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EXTENSION AND ADVISORY TEAM

# GUIDE TO PEST MANAGEMENT IN CHINESE VEGETABLES

Nova Scotia Vegetable Crop Guide to Pest Management 2021  
[CHIN1-21]



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## 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 using 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 container

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted-Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
<b>WEEDS:</b>							
<b>Preplant</b> <i>Perennial weeds including quackgrass</i>	9	Glyphosate	<b>Roundup Transorb HC</b>	1.67-4.67 L/ha	12 hours 12 hours 12 hours	7 7 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.
			<b>Roundup WeatherMAX</b>	1.67-4.67 L/ha			
			<b>Touchdown Total</b>	1.8-5.0 L/ha			
	14	Carfentrazone-ethyl	<b>Aim EC</b>	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.
<b>Preemergence</b> <i>Stale seedbed technique</i>	22	Diquat	<b>Reglone</b>	2.3-4.6 L/ha	24 hours	-	Apply at least 3 days prior to crop emergence. Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
			<b>Dessicash</b>				
		Paraquat	<b>Gramoxone®</b>	2.75-5.5 L/ha	24 hours	-	

<i>Germinating annual weeds</i>	15	Napropamide	<b>Devrinol 50 DF</b>	2.25-4.5 Kg/ha	12 hours	-	Apply pre-plant or pre-emergent of crop only to seeded Chinese broccoli, Chinese radish and Chinese mustard cabbage; Seeded and transplanted Chinese cabbage and transplanted kohlrabi. Max 1 application per season.
<b>Postemergence</b> <i>Broadleaf control</i>	4	Clopyralid	<b>Lontrel 360</b>	0.56 L/ha	12 hours	30	Apply post planting to Chinese radish, Chinese broccoli and mustard cabbage. Apply in 300 L of water/ha. Adequate testing on different varieties has not been completed in Atlantic Canada.
	4	Clopyralid	<b>Pyralid</b>	0.672 L/ha in 300 L water/ha.	12 hours	30	CHINESE RADISH, MUSTARD CABBAGE AND CHINESE BROCCOLI (ALL 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	<b>Reglone</b>	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.
			<b>Dessicash</b>				
	Paraquat	<b>Gramoxone®</b>	2.75-5.5 L/ha	24 hours	-		
	14	Carfentrazone-ethyl	<b>Aim EC</b>	37-117 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.
<i>Annual grasses and quackgrass</i>	1	Sethoxydim	<b>Poast Ultra plus Merge</b>	0.32-1.1 L/ha 1-2 L/ha	12 hours	30	Apply to Chinese broccoli, Chinese cabbage, Chinese radish and kohlrabi. Use high rate on quackgrass.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted-Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
<b>INSECTS:</b>							
Cutworms	1B <sup>1</sup>	Chlorpyrifos  <i>FINAL SALE 2022</i> <i>FINAL USAGE 2023</i>	Lorsban 4 E	1.2 - 2.4 L/ha	24 hours	32	Pre-plant treatment for Chinese cabbage.
			Warhawk 480 EC				Pre-plant treatment for Chinese cabbage. Seedling treatment: Apply once as a broadcast spray at the 2 to 5- leaf stage of the crop.
	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 optimal control, apply to smaller plants or when lower portions of plant can receive adequate coverage. Do not make more than 4 applications per season.
	28	Tetraniliprole	Vayego 200 SC  <i>NEW 2021</i>	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).

<b>Cabbage Looper, Imported Cabbage worm and Diamondback Moth</b>	-	<i>Bacillus thuringiensis</i>	<b>Dipel 2XDF</b>	55-550 g/ha	4 hours	0	Rates vary depending on pest (read label). Chinese cabbage, Chinese broccoli, bok choy and Asian radish. Max 5 applications per year. Apply in 400 l/ha when larvae are small.
	1A	Carbaryl	<b>Sevin XLR</b>	2.5-5.25 L/ha	12 hours (general), 5 days (hand harvest)	21 5 (kohlrabi)	Spray in sufficient water for full coverage. Use the lower rate on young plants. Apply when insects or damage appear. To avoid possible injury on lettuce, do not apply when foliage is wet or when rain or excessive humidity is expected during the next 2 days.
	28	Chlorantraniliprole	<b>Coragen</b>	250 ml/ha	12 hours	3	Begin applications when treatment thresholds have been reached. Maximum of 4 applications per season. Do not apply more than once every 3 days. Do not exceed 1 L of Coragen per 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 100L/ha.
	15	Novaluron	<b>Rimon 10 EC</b>	410-820 ml/ha	12 hours	2-7 depending on crop	Reapplication on 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 per crop per season. Do not apply more than 2460 ml of product per hectare per season. Apply in water volumes of 200-400 L /ha. Use higher rate under high insect pressure or when larvae are large.
	5	Spinetoram	<b>Delegate WG</b>	140-200 g/ha	12 hours	1	Time application with peak egg hatch or small larvae. Repeat applications based on population monitoring. Use higher rate for higher infestations or advanced growth stages. Maximum of 3 applications per year with a minimum re-treatment interval of 5

<b>Cabbage Looper, Imported Cabbage worm and Diamondback Moth</b>							days. <b>Oriental Radish, Chinese Celery, read label for other labeled crops</b>
	5	Spinosad	<b>Success 480 SC</b>	182 ml/ha	-	1 (Chinese celery) 3 (Oriental radish)	Maximum 3 applications per year. Allow 7-10 days between applications.
			<b>Entrust 80 W</b> <b>Entrust SC</b>	109 g/ha 364 ml/ha			
	3&4	Imidacloprid Deltamethrin	<b>Concept</b>	650 ml/ha	12 hours	7	Apply at threshold. Repeat on a minimum 5 day interval. Maximum 3 applications per year.
	18	Methoxyfenozide	<b>Intrepid 240F</b>	0.3 – 0.6 L/ha	12 hours	7	Apply at first sign of feeding damage or when infestations reach threshold levels as determined by insect monitoring. Tank-mix with a nonionic 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	<b>Exirel</b>	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.
28	Tetraniliprole	<b>Vayego 200 SC</b>  <i>NEW 2021</i>	150 mL/ha  225 mL/ha (Cabbage looper)	12 hours	1	Imported cabbageworm, diamondback moth, <b>cabbage looper suppression</b> . 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	

<b>Cabbage Looper, Imported Cabbage worm and Diamondback Moth</b>							application volume: 100 L/ha (ground application).
	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	<b>XenTari WG</b>	500-1000 g/ha	-	0	<b>Cabbage looper, Cross-striped cabbageworm, Diamondback moth, Imported cabbageworm.</b> Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L per ha.
	3	Lambda cyhalothrin	<b>Matador 120 EC</b>	83 ml/ha	24 hours	3	<b>Cabbage looper.</b> Use 100 to 200 L/ha of spray volume for thorough coverage. Maximum 3 applications per year, with a 7 day interval between treatments.
<b>Aphids</b>	4	Acetamiprid	<b>Assail 70 WP</b> <b>Aceta 70 WP</b>	56-86 g/ha	12 hours	7	Mustard greens, amaranth, kohlrabi, chrysanthemum greens, kale, Chinese cabbage and bok choy. Maximum 5 applications per year. Alternate with other insecticide groups. <b>Also registered for Swede Midge.</b>
	1B	Dimethoate	<b>Lagon 480 EC</b>	600-1000 mL/ha	4 days	7	Chinese broccoli, bok choy and Chicory. Maximum 3 applications per season.
	29	Flonicamid	<b>Beleaf 50SG</b>	0.12-0.16 kg/ha	-	0 days	Leafy Vegetables. Thorough spray coverage of plant foliage is essential. Minimum of 94 L of water/ha. Maximum of 3 applications per season; allow 7 days between applications. <b>Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier and do not use adjuvants.</b>
	4C	Sulfoxaflor	<b>Closer SC</b>	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.



Aphids	28	Cyantraniliprole	<b>Exirel</b>	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.
	28	Tetraniliprole	<b>Vayego 200 SC</b> <i>NEW 2021</i>	150 mL/ha	12 hours	1	<b>Suppression only.</b> 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).
	9D	Afidopyropen	<b>Versys</b>	0.1 L/ha	12 hours	0	<b>Crop group 4 -13: Leafy Vegetables</b> <u>Green peach aphid (<i>Myzus persicae</i>), potato aphid (<i>Macrosiphum euphoribae</i>) &amp; lettuce aphid (<i>Nasonovia ribis-nigri</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	4D	Flupyradifurone	<b>BYI 02960 200SL</b> <i>NEW 2021</i>	<b>Aphids:</b> 500 – 750 mL/ha <b>Whiteflies:</b> 750 – 1000 mL/ha	12 hours	1	Minimum interval between applications: 7 days. Minimum application volumes: 100 L/ha. Maximum allowed per crop season: 2000 mL/ha. Apply as a directed foliar spray ensuring thorough coverage.
	23	Spirotetramat	<b>Movento 240 SC</b>	220-365 ml/ha	12 hours	1 day	Minimum interval between applications is 7 days. Maximum of 730 ml/ha of product applied per season. <b>This product is TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply this</b>

Aphids and Whiteflies							product during crop flowering period or when flowering weeds are present in the field.
			<b>Movento 150 OD</b>	347-585 ml/ha	12 hours	1 day	Minimum interval between applications is 7 days. Maximum of 1.17 L/ha of product applied per season. <b>This product is TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply this product during crop flowering period or when flowering weeds are present in the field.</b>
	9D	Afidopyropen	<b>Versys</b>	0.35-0.5 L/ha	-	0	<b>Crop group 4 -13: Leafy Vegetables</b> <u>Sweet potato whitefly (<i>Bemisia tabaci</i>) &amp; 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.
Swede midge	23	Spirotetramat	<b>Movento 240 SC</b>	220-365 ml/ha	12 hours	1	<b>Swede midge larvae.</b> 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. <b>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.</b>
	28	Cyantraniliprole	<b>Exirel</b>	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

<b>Swede midge</b>		Chlorantraniliprole	<b>Coragen</b>	250 ml/ha	12 hours	3	or MSO Concentrate with Leci-Tech* at an application rate of 0.5% v/v. Make no more than 4 applications per season.
	28	Cyantraniliprole	<b>Verimark</b>	750-1000 ml/ha	12 hours	-	Apply specified dosage as an infurrow 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.
	3	Lambda-cyhalothrin	<b>Matador 120 EC</b>	83 ml/ha	24 hours	1 Cabbage 3 broccoli, cauliflower , Brussels sprouts	Maximum 3 applications per season. Allow 7 days between applications.
			<b>Warrior</b>				
	5	Spinosad	<b>Success</b>	146 ml/ha	12 hours	3	<u>Reduction in damage from Swede midge.</u> 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.
			<b>Entrust</b>	292 ml/ha			
	4	Acetamiprid	<b>Assail 70 WP</b> <b>Aceta 70 WP</b>	86 g/ha	2-4 days	7	Maximum 5 applications per year and alternate with other insecticide families.
4,15	Acetamiprid, Novaluron	<b>Cormoran</b>	740 ml/ha	12 hours	7	<b>Chinese cabbage (napa).</b> 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.	
<b>Flea Beetles</b>	1A	Carbaryl	<b>Sevin XLR</b>	1.25-2.5 L/ha	12 hours to 5 days	21 5 (kohlrabi)	Chinese cabbage, mustard greens
	3&4	Imidacloprid Deltamethrin	<b>Concept</b>	650 ml/ha	2 days	7	Apply at threshold. Repeat on a minimum 5 day interval. Maximum 3 applications per year.

Flea Beetles	28	Cyantraniliprole	<b>Exirel</b>	500-1000 ml/ha	12 hours	1	<b>Chinese celery, Chinese spinach.</b> Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. For optimal control, apply to smaller plants or when lower portions of plant can receive adequate coverage. Do not make more than 4 applications per season.
	28	Tetraniliprole	<b>Vayego 200 SC</b> <i>NEW 2021</i>	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).
Cabbage Maggot	1B <sup>1</sup>	Chlorpyrifos  <i>FINAL SALE 2022</i> <i>FINAL USAGE 2023</i>	<b>Lorsban 4 E</b>	Rate varies with application method – see label	24 hours	15	Pak choy. Rate depends on row spacing. See label for details.
			<b>Warhawk 480 EC</b>	Rate varies with row spacing – see label	24 hours	32	Chinese cabbage.
						15 days pak choy, 21 days Chinese broccoli, 32 days other crops	<b>Chinese cabbage, pak choy:</b> <u>At planting:</u> 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. <u>Post planting drench:</u> Mix 1.7 litres 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. <b>Asian radish (lo bok, daikon):</b> Apply as a drench over seeded rows at 7, 20 and 35 days after seeding.

<b>Cabbage Maggot</b>							<b>Chinese broccoli:</b> Apply 150 millilitres of product in 800 L/1000 m row. Apply once per season banded over the row 5–7 days after seeding.
<b>Whitefly (including silverleaf, sweetpotato &amp; greenhouse)</b>	23	Spiromesifen	<b>Oberon</b>	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.
<b>Thrips</b>	5	Spinosad	<b>Success 480 SC</b>	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	<b>Entrust 80W Entrust SC</b>	87.5 g/ha 292 ml/ha	12 hours	3	Max 3 applications/year. Apply when onion thrips first appear targeting egg hatch and small nymphs. Repeat in 7-10 days if needed.
	5	Spinetoram	<b>Delegate WG</b>	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	<b>Movento 240 SC</b>	365 ml/ha	12 hours	3 days	<u>Leafy vegetables-non brassica:</u> Minimum interval between applications: 7 days. Maximum allowed per crop season: 730 mL/ha. Apply when thrips are first identified. Movento should be used during the first half of the season when adult populations are relatively low or building. Reductions in numbers of thrips larvae may take 3 to 4 days after Movento is applied.
	3	Lambda cyhalothrin	<b>Matador 120 EC</b> <b>Labamba</b>	188 ml/ha	24 hours	3	<b>Onion Thrips.</b> Use 500 L/ha of spray volume for thorough coverage. Maximum 3 applications per year, with a 7 day interval between treatments.

<b>Beet Armyworm, Fall Armyworm, Corn earworm, Dipteran leafminers (larvae)</b>	28	Tetraniliprole	<b>Vayego 200 SC</b> <i>NEW 2021</i>	150 mL/ha	12 hours	1	<b>Armyworm.</b> 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).
	28	Cyantraniliprole	<b>Exirel</b>	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			
<b>Pea leafminer (<i>Liriomyza huidobrensis</i> Blanchard).</b>	4	Acetamiprid	<b>Assail 70 WP</b> <b>Aceta 70 WP</b>	86 g/ha	12 hours	7	Begin applications when insect populations reach recognized economic threshold. Thorough coverage is important to obtain optimum control. Do not make more than 5 applications per season. Do not apply more than once every 7 days.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
<b>DISEASES:</b>							
<b>Downy Mildew</b>	44	<i>Bacillus subtilis</i>	<b>Serenade Opti</b>	1.1-1.7 Kg/ha	-	0	<b>Biopesticide that will only suppress the indicated diseases.</b> Make first application at emergence, or immediately following transplanting. Repeat applications on 10-14 day intervals if conditions for disease

Downy Mildew							development continue. <i>May also control Alternaria Pin rot (see product label).</i>
	11	Fenamidone	<b>Reason 500SC</b>	400 – 600 ml/ha	48 hours	2	<b>Suppression of Downy Mildew. Brassica Head and Stem Vegetables Group &amp; Kohlrabi and Brassica Leafy Greens Subgroup.</b> Do not make 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	<b>Aliette WDG</b>	2.25-3.125 Kg/ha	12 hours	7	<b>Bok-choy only.</b> Max 5 applications/year.
	U15	Oxathiapiprolin	<b>Zorvec Enicade</b>	0.175-0.35 L/ha	12 hours	0	<b>Leafy Brassica greens, head and stem brassica vegetables.</b> Begin applications prior to disease development and continue on a 7-10 day interval. Use higher rate and shorter interval when disease pressure is high.
	49-40	Oxathiapiprolin & Mandipropamid	<b>Orondis Ultra</b>	600 mL/ha	12 hours	1	
	40	Mandipropamid	<b>Revus plus Non-ionic adjuvant</b>	400-600 ml/ha plus 0.125% v/v	12 hours	1	<b>Downy mildew.</b> Begin applications prior to disease development and continue throughout the season on a 7-10 day schedule of fungicides, following resistance management guidelines. Maximum 4 applications/year. <b>May be tank mixed with Bravo 500 for any Brassica crop listed on that label. Follow the most restrictive use directions of either label.</b>
	7-11	Pyraclostrobin/ boscalid	<b>Pristine WG</b>	1.0 Kg/ha	4 days	4	<b>Maximum of 4 applications per season.</b> 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.

Downy Mildew	43	Fluopicolide	<b>Presidio</b>	220-292 ml/ha	12 hours	2 (head and stem vegetable) 7 (root vegetable)	<p>Maximum of 4 applications per season. Do not make more than 2 sequential applications. Begin when conditions favour disease and repeat on a 7-14 day interval.</p> <p>For resistance management, Presidio must be tank-mixed with a labelled 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.</p> <p>Make foliar applications on a 7 to 10 day schedule beginning with initial flowering, or when disease conditions are favourable, but prior to disease development. Use the lower rate and longer interval as preventive applications. Use the higher rate and shorter interval if disease is present.</p>
			<b>Fluopicolide 4SC</b>				
	40	Dimethomorph	<b>Acrobat 50 WP</b>	450 g/ha	7 days (hand harvesting)  5 days (scouting)  12 hours (no entry)	7	<p><b>Suppression only. Acrobat 50 WP must be applied as a tank mix with another fungicide active against downy mildew.</b> 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. <b>DO NOT</b> use less than 200 liters of water per hectare for ground applications. Max 5 applications per year.</p>
33	Mono and dibasic sodium and potassium and	<b>Phostrol</b>	2.9-5.8 L/ha	12 hours	0	For preventative suppression of <b>downy mildew</b> , begin foliar applications when conditions favouring disease development	



<b>Downy Mildew</b>		ammonium phosphites					exist and continue on a 7-21 day interval, if needed.
	40,45	Ametoctradin, dimethomorph	<b>Zampro</b>	0.8-1.0 L/ha	Hand harvesting – 6 days Scouting – 4 days All other activities – 12 hours	0	<b>Downy mildew:</b> In order to reduce the risk of the development of fungicide resistance <b>Zampro</b> must be used in rotation with other fungicides having a different mode of action active against downy mildew. Begin applications of <b>Zampro</b> 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. Max 3 applications.
	21	Cyazofamid	<b>Torrent 400 SC + Sylgard 309</b>	0.2 L in 300 to 500 L of water per hectare + 0.15 L/ha	12 hours	1	<b>Downy mildew, suppression only.</b> Make applications on a 7 to 10 day schedule beginning when disease is first seen or when weather conditions are favourable for disease outbreak. Max 5 applications per season.
<b>Clubroot (<i>Plasmodiophora brassicae</i>)</b>	29	Fluazinam	<b>Allegro 500F</b>	<b>Transplant treatment:</b> 50 ml/100L of water Apply 100 ml of solution per plant	24 hours	65 (Head and stem brassica)  30 (Leafy brassica)	Apply solution to plant immediately after planting.
				<b>Pre-transplant treatment:</b> 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.

<b>Sclerotinia White Mold</b> ( <i>Sclerotinia spp.</i> )	7-11	Pyraclostrobin/ boscalid	<b>Pristine WG</b>	1.0 – 1.3 Kg/ha	24 hours	0	<b>For suppression of white mold in Celtuce, cardoon and Chinese celery.</b> Apply once per season before disease develops. For hand harvesting and thinning in leafy vegetables do not enter for 9 days after application.
	7	Penthiopyrad	<b>Fontelis</b>	1.25-1.75 L/ha	4 hours	0	<b>Begin applications prior to disease development, continue on a 7-10 day interval.</b> 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.
	44	<i>Bacillus subtilis</i>	<b>Serenade Opti</b>	1.7-3.3 Kg/ha	-	0	<b>Biopesticide that will only suppress the indicated diseases.</b> Make the first application at emergence, or immediately following transplanting. Repeat applications on 10-14 day intervals if conditions for disease development continue.
<b>Botrytis</b>	7-11	Pyraclostrobin/ boscalid	<b>Pristine WG</b>	1.0 Kg/ha	4 days	4	<b>Maximum of 4 applications per season.</b> 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	<b>Fontelis</b>	1.25-2.25 L/ha	4 hours	0	<b>Begin applications prior to disease development, continue on a 7-10 day interval.</b> 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.
<b>Early and Late Blight</b> <b>Alternaria leaf blight</b>	7-3	Pydiflumetofen & Difenoconazole	<b>A20259 Fungicide</b>  <i>NEW 2021</i>	0.728 – 1.0 L/ha	12 hours*	3 (leafy veg) 5 (head and stem veg)	<b>Alternaria in Brassica Leafy and Head Vegetables.</b> Apply on a 7 to 10 day interval, starting prior to disease establishment. Apply

<b>Early and Late Blight Alternaria leaf blight</b>							as a broadcast spray in sufficient water (minimum of 150 L/ha) for thorough coverage. * <b>REI:</b> 12 hours except, 5 days for hand harvesting, 4 days for weeding and 3 days for scouting/topping/tying/training in brassica head vegetables; 4 days for weeding in brassica leafy vegetables.
	11	Trifloxystrobin	<b>Flint</b>	Early blight: 190-210 g/ha Late blight: 210 g/ha	12 hours	7	<b>Chinese celery.</b> Begin applications preventatively and continue as needed on a 7-14 day interval. Use the higher rate and shorter spray interval when disease pressure is severe. A minimum spray volume of 280 L/ha is recommended. <b>DO NOT</b> apply more than 840 g of FLINT Fungicide per hectare per season.
	9-12	Cyprodinil & fludioxonil	<b>Switch 62.5 WG</b>	775-975 g/ha	3 days (hand weeding), 12 hours general	7	<b>Alternaria leaf blight</b> in <i>Broccoli raab (rapini)</i> , <i>Chinese cabbage (bok choy)</i> , <i>collards</i> , <i>kale</i> , <i>mizuna</i> , <i>mustard greens</i> , <i>mustard spinach</i> , <i>rape greens</i> . Make first application when disease first appears and continue on 7-10 day intervals. Apply in sufficient water volume to obtain thorough coverage; a minimum spray volume of 200 L/ha is recommended.
<b>Black Rot</b>	M1	Copper	<b>Cueva</b>	0.5% to 2% solution, applied at 470-940 L/ha.	4 hours	1	<b>Suppression.</b> (Bok choy, Kale, Kohlrabi, Mustard, Pak-choi) Re-apply using 5-10 day intervals.
<b>Phytophthora spp</b>	U15	Oxathiapiprolin	<b>Zorvec Epicaltrin</b>	0.7-1.4 L/ha	12 hours	0	<b>Kohlrabi.</b> Apply a transplant drench prior to planting or a soil drench to established plantings. See specific soil application directions in the label.

<i>Phytophthora spp</i>	44	<i>Bacillus subtilis</i>	<b>Serenade Soil</b>	2.7-14 L/ha	-	-	Brassica leafy vegetables. See label for application details.
<b>Post-emergence damping off (<i>Rhizoctonia solani</i>)</b>	44	<i>Bacillus subtilis</i>	<b>Serenade Soil</b>	2.7-14 L/ha	-	-	Brassica leafy vegetables. See label for application details.
	BM02	<i>Trichoderma harzianum</i> Rifai strain T22	<b>Trianium P NEW 2021</b>	<b>After Sowing:</b> 1.5 g/m <sup>2</sup> of cultivated area in 1.33 L of water. <b>After transplanting:</b> 6 g in 1 L of water and apply 500 L/ha of suspension.	-	-	Leafy vegetables, brassica vegetables. Starting drench application immediately after sowing seeds or transplanting, repeat every 10 weeks.

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/ls-re/index-eng.php>

## PESTICIDE EMERGENCY CONTACT INFORMATION

<b>Poison Control Centres</b>		
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

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

<b>Formulation and Measurement Abbreviations</b>			
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)

<b>Helpful Conversions<sup>1</sup></b>	
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

### <sup>1</sup> 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!