorothalonil	Bravo ZN	2.5-4.8 L/ha	12 hours (see label for specific activity REI's)	7	Broccoli, Brussels Sprouts, Cauliflower: Begin application after transplants are set in the field (or shortly after emergence of field seeded crop) or when conditions favour disease development. Use sufficient water to obtain adequate coverage. <u>Max 1 app/year.</u> Cabbage: <u>Max 2 app/year.</u> 7–10-day intervals.
			Echo 90WSP	1.3-2.7 kg/ha	12 hours (see label for specific activity REI's)		Broccoli, Brussels Sprouts, Cabbage, Cauliflower: Begin applications after transplants are set in the field (or shortly after emergence of field seeded crop) or when conditions favor disease development. Max 1 app/year. For cabbage, make a second application 7-10 days after the first application to maintain disease control.
			Echo 720	1.7-3.3 L/ha			
	U15	Oxathiapiprolin	Zorvec Enicade	0.175-0.35 L/ha	12 hours	0	Head & Stem Brassica, leafy greens. Downy Mildew: Begin applications prior to disease development and continue on a 5-to-10-day interval. Use higher rate and shorter interval when disease pressure is high.
	P07	Fosetyl-al	Aliette WDG	2.25-3.125 Kg/ha	12 hours	7	Maximum 5 applications per year.
Mono and dibasic sodium and potassium and ammonium phosphites		Phostrol	2.9-5.8 L/ha	12 hours	0	For preventative suppression of downy mildew , begin foliar applications when conditions favouring disease development exist and continue on a 7–21-day interval, if needed.	

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy mildew (cont.)	BM02	<i>Bacillus subtilis</i>	Serenade <i>Opti</i>	1.1-1.7 Kg/ha	4 hours	0	Biopesticide that will only suppress the indicated diseases. Make the first application at emergence, or immediately following transplanting. Repeat applications on 10–14-day intervals if conditions for disease development continue. May also control <i>Alternaria</i> Pin rot (see product label).
	-	Hydrogen Peroxide and Peroxyacetic acid	OxiDate® 2.0 NEW 2023	1L of product in 100L H2O	-	0	Start applications before the disease occurs or at the first sign of disease and/or when weather conditions are favorable for disease development. maximum number of applications per year is 8. Apply at 7-day spray intervals, depending upon the level of disease pressure. 5-day spray interval if disease pressure is high.
Alternaria Leaf blight (<i>Alternaria brassicae</i>) & Black Leaf Spot (<i>Alternaria raphani</i>)	7 & 3	Pydiflumetofen & Difenoconazole	A20259 Fungicide	0.728 – 1.0 L/ha	12 hours (see remarks)	Leafy = 3 Head and stem = 5	Apply on a 7-to-10-day interval, starting prior to disease establishment. Apply as a broadcast spray in sufficient water (minimum of 150 L/ha). REI: 12 hours except 5 days for hand harvesting, 4 days for weeding, 3 days for scouting in brassica head and stem vegetables, and 4 days for weeding in brassica leafy vegetables.
	7 & 11	Fluopyram, Trifloxystrobin	Luna Sensation	300-500 mL/ha	12 hours	0	Begin fungicide applications preventatively. Continue as needed on a 7-to-14-day interval. When disease pressure is severe, use the higher rates.
	9 & 12	Cyprodinil and fludioxonil	Switch 62.5 WG	775-975 g/ha	12 hours	7	Maximum of 3 applications per year. Allow 7-10-days between applications.
	11	Azoxystrobin	Quadris Azoshy 250 SC	1.12 L/ha	12 hours	1	Cabbage only. Apply with a minimum spray volume of 95 L/ha and at 7–14-day intervals. Maximum 3 applications per season. Suppression only.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Black Leaf Spot (<i>Alternaria raphani</i>)	M	Copper sulphate	Copper 53W	4 kg/ha	48 hours	2	Apply in a maximum 1000 L/ha water. Maximum 2 applications per year for Brussels sprouts.
<i>Alternaria</i> and <i>Cercospora</i>	11	Pyraclostrobin	Cabrio EG	0.56-1.1 Kg/ha	3 days hand harvest 12 hours general	3	Horseradish only. Maximum of 3 applications a year and no more than two sequential applications.
Sclerotinia Stem Rot (<i>Sclerotinia sclerotium</i>)	7	Penthiopyrad	Fontelis	1.25-1.75 L/ha	12 hours	0	Begin applications prior to disease development, continue on a 7–10-day interval. Use higher rate and shorter interval when disease pressure is high. Max seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
	BM02	<i>Bacillus subtilis</i>	Serenade Opti	1.7-3.3 Kg/ha	4 hours	0	Biopesticide that will only suppress the indicated diseases. Make the first application at emergence, or immediately following transplanting. Repeat applications on 10–14-day intervals if conditions for disease development continue.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Botrytis	7	Penthiopyrad	Fontelis	1.25-2.25 L/ha	12 hours	0	Begin applications prior to disease development, continue on a 7–10-day interval. Use higher rate and shorter interval when disease pressure is high. Max seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
	7-11	Pyraclostrobin/boscalid	Pristine WG	1.0 Kg/ha	4 days	4	Maximum of 4 applications/season. Begin prior to disease development and continue on a 7–14-day schedule. Do not make sequential applications of Pristine or other Group 11 fungicides.

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>