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EXTENSION AND ADVISORY TEAM

SPRAY GUIDE FOR FIELD LETTUCE

Nova Scotia Vegetable Crop Spray Guide 2022
[LET1-22]

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Updated April 14, 2022 by

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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 *Perennial weeds including quackgrass*	9	glyphosate	**Roundup WeatherMAX**	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.
			Touchdown Total	1.8-5.0 L/ha	12 hours	7	
	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-emergence *Stale Seedbed Technique*	10	glufosinate ammonium	**Ignite SN**	2.7-5 L/ha	12 hours	-	Apply in a minimum of 110-330 L/ha of water. Apply at a spray pressure of 275-310 kPa using nozzles which will provide small droplets and thorough coverage.
Pre-emergence *Annual Grasses and some broadleaves*	15	propyzamide	**Kerb 50 WSP**	2.2 kg/ha	24 hours	55	Use on mineral soils only. Do not replant a second crop of lettuce in the same season. One application/year. For transplanted lettuce apply Kerb 7-10 days post-transplant.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Postemergence *Inter-row shielded*	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.
Postemergence	1	fluazifop-p-butyl and S-isomer	**Venture L**	2.0 L/ha	12 hours	14	**Head & Leaf Lettuce**. Apply as a post-emergent broadcast application. One application per season.
		sethoxydim	**Poast Ultra** plus **Merge**	0.32-1.1 L/ha 0.5-2 L/ha	12 hours	30	Transplanted lettuce – 1 application per year, between 1- 6 leaf stage. Direct seeded – 2 applications/year. First between 1- 6 leaf stage, 2nd 14 to 21 days after thinning. DO NOT exceed 1.1 L/ha/year.
	15	propyzamide	**Kerb 50 WSP**	2.2 kg/ha	24 hours	55	Transplanted lettuce only. Apply 7-10 days after planting. One application per year.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
INSECTS:							
Aster Leafhopper	1A	carbaryl	**Sevin XLR Plus**	1.25-2.5 L/ha	12 hours	5 (head lettuce) 21 (leaf lettuce)	Use low rate on young plants. Repeat applications at 7–10-day intervals, as necessary. **Do not apply** when foliage is wet or when rain or excessive humidity is expected during the next 2 days.
	1B	malathion	**Malathion 500 EC**	1.5-2.75 L/ha	12 hours	3 (head lettuce) 14 (leaf lettuce)	Weekly or twice weekly during growing season.
	3	cypermethrin	**Mako**	125 ml/ha	12 hours	14	7–14-day spray schedule. Up to 4 applications/season.
			UP-Cyde	200 ml/ha	12 hours	14	
	4A, 28	Thiamethoxam, cyantraniliprole	**Minecto Duo**	750 g/ha	12 hours	-	In-furrow application at the seeding or transplant depth, or a narrow surface band above the seedline during planting. Apply once per season.
	NC	kaolin	**Surround WP**	12.5-25 kg/ha	4 hours	0	**An OMRI Listed product suitable for organic production.** Apply in 500 L of water at 7–14-day intervals once initial infestation is detected. Use high rate for early applications. Do not exceed 25 kg/ha per application.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids	1B	dimethoate	**Lagon 480 EC**	700 ml/ha	3 day	7	**Leaf lettuce only.**
	4	acetamiprid	**Assail 70 WP**	56-86 g/ha	12 hours	7	Max 5 applications per year, alternate with other products.
			Aceta 70 WP				
		imidacloprid	**Admire 240 F**	10.2 ml/ 1000plants	12 hours	21	**Transplant tray plug drench**. Do not follow with soil or foliar treatments
				650 ml/ha	24 hours	21	**Soil application (field drench)** Apply after transplanting in 2000 L water/ha. Max 1 application per year.
				200 ml/ha	24 hours	7	**Foliar** – Do not make foliar application after either a transplant or soil drench of Admire.
		thiamethoxam	**Actara 25 WP**	105 g/ha	12 hours	7	Apply before aphids reach damaging levels. Maximum 2 applications/year. **Actara is highly toxic to bees, do not apply to blooming crops and wait at least 5 days before placing beehives in a treated field.** Allow at least 7 days between applications.
	4C	Sulfoxaflor	**Closer SC**	100-150 ml/ha	12 hours	3	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.
	9B	Pymetrozine	**FulFill 50WG** ***FINAL SALE 2022*** ***FINAL USE 2023***	193 g/ha	12 hours	14	Apply when aphids first appear. Do not exceed 2 applications/ season. Allow 7 days between applications. Causes feeding cessation shortly after exposure but aphids may remain on the plant for 2-4 days before they die. The use of a non-ionic surfactant at a rate of 0.25% v/v is recommended to improve performance under drought stress conditions.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids (cont.)	9D	Afidopyropen	**Versys**	0.1 L/ha	12 hours	0	Green peach aphid (*Myzus persicae*), potato aphid (*Macrosiphum euphoribae*) & lettuce aphid (*Nasonovia ribis-nigri*). Minimum 7-day interval between applications. Monitor pest population and reapply if necessary once thresholds are reached. Max 4 applications per year.
	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.
		Tetraniliprole	**Vayego 200 SC**	150 mL/ha	12 hours	1	**Suppression only**. Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum 5 days between applications.
	29	Flonicamid	**Beleaf 50SG**	0.12-0.16 kg/ha Greenhouse: 0.14 – 0.20 g/L	12 hours	0 days	Thorough spray coverage of plant foliage is essential. Minimum of 94 L of water/ha. Max 3 applications /season; allow 7 days between applications. **Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier; do not use adjuvants.** **Greenhouse lettuce:** Foliar application. Apply sufficient volume to ensure good coverage, up to 1000 L/ha. No more than 1 application/ crop cycle.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids and Whiteflies	4D	Flupyradifurone	**BYI 02960 200SL**	**Aphids:** 500 – 750 mL/ha **Whiteflies:** 750 – 1000 mL/ha	12 hours	1	Apply as a directed foliar spray ensuring thorough coverage. Minimum of 7 days between applications. Maximum 2000 mL/ha applied per crop season.
	9D	Afidopyropen	**Versys**	0.35-0.5 L/ha	12 hours	0	Sweet potato whitefly (*Bemisia tabaci*) & silverleaf whitefly (*Bemisia argentifolii*). Allow a minimum of 7 days between applications. Monitor pest population and reapply if necessary once thresholds are reached. Max 4 applications per year.
	23	spirotetramat	**Movento 240 SC**	220-365 ml/ha	12 hours	3	Minimum 7-day interval between applications. Maximum of 730 ml/ha of product applied/season. Movento is **TOXIC to bees** through direct contamination of pollen and nectar. **DO NOT apply** during crop flowering period or when flowering weeds are present in the field.
			Movento 150 OD	347-585 ml/ha	12 hours	3	Minimum 7-day interval between applications. Maximum 1.17 L/ha of product applied/season. Movento is **TOXIC to bees** through direct contamination of pollen and nectar. **DO NOT apply** during crop flowering period or when flowering weeds are present in the field.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids and Whiteflies (cont.)	28	Cyantraniliprole	**Exirel**	750 – 1000 mL/ha	12 hours	1	**Greenhouse Only. Whiteflies Only.** Begin applications when treatment thresholds have been reached. Thorough coverage is required to obtain optimum control. Do not make more than 3 applications per crop cycle. Do not apply more than once every 5 days. **For use only on lettuce being grown to harvest in commercial greenhouse crop production facilities. Do not treat plants grown for transplanting.**
	-	*Beauveria bassiana* strain ANT-03	**Bioceres EC**	2 – 4 mL/L of water	4 hours	0	**Greenhouse only**. Depending on crop 500 – 1000 L of spray volume may be required per hectare. Reapply within a 7-day interval. In case of pest outbreak, the product can be used every 3-5 days. Multiple applications may be required to reduce numbers of target pests. There is no limit on number of applications. See label for mixing instructions.
Cabbage Looper	3	cyhalothrin-lambda	**Matador 120 EC**	83 ml/ha	24 hours	3	**Head lettuce only.** Maximum 3 applications/year.
			Labamba				
	4, 28	Thiamethoxam, cyantraniliprole	**Minecto Duo**	750 g/ha	12 hours	-	Early season control of cabbage looper. In-furrow application at the seeding or transplant depth, or a narrow surface band above the seedline during planting.
	5	spinetoram	**Delegate WG**	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. Max. 3 applications/year with a minimum of 5 days between treatments.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Cabbage Looper (cont.)	5	spinosad	**Success**	182 ml/ha	When dry, 12 hours (greenhouse lettuce)	1	Max 3 applications/yr. Allow 7-10 days between applications
			Entrust 80	109 g/ha	When dry, 12 hours (greenhouse lettuce)	1	
			Entrust	364 ml/ha			
	6, 28	Abamectin cyantraniliprole	**Minecto Pro**	370-566 mL/ha	12 hours	7	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Apply with a non-ionic surfactant.
	11	*Bacillus thuringiensis*	**Dipel 2X DF**	275-550 g/ha	4 hours	0	Apply when larvae are small and in the early instar stages. Not effective as larvae become larger.
			Thuricide HPC	2.0-4.25 L/ha	-	0	
		Bacillus thuringiensis, subsp. *aizawai,*	**XenTari WG**	500-1000 g/ha	4 hours	0	Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L per hectare.
	18	Methoxyfenozide	**Intrepid**	0.3 – 0.6 L/ha	12 hours	1	Apply at the first sign of feeding damage or when infestations reach threshold levels as determined by monitoring. Repeat applications after 7-14 days if required based on monitoring. Use higher rate for heavy infestations, advanced growth stages of the target pest or larger crop canopies.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Cabbage Looper (cont.)	28	chlorantraniliprole	**Coragen**	250 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Maximum 4 applications/season. Do not apply more than once every 3 days. Do not exceed 1 L/ha /season. Apply in a finished spray volume of 100L/ha.
		Tetraniliprole	**Vayego 200 SC**	225 mL/ha	12 hours	1	**Suppression only**. Begin applications when treatment thresholds have been reached. Apply as a directed foliar spray ensuring thorough coverage. Maximum 4 applications per season. Minimum 5 days between applications.
		Cyantraniliprole	**Exirel**	250-500 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not make more than 4 applications per season.
Cutworm	3	cyhalothrin-lambda	**Matador 120 EC** **Labamba**	83 ml/ha	24 hours	3	**Head lettuce only.** Max 3 applications/year
		cypermethrin	**Ripcord 400 EC**	175 ml/ha	12 hours	21	Do not disturb soil for 5 days after treating.
		permethrin	**Pounce 384EC**	180-390 ml/ha	When dry	1	Do not disturb soil for 5 days after treating.
	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 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. Maximum 4 applications/yr.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Cutworm (cont.)	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 5 days between applications.
Tarnished Plant Bug	1A	carbaryl	**Sevin XLR Plus**	2.5-5.25 L/ha	12 hours (low contact activities) 5 days (high contact activities)	5 (head lettuce) 21 (leaf lettuce)	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.
	3	Lambda cyhalothrin	**Matador 120 EC** **Labamba**	83 ml/ha	24 hours	3	**For Head and Leaf Lettuce**. Use 500 L/ha of spray volume for thorough coverage. Maximum 3 applications per year, with a 7-day interval between treatments.
	4	thiamethoxam	**Actara 25 WP**	210 g/ha	12 hours	7	Apply before aphids reach damaging levels. Maximum one application/year. **This product is highly toxic to bees, do not apply to blooming crops and wait at least 5 days before placing beehives in a treated field.**
	29	Flonicamid	**Beleaf 50SG**	0.2 – 0.3 Kg/ha	12 hours	0	**Suppression only**. Apply when tarnished plant bugs first appear in the field and before populations reach high levels. Allow a minimum of 7 days between applications. Do not apply more than 3 applications per year. Do not apply more than 0.6 kg/ha per season.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Tarnished Plant Bug (cont.)	-	Beauveria bassiana strain ANT-03	**BioTitan WP** ***NEW 2022***	4 – 8 g/L water 500 – 1000 L spray volume/ha	4 hours	0	Begin at first appearance of pest. **Do not mix with fungicide.** If a fungicide must be used, make the application of the fungicide at least 4 days before the BioTitan WP application or at least 2 days after the BioTitan WP application. Reapply if necessary within a 7 day interval. There is no limit to the number of applications
Onion thrips	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.
	23	Spirotetramat	**Movento 240 SC**	365 ml/ha	12 hours	3 days	Minimum 7-day interval between applications. 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.
Armyworm, Beet Armyworm, Fall Armyworm	11	*Bacillus thuringiensis*, subsp. *aizawai,*	**XenTari WG**	500-1000 g/ha	4 hours	0	**Beet Armyworm.** Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L per ha.
	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. Make no more than 4 applications per season.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Armyworm, Beet Armyworm, Fall Armyworm (cont.)	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 5 days between applications.
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. Do not make more than 4 applications per season.
Leafminers (larvae)	4	Acetamiprid	**Assail 70 WP** **Aceta 70 WP**	86 g/ha	12 hours	7	**Pea leafminer (***Liriomyza huidobrensis Blanchard***).** 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.
	4, 28	Thiamethoxam, cyantraniliprole	**Minecto Duo**	750 g/ha	12 hours	-	In-furrow application at the seeding or transplant depth, or a narrow surface band above the seedline during planting. One application per season.
	17	Cyromazine	**Citation 75WP**	188 g/ha	12 hours	7	Apply when pea leafminer larvae first appear. Reapply based on monitoring. Do not make more than 5 applications per growing season. Allow 7 days between applications.
	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. Do not make more than 4 applications per season.

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Flea Beetles	28	Cyantraniliprole	**Exirel**	500-1000 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Re-application interval: 5 days. Max 4 applications/season.
		Cyantraniliprole	**Cyclaniliprole 50SL**	1.2 L/ha	12 hours	1	Redheaded flea beetle. Spray volumes of 200-1000 litres of water per hectare are recommended for ground application. Avoid applying Cyclaniliprole 50SL or any other Group 28 insecticide consecutively more than 2 times within a 30-day period. Make no more than 3 applications per crop per year. Minimal interval between treatments is 7 days.
		Cyantraniliprole	**Harvanta 50SL**	1.2 L/ha	12 hours	1	Redheaded flea beetle. Spray volumes of 200-1000 litres of water per hectare are recommended for ground application. Avoid applying Cyclaniliprole 50SL or any other Group 28 insecticide consecutively more than 2 times within a 30-day period. Make no more than 3 applications per crop per year. Minimal interval between treatments is 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 5 days between applications.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
DISEASES:							
Aster Yellows		-	**-**	-	-	-	Control Aster leafhoppers
Damping Off	4	metalaxyl	**Ridomil Gold 1G**	25 kg/ha	12 hours	-	Apply with seed in furrow. Do not use on transplants
		metalaxyl-M and s-isomer	**Apron XL LS**	20–40 ml / 100kg of seed	-	-	One application as a seed treatment. Do not apply to leafy greens that are destined to be grown in the greenhouse.
	M	thiram	**Thiram 75 WP** ***FINAL SALE 2021*** ***FINAL USE 2024***	90 g/25kg seed	24 hours	-	Apply as a slurry treatment to seed.
	BM02	*Bacillus subtilis*	**Serenade Soil**	2.7-14 L/ha	4 hours	0	**Suppression only.** May be applied at planting and/or post-planting. See label for application instructions. For broadcast or banded applications, incorporate into the seed zone with rainfall or overhead irrigation within 24 hr.
		Trichoderma harzianum Rifai strain T22	**Trianum 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.	-	-	**Biological fungicide. Suppression only.** Post-emergence damping off (*Rhizoctonia solani).* Starting drench application immediately after sowing seeds or transplanting, repeat every 10 weeks.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Damping Off (cont.)	BM02	*Trichoderma asperellum* strain T34	**Asperello T34**	**Incorporation in the growing media:** 10 g/m3 of growing media **Spray/drench:** 0.5 g/m2 in sufficient water (5 L/ m2) **Chemigation after planting:** 5 – 10 g/(50 – 100 L of water per m3 of growing media)	4 hours	0	**Greenhouse Vegetable Transplants. Partial suppression of Fusarium wilt.** See label for instructions specific to each application method.
	NC	*Trichoderma harzianum Rifai* strain KRL-AG2 and *Trichoderma virens* strain G-41	**RootShield Plus WP**	30-60 g in 100L water/10 m^2 soil	4 hours	-	**Suppression only.** Drench application to potting mix, soil, or planting beds.
Botrytis (Grey mold)	2	iprodione	**Rovral WP**	1.0 kg ai/ha in 2000L water/ha	12 hours	14	**Greenhouse lettuce only**. Max 1 application/year at three-leaf stage.
	7	boscalid	**Cantus WDG**	0.285 kg/ha	12 hours	14	Maximum 2 applications/year.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Botrytis (Grey mold) (cont.)	7	penthiopyrad	**Fontelis**	1.25-1.75 L/ha	12 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. **Can also be used on greenhouse lettuce.**
	BM02	*Bacillus subtilis*	**Serenade Opti**	0.6-1.7 Kg/ha	4 hours	0	**Biopesticides that will only suppress the indicated diseases.** Begin applications soon after emergence or transplant and continue as necessary on a 7–10-day interval. When conditions are conducive to rapid disease development, use in a rotational program with other registered fungicides. Thorough coverage is essential.
		Bacillus amyloliquefaciens strain MBI 600	**Serifel**	0.25 – 1.0 Kg/ha	4 hours	0	**Suppression only.** Begin applications prior to infection and continue on 7-10-day intervals if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.
	NC	*Trichoderma harzianum* Rifai strain KRL-AG2	**RootShield HC**	10 g / L of water	0 hours	-	**Suppression only.** Apply 10 grams/L of water to foliage every 7-14 days depending upon disease pressure. Apply sufficient spray volume to adequately cover the leaves. **This product does not work well when soils are below 10°C.**

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Botrytis (Grey mold) (cont.)	-	Tea Tree Oil	**Timorex Gold**	1.5 – 2.0 L/ha	4 hours	2	**Greenhouse Only**. Make applications preventatively or in the early stages of disease infestation for best results. Use enough spray solution to completely penetrate the leaf canopy and cover both the top and underside of all leaves until runoff. Reapply at 7–14-day intervals.
Downy Mildew	4M	Metalaxyl-M/mancozeb	**Ridomil Gold MZ 68 WP**	2.5 kg/ha	24 hours	14	For head lettuce only. Apply every 14 days beginning at thinning. Maximum 3 applications per year.
	19	Polyoxin D zinc salt	**Diplomat 5SC**	463 – 926 ml/ha	When dry	0	Apply as a foliar spray in sufficient water to provide thorough coverage of foliage. Begin as a preventative application when conditions favour disease development and continue on a 7–14-day interval as needed to maintain suppression. Do not apply more than 150 g a.i./ha/season or 12 months.
	21	Cyazofamid	**Torrent 400 SC** **+ Sylgard 309**	0.20 L/ha	12 hours	0	**Suppression only.** Make the first application after seeding or once the lettuce transplants are set in the field. Subsequent applications should be initiated when weather conditions are favourable for downy mildew development or when disease first appears in the field. All subsequent applications on a 7–14-day schedule, using the shorter interval when disease pressure is moderate to severe. Max 6 applications/ season. **A plant back interval of 30 days is required.**

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Downy Mildew (cont.)	40	Dimethomorph	**Acrobat 50 WP**	450 g/ha	2 days (hand harvesting) 12 hours (no entry)	0	**Suppression only. 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 5–10-day schedule as needed until weather conditions favouring infection and sporulation decrease. DO NOT use less than 200 L of water/ha for ground applications. Max 5 applications/year.
		mandipropamid	**Revus** plus **Non-ionic adjuvant**	400-600 ml/ha plus 0.125% v/v	12 hours	1	**For control of Downy Mildew and Blue Mold.** Applications should begin prior to disease development and continue throughout the season on a 7–10-day schedule of fungicides, following resistance management guidelines. Maximum 4 applications per year.
	40, 45	Ametoctradin, dimethomorph	**Zampro**	1.0 L/ha	Hand harvesting – 1 day All other activities – 12 hours	0	To reduce the risk of development of fungicide resistance use in rotation with other fungicides having a different mode of action active against downy mildew. Begin applications prior to disease development and continue on a 5-7-day interval. Max 3 applications.

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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	2	**Apply in 200-1000 L/ha.** For resistance management, Presidio must be tank-mixed with a labelled rate of another fungicide registered for the target pathogen with a different mode of action. Apply in a tank mix with Aliette. 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 the higher rate and shorter interval if disease is present.
	49, 40	Oxathiapiprolin & Mandipropamid	**Orondis Ultra**	0.6 L/ha	12 hours	1	Begin applications prior to disease development and continue on a 7-10-day interval. Use shorter interval when disease pressure is high. Do not make more than 2 consecutive sprays before switching to a non-group 49 and 40 fungicide.
	U15	Oxathiapiprolin	**Zorvec Enicade**	0.175-0.35 L/ha	12 hours	0	Begin applications prior to disease development and continue on a 5–14-day interval. Use higher rate and shorter interval when disease pressure is high.
	P07	fosetyl-al	**Aliette WDG**	2.8 kg/ha	24 hours	7	Max 5 applications/year.
		Mono and dibasic sodium and potassium and ammonium phosphites	**Phostrol**	2.9-5.8 L/ha	12 hours	1	For preventative control of **downy mildew**, begin foliar applications when conditions favouring disease development exist and continue on a 7–21-day interval, if needed. Max 7 applications per year.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Downy Mildew (cont.)	BM02	*Bacillus amyloliquefaciens* strain MBI 600	**Serifel**	0.25 – 1.0 Kg/ha	4 hours	0	Partial suppression. Begin applications prior to infection and continue on 7-10-day intervals if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.
		Bacillus subtilis	**Serenade Opti**	1.7-3.3 Kg/ha	4 hours	0	**Biopesticide that will only suppress the indicated diseases.** Begin applications at the first sign of disease, or when conditions become conducive for disease development. Repeat as necessary on a 7–10-day interval.
		Bacillus amyloliquefaciens strain D747	**Double Nickel LC (1x10^{10}spores/mL)**	5-12.5 L/ha	When dry	0	Begin applications preventatively when conditions are favorable for onset of disease. Repeat application every 7-10 days while conditions favor disease development.
			Double Nickel 55 (5x10^{10}spores/g)	1-2.5 kg/ha			
***Sclerotinia* (Head and Leaf Drop)**	7	boscalid	**Cantus WDG**	0.385 kg/ha	12 hours	14	Max 2 applications/year.
		Isofetamid	**Kenja 400SC**	0.90 L/ha	12 hours	14	On direct seeded lettuce make the first application after emergence, thinning or prior to onset of disease development. On transplanted lettuce make the first application immediately after transplanting or prior to the onset of disease development. Make a second application 14 days later if conditions continue to favor disease development. Do not make more than 2 applications per year.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
***Sclerotinia* (Head and Leaf Drop)** (cont.)	7	penthiopyrad	**Fontelis**	1.25-1.75 L/ha	12 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.
	7, 11	Fluopyram, trifloxystrobin	**Luna Sensation**	400-600 mL/ha	12 hours	0	Begin fungicide applications preventatively. Continue as needed, on a 9 -14-day interval. When disease pressure is severe use the higher rate
		Pyraclostrobin & Fluxapyroxad	**Merivon**	0.3 – 0.4 L/ha	12 hours, 9 days (Hand harvesting), 1 days (Mechanical harvesting, scouting, hand-set irrigation)	1	**Suppression only.** Begin applications prior to onset of disease development. Use the shorter interval and/or the higher rate when disease pressure is high. Apply subsequent applications on a 7–14-day interval if disease persists or weather conditions are favourable for disease development. Maximum 3 applications per year.
	7, 12	Pydiflumetofen, fludioxinil	**Miravis Prime**	800-1000 mL/ha	12 hours	3	Apply immediately after emergence or prior to disease development. In transplanted leafy vegetables, apply immediately after transplanting or prior to disease development. A second application should be made if either, 1) the soil is disturbed by cultivation or thinning or, 2) conditions occur that are conducive to disease development. Apply no closer than on a 7-day interval. Use the higher rate under conditions favouring high disease pressure.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
***Sclerotinia* (Head and Leaf Drop)** (cont.)	BM02	*Bacillus subtilis*	**Serenade Opti**	0.6-1.7 Kg/ha	4 hours	0	**Biopesticide that will only suppress the indicated diseases.** Make the first application at planting (or immediately following planting but prior to crop emergence). Make a 2nd application as a directed spray with multiple nozzles per seed line in sufficient water to ensure thorough coverage of lower plant leaves and surrounding soil surface within 7 days of thinning. Repeat applications on 10–14-day intervals if conditions for disease development persist.
		Bacillus amyloliquefaciens strain D747	**Double Nickel LC (1x10^{10}spores/mL)**	Foliar: 5-12.5 L/ha Low disease pressure: 1-5 L/ha Soil: 1-2.5 L/ha	When dry	0	Growth stage: From planting to formation of the head of lettuce. Repeat application every 3 to 10 days for as long as conditions favor disease development. See **Soil application** on label. Apply at or after planting (but before plant emergence) as a banded seed line treatment, see **Banded/in furrow application** on label. Alternatively, apply to seed bed via overhead sprinkler chemigation with germination water, see **Chemigation Instructions** on label. Make second application at thinning or cultivation in sufficient water and multiple nozzles to ensure thorough coverage of lower leaves and surrounding soil surface. Incorporation with light irrigation after application may improve disease control. Repeat at 10–14-day intervals if conditions promoting disease persist.
			Double Nickel 55 (5x10^{10}spores/g)	Foliar: 1-2.5 kg/ha Low disease pressure: 0.2-1 kg/ha Soil: 0.2-0.5 kg/ha			

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
***Sclerotinia* (Head and Leaf Drop)** (cont.)	BM02	*Bacillus amyloliquefaciens* strain MBI 600	**Serifel**	0.3 – 1.0 Kg/ha	4 hours	0	Partial Suppression. Begin applications prior to infection and continue on 7-10-day intervals if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.
Powdery Mildew	7	Penthiopyrad	**Fontelis**	1.0 – 1.75 L/ha	12 hours	3	Begin applications prior to disease development and continue on a 7-10-day interval. Use the highest rate and the shortest interval when conditions favour high disease pressure. Do not make more than 2 sequential applications before switching to a non-group 28 fungicide.
	7, 11	Pyraclostrobin & Fluxapyroxad	**Merivon**	0.3 – 0.4 L/ha	12 hours, 9 days (Hand harvesting), 1 days (Mechanical harvesting, scouting, hand-set irrigation)	1	Begin applications prior to onset of disease development. Use the shorter interval and/or the higher rate when disease pressure is high. Apply subsequent applications on a 7–14-day interval if disease persists or weather conditions are favourable for disease development. Maximum 3 applications per year.
	BM02	*Bacillus subtilis*	**Serenade Opti**	1.7-3.3 Kg/ha	4 hours	0	**Biopesticides that will only suppress the indicated diseases**. Begin applications at the first sign of disease, or when conditions become conducive for disease development. Repeat as necessary on a 7–10-day interval.

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Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Powdery Mildew (cont.)	-	Potassium bicarbonate	**MilStop**	2.8 – 5.6 Kg/ha	4 hours	0	**Greenhouse Only. Suppression.** Start application at first sign of disease. For best protection, repeat at one- or two-week intervals as indicated until conditions are no longer favorable for disease development. Apply on a 7–14-day interval.
		Potassium bicarbonate	**Sirocco** ***FINAL SALE 2021*** ***FINAL USE 2024***	2.8 – 5.6 Kg/ha	4 hours	0	**Greenhouse Only. Suppression.** Start application at first sign of disease or when conditions are conducive for disease development. Use adequate spray volume to obtain excellent coverage of foliage. Make applications on a 7–14-day interval, with a maximum of 10 applications per season.

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

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