

Cole Crops Management Schedule

*A guide to weed, insect and
disease management in cole
crops in Nova Scotia*



2019



GUIDE TO PEST MANAGEMENT IN COLE CROPS

Nova Scotia Vegetable Crop Guide to Pest Management 2019
[COL1-19]

Updated April 23, 2019 by
Peter Burgess, Horticulture Specialist, Perennia
Mélanie Leclerc, Research Associate, Perennia

IMPORTANT

This publication was compiled by representatives from Perennia using information from the Pest Management Regulatory Agency of Health Canada, specific pesticide labels, previous Atlantic Provinces Vegetable Pest Guides and manufacturer's information. **This information is continuously changing and therefore it can cease to be current and accurate. Pesticide labels are the best source of information and should always be consulted prior to using a product.**

By printing this publication, Perennia does not offer any warranty or guarantee, nor do they assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

WARNINGS

This publication is meant to be used as a reference for possible pest control options. Where there are multiple brand names of a specific active ingredient registered in Canada, Perennia has only listed a couple for reference purposes and as such does not endorse one brand over another. If you have purchased a generic product not specifically in this guide but has your crop and pest on the label, always follow that product label.

If any information in this or any other publication conflicts with the information on the label, always use the label recommendation. You are legally responsible for the safe use of pesticides you purchase. This means the safe transport and storage of these materials, the label rates used on crops, and the safe disposal of containers.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
WEEDS:							
Preplant <i>Perennial weeds including quackgrass</i>	9	Glyphosate	Roundup Original	2.5-7.0 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 (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 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 with fall-applied herbicides.
			Roundup WeatherMAX	1.67-8.0 L/ha			
			Touchdown® 480	2.5-7.0 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.
Pre-Transplant	15	Dimethenamid-P	Frontier Max	756-963 ml/ha	24 hour	60	Apply prior to transplanting and before weed emergence.
	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.
	14	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.
	3	Pendimethalin	Prowl H₂O	2.46 L/ha		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.
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 8 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			
			S-metolachlor	Dual II Magnum	1.25-1.75 L/ha	12 hours	-

<i>Stale seedbed technique</i>	22	Diquat	Reglone, Dessicash	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. Use Gramoxone for best control of grasses.
		Paraquat	Gramoxone®	2.75-5.5 L/ha	24 hours	-	
Postemergence <i>Grasses</i>	1	Fenoxaprop-p-ethyl	Excel Super	670 ml/ha	-	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.
		Fluazifop-p-butyl	Venture L	0.8-2.0 L/ha	-	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>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 <u>Brussels sprouts</u> (<i>NEW 2019</i>). One application per year.
	4	Clopyralid	Pyralid	0.672 L/ha in 300 L water/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.
<i>Inter-row shielded</i>	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. Use Gramoxone for best control of grasses.
		Paraquat	Gramoxone®	2.75-5.5 L/ha	24 hours	-	
	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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS:							
Cabbage Maggots	1B ¹	Chlorpyrifos	Lorsban 50 W	32.5 g product/100 L water	10 days for cauliflower, 24 hours other crops	32	For cabbage only. 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. (Broccoli, Brussels sprouts, Cabbage Cauliflower)
			Lorsban 4 E	Rate varies with row spacing – see label			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. (Broccoli, Brussels sprouts, Cabbage Cauliflower)
			Warhawk 480 EC				At planting: Apply 210 mL/1000 m row. Apply one drench spray in 1000 L/ha spray solution, 10 cm on each side of the plant, 7-10 days after seeding or 3 days after transplanting. Post planting drench: Mix 1.7 L in enough water to make 1000 L of finished spray. Apply 12.5 L of this solution per 100 m of row on soil, 10 cm on each side of the plant. Do not apply to harvestable portions of the crop. If no granular treatment was used at seeding: For

							broccoli, Brussels sprouts, cabbages and cauliflower, apply a drench treatment within 3 days of transplanting (after plant recovery) or 7-10 days after seeding. Repeat 21 days after the transplanting drench or 28 days after the seeding drench.
Cabbage Looper, Imported Cabbageworm & Diamondback Moth Larvae	1B	Acephate	Orthene 75 SP	563-825 g/ha	12 hours	28	Do not apply more than 2 times/season. Apply in 225-1650 L/ha of water.
	-	<i>Bacillus thuringiensis</i>	Dipel 2X DF	55-550 g/ha	-	0	Check labels for details on rates according to species.
			Thuricide HPC	2.0-4.25 L/ha			
	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.
	3	Cypermethrin	Mako	87.5-125 mL/ha	-	3	Begin treatment when insects or signs of insect feeding appear. Repeat every 10 – 14 days if necessary, up to 3 applications per season.
			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.
	3	Deltamethrin	Decis 5 EC	150-200 ml/ha	12 hours	1 Brussels sprouts 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.
			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.

	3	Lambda-cyhalothrin	Matador 120 EC	42 mL/ha (Imported Cabbage-worm, Diamond-back Moth) 83 mL/ha (Cabbage Looper)	24 hours	1 cabbage 3 broccoli, cauliflower , Brussels sprouts	Do not apply more than 3 times per season. Allow 7 days between applications.
			Warrior	42 mL/ha (Imported Cabbage-worm, Diamond-back Moth) 83 mL/ha (Cabbage Looper)	24 hours	1 cabbage 3 broccoli, cauliflower , Brussels sprouts	Do not apply more than 3 times per season. Allow 7 days between applications.
	1A	Methomyl	Lannate	270-540 g/ha	-	1 cabbage 7 broccoli, cauliflower , Brussels sprouts	Apply with low pressure ground equipment. Repeat at 5 to 7 day intervals.
	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/crop/season. Do not apply more than 2460 ml of product/ha per season. Apply in water volumes of 200-400 L/ha. Use higher rate under high insect pressure or when larvae are large.
	3	Permethrin	Pounce 384 EC	90-180 mL/ha	-	3 Cabbage, cauliflower , Brussels sprouts, 7 broccoli	Apply when insects or insect damage first appears. See note under Decis.

	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.
	5	Spinosad	Success 480 SC	182 ml/ha	3 days	3	Maximum 3 applications per year. Allow 7-10 days between applications.
			Entrust 80 W	109 g/ha			
	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.
	18	Methoxyfenozide	Intrepid 240F	0.3 – 0.6 L/ha	12 hours	1 day	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. 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. 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.
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	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.
Flea Beetles	3	Cypermethrin	Ripcord 400 EC	87.5-125 mL/ha	-	3	Use up to 3 applications per year.

	3	Deltamethrin	Decis 5.0 EC	150-200 ml/ha	12 hours	3	Use on cabbage only. In 350-550 L water/ha.
			Poleci 2.5 EC	300-400 ml/ha			
	3	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.
			Warrior	42 ml/ha			
	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.	
Aphids	4	Acetamiprid	Assail 70 WP Aceta 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.
	1B	Dimethoate	Lagon 480 EC	0.7-1.0 L/ha	-	7 Broccoli, cauliflower 21 Brussels sprouts	Use repeat applications as necessary. Max 3 applications per season.
	4	Imidacloprid	Admire 240	6.5 ml/100 m row	-	21	One application per season. Do not apply a foliar application after a sidedress treatment.
				Foliar: 200 ml/ha	24 hours	7	Two applications/season, 7 days apart. Do not apply a foliar application after a sidedress treatment.
	29	Flonicamid	Beleaf 50SG	0.12-0.16 kg/ha	-	-	Leafy Vegetables. Thorough spray coverage of plant foliage is essential. Minimum of 94 L water/ha. Maximum of 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.

	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	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.
	9D	Afidopyropen <i>NEW 2019</i>	Versys	0.1 L/ha	12 hours	0	<u>Cabbage aphid (<i>Brevicoryne brassicae</i>)</u> <u>green peach aphid (<i>Myzus persicae</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.
Aphids and Whiteflies and Swede Midge larvae	23	Spirotetramat	Movento 240 SC	220-365 ml/ha	12 hours	1	Minimum interval between applications is 7 days. Maximum of 730 ml/ha of product applied per season. 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	12 hours	1	Minimum interval between applications is 7 days. Maximum of 1.17 L/ha of product applied per season. 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	Swede midge. 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.
	9D	Afidopyropen <i>NEW 2019</i>	Versys	0.35-0.5 L/ha	12 hours	0	<u>Sweet potato whitefly (<i>Bemisia tabaci</i>) & 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.
Cutworms	3	Cypermethrin	Ripcord 400 EC	175 ml/ha	-	21	Spray under warm moist conditions. Do not disturb the soil surface for at least 5 days.
	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.
	1B	Chlorpyrifos	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.

Thrips	3	Cypermethrin	Ripcord 400 EC	87.5-125 ml/ha	-	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.
	5	Spinosad	Success 480 SC	146 ml/ha	-	3	Leafy Brassica crops only. Apply when thrips first appears. Reapply at 7-10 day intervals. Max 3 applications per year. <i>Also suppresses swede midge.</i>
	5	Spinosad	Entrust 80W Entrust SC	87.5 g/ha 292 ml/ha	12 hours	3	
	5	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.
Slugs (Grey Garden)	-	Ferric phosphate	Sluggo	25-50 Kg/ha	-	-	
	1A	Methomyl	Lannate	775 g/ha	2 days	30	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. For Brussels sprouts only.
Whitefly (including silverleaf, sweetpotato & greenhouse)	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.
Beet Armyworm Fall Armyworm Corn earworm Dipteran leafminers (larvae)	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. 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.
750 ml/ha							
1000-1500 ml/ha							

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
DISEASES:							
Black Rot	-	-	Hot Water	-	-	-	Contact an extension specialist for methods.
	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.
Damping Off and Wirestem	-	Metam sodium	Vapam	Follow manufacturer's directions	-	-	Fumigate seed beds in fall prior to planting.
		1,3-dichloropropene	Telone II				
Damping Off	-	Captan	Captan 50 W	125-225 g / 100 m ²	-	-	Work into upper 8 to 10 cm of soil.
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 30 Leafy brassica	Apply solution to plant immediately after transplanting.
				Pre-transplant treatment: 2.9 L in 500 L water/ha			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, Black Leaf Spot (<i>Alternaria</i>)	-	<i>Bacillus subtilis</i>	Serenade Opti	1.1-1.7 Kg/ha	-	0	Biopesticide that will only suppress the indicated diseases. Make 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).

	M	Chlorothalonil	Bravo 500 / Bravo ZN	2.5-4.8 L/ha	48 hours	7	Begin applications after transplants are set in the field or when conditions favor development. Repeat on 7-10 day intervals.
			Echo 90DF	1.4-2.7 kg/ha	48 hours	7	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. Repeat applications at 7-10 day intervals or as necessary to maintain disease control. DO NOT use more than 5 applications per season.
			Echo 720	1.7-3.3 L/ha			
	M	Copper sulphate	Copper 53W (tri-basic copper sulphate)	4 kg/ha Follow manufacturer directions	48 hours	1	Apply in a maximum 1000 L/ha. Maximum 2 applications per year for Brussels sprouts.
	11	Fenamidone	Reason 500SC	400 – 600 ml/ha	48 hours	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.
	U	Fosetyl-al	Aliette WDG	2.25-3.125 Kg/ha	12 hours	7	Broccoli only. Maximum 5 applications per year.
	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.
Orondis							
2	Iprodione	Rovral WP	3.0 Kg/ha	12 hours	7 cabbage 5 cauliflower	Black leaf spot (<i>alternaria</i>) only. May be used on cabbage and cauliflower. For <i>Alternaria</i> control on storage cabbage, apply 1 application 7-14 days prior to harvest. For <i>Alternaria</i> control on cauliflower, apply 1 application 1-2 days prior to tying.	

	40	Mandipropamid	Revus plus Non-ionic adjuvant	400-600 ml/ha plus 0.125% 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.
	7-11	Pyraclostrobin/ Boscalid	Pristine WG	1.0 Kg/ha	4 days	4	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.
	43	Fluopicolide	Presidio	220-292 ml/ha	12 hours	2 head and stem vegetables 7 root vegetables	Maximum of 4 applications/season. Do not make more than 2 sequential applications. Begin when conditions favour disease and repeat on a 7-14 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				
	40	Dimethomorph	Acrobat 50 WP	450 g/ha	7 days (hand harvesting) 5 days (scouting) 12 hours (no entry)	7	ACROBAT must be applied as a tank mix with another fungicide active against downy mildew. Begin applications when conditions favour disease development. Continue applications on a 7-day spray schedule as needed until weather conditions favouring infection and sporulation decrease. DO NOT use less than 200 L of water/ha for

							ground applications. Maximum 5 applications per year.
	33	Mono and dibasic sodium and potassium and ammonium phosphites	Phostrol	2.9-5.8 L/ha	12 hours	1	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.
	40,45	Ametoctradin, dimethomorph	Zampro	0.8-1.0 L/ha	Hand harvesting – 6 days Scouting – 4 days All other activities – 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.
	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.
Alternaria and Cercospora	11	Pyraclostrobin	Cabrio EG	0.56-1.1 Kg/ha	12 hours	3	Horseradish only. Maximum of 3 applications a year and no more than two sequential applications.
Alternaria Leaf blight (Cabbage Only)	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	Apply with a minimum spray volume of 95 L/ha and at 7-14 day intervals. Maximum 3 applications per season. Suppression only.
Sclerotinia Stem Rot (Sclerotinia sclerotium)	-	<i>Bacillus subtilis</i>	Serenade Opti	1.7-3.3 Kg/ha	-	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.

	7	Penthiopyrad	Fontelis	1.25-1.75 L/ha	4 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.
Botrytis	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.
	7	Penthiopyrad	Fontelis	1.25-2.25 L/ha	4 hours	3	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.

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>

PESTICIDE EMERGENCY CONTACT INFORMATION

Poison Control Centres		
Nova Scotia	800.565.8161 or 902.428.8161	IWK, Halifax, NS
New Brunswick	911	Ask for Poison Information
Prince Edward Island	800.565.8161 or 902.428.8161	IWK, Halifax, NS
Newfoundland	709.722.1110	Dr. Charles A. Janeway Child Health Care Centre, St. John's, NF

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

ABBREVIATIONS & CONVERSIONS

Formulation and Measurement Abbreviations			
FORMULATIONS		MEASUREMENTS	
DF	Dry flowable	mL	millilitre
EC, E	Oil-based emulsifiable concentrate	kPa	kilopascal
EG	Water dispersible granule	kg	kilogram
F	Flowable	g	gram
G	Granule	L	litre
L	Liquid	BIU	Billions of International Units
WG	Wettable Granule	ppm	parts per million (1000 ppb)
WDG	Wettable dry granule	ppb	parts per billion (1/1000 ppm)
WP, W	Wettable powder		
SC	Suspension concentrate		
SP	Soluble powder		
Sn	Solution		

Helpful Conversions¹	
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!