

2023



EXTENSION AND ADVISORY TEAM

SPRAY GUIDE FOR FIELD LETTUCE

Nova Scotia Vegetable Crop Spray Guide 2023
[LET1-23]



SPRAY GUIDE FOR LETTUCE PRODUCTION

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[LET1-23]

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LIABILITY STATEMENT

Recommendations in this guide are given for general information only and do not give the user the right to use a product in a manner not in accordance with the pesticide label or Pest Control Products Act. Perennia, by funding and printing this publication, and the editors/authors, do not offer any warranty or guarantee and do not assume any liability for crop loss, animal loss, health, safety, or environmental hazard caused by the use of any pesticide, advice, or recommendation in this schedule. Pesticides used in this schedule are products labeled for the target and crop. This information was retrieved from the Pest Management Regulatory online of Registered Products Database. The list of products presented in this schedule is intended to be complete, based on products known to be available in the region, but in no way is guaranteed to be complete. Some of the products listed may not be available. Trade names are given as a convenience to producers and are neither an endorsement of the product nor a suggestion that similar products are not available or effective.

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PESTICIDE EMERGENCY CONTACT INFORMATION

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

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

ABBREVIATIONS & CONVERSIONS

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

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

¹ Pesticide Units of Measurement

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

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
WEEDS:							
Preplant <i>Perennial weeds including quackgrass</i>	9	glyphosate	Roundup 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 it to actively growing quackgrass when at least 4 new leaves are present. The low rate (1.67 L/ha) will provide a minimum of one season control, while higher rates (1.67-4.67 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used, add a suitable surfactant. Allow 3 or more days after treatment before tillage. Best control of quackgrass is obtained when these herbicides are applied in the fall.
			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 <i>Stale Seedbed Technique</i>	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.
Postemergence <i>Inter-row shielded</i>	14	carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	12 hours	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Postemergence	1	fluazifop-p-butyl and S-isomer	Venture L	2.0 L/ha	12 hours	14	Field use only. 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 (head) 15 (leaf and romaine)	<u>Transplanted lettuce</u> – 1 application/year, between 1- 6 leaf stage. <u>Direct seeded</u> – 2 applications/year. First between 1- 6 leaf stage, 2 nd 14 to 21 days after thinning. DO NOT exceed 1.1 L/ha/year.
	-	Acetic Acid	Serene NEW 2023	179-219.5 L/ha	When residue is dry	-	Greenhouse or field use. Apply as a uniform band or spot application directed at weeds on the ground between the crops. Use hooded or shielded application equipment. Do not spray the crop directly. Do not apply it when plants are under stress. Retreatment is required for regrowth of weeds.

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	<u>Low contact activity:</u> 12 hours <u>High contact activity:</u> 5 days	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. Max 2 applications per year, 7 days between sprays.
	1B	malathion	Malathion 500 EC	1.4-3 L/ha	1	14	Leaf or head lettuce. Max 1 application per year.
	3	cypermethrin	Mako	125 ml/ha	12 hours	14	Not for use in greenhouses. 7–14-day spray schedule, up to a maximum of 4 applications/season. Recommended 100-500L/ha spray volume.
			UP-Cyde	200 ml/ha	12 hours	14	
	NC	kaolin	Surround WP	12.5-25 kg/ha	4 hours	0	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.
Aphids	1B	dimethoate	Lagon 480 EC	700 ml/ha	3 days	14	Leaf lettuce only. Toxic to bees. Maximum 2 applications/year
	4	acetamiprid	Assail 70 WP	56-86 g/ha	12 hours	7	Max 5 applications per year, alternate with other products.
			Aceta 70 WP				
			Admire 240 F	200 ml/ha	24 hours	7	Foliar – Maximum 1 application per season
		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, wait at least 5 days before placing beehives in a treated field. Allow at least 7 days between applications.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids (cont.)	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 the treatment area. Minimum treatment interval = 7 days.
	9B	Pymetrozine	FulFill 50WG 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. 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 in drought stress conditions.
	9D	Afidopyropen	Versys	0.1 L/ha	12 hours	0	Field use only. Green peach, potato, & lettuce aphid. Minimum 7-day interval between applications. Apply in a minimum spray volume of 100L/ha. 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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids (cont.)	29	Flonicamid	Beleaf 50SG	Field: 0.12-0.16 kg/ha Greenhouse: 0.14 – 0.20 g/L	12 hours	0 days	Field and greenhouse use. Thorough spray coverage of plant foliage is essential. Minimum of 94 L of water/ha. Max 3 applications /season; allow 7 days between applications. 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.
	-	Mineral oil	Purespray Green NEW 2023	1% solution	12 hours	1	Deters feeding. Use sufficient spray volume (up to 1000L/ha) to ensure thorough crop coverage. Begin when aphids appear. Apply at 7–14-day intervals. Maximum 8 applications per year.
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	Field use only. Sweet potato and silverleaf whitefly. Allow a minimum of 7 days between applications. Apply in minimum spray volume of 100L/ha. 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. 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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Aphids and Whiteflies (cont.)	23	spirotetramat	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. 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	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.
	-	<i>Beauveria bassiana</i> strain ANT-03	Bioceres EC	2 – 4 mL/L	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 target pests. No limit on the number of applications.
		Mineral Oil	SuffOil-X® NEW 2023	<u>Aphids:</u> 10-20 L product/ 1000L <u>Whitefly:</u> 20L product/1000L	12 hours	0	Greenhouse use. Control of whiteflies and deters feeding of aphids. Begin applications when pests appear. Apply at 7–14-day intervals. Do not apply more than 8 applications

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Whitefly	-	Beauveria bassiana strain R444...	Bassidor NEW 2023	0.5-1.0g/L of water	4 hours	0	Control. Greenhouse only. apply as a full cover spray without excess runoff every 3-7 days depending on the crop and the severity of the pest pressure.
Cabbage Looper	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.
		spinosad	Success	182 ml/ha	Field: When dry Greenhouse: 12 hours	1	Max 3 applications/yr. Allow 7-10 days between applications
			Entrust 80	109 g/ha	Field: When dry Greenhouse: 12 hours	1	
			Entrust	364 ml/ha	Field: When dry Greenhouse: 12 hours	1	
	11	<i>Bacillus thuringiensis</i>	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	
		<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> ,	XenTari WG	500-1000 g/ha	4 hours	0	Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L/hectare for thorough coverage.
	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. 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.

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 for optimum control. Do not make more than 4 applications per season. 7-day re-application interval.
Cutworms		cypermethrin	Ripcord 400 EC	175 ml/ha	12 hours	21	Not for greenhouse use. Do not disturb soil for 5 days after treatment. Spray under warm moist conditions. Apply when cutworms/signs of feeding appear.
		permethrin	Pounce 384EC	180-390 ml/ha	When dry	1	Do not disturb soil for 5 days after treatment. Use lower rates with good coverage for seedlings/transplants. When cutworms are large (2.5-4cm), use higher rate.
	28	Cyantraniliprole	Exirel	500-750 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important for 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.

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		Cypermethrin	Up-Cyde®2.5 EC	200 ml/ha	12 hours	14	Apply in 100 to 500 L/ha of water when damage or insects are first observed. Apply up to 4 applications at 7- to 14-day interval.
	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, 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.
	-	Beauveria bassiana strain ANT-03	BioTitan WP	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 application or at least 2 days after 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	Suppression. Max 3 applications/year. Recommended water volume for coverage is 300-500L/ha. Apply when onion thrips first appear targeting egg hatch and small nymphs. Repeat in 7-10 days if needed.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Onion thrips (cont.)	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. Should be used during the first half of the season when adult populations are low/building. Reductions in numbers of thrips larvae may take 3 to 4 days after application.
Armyworm, Beet Armyworm, Fall Armyworm	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> ,	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. Re-application interval 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.
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, with a 7-day re-application interval.
Leafminers (larvae)	4	Acetamiprid	Assail 70 WP Aceta 70 WP	86 g/ha	12 hours	7	Pea leafminer (<i>Liriomyza huidobrensis</i> 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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Leafminers (larvae) <i>(cont.)</i>	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. 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.
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.
			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 this or any other Group 28 insecticide consecutively more than 2 times within a 30-day period. Max 3 applications per crop per year. Minimal interval between treatments is 7 days.
			Harvanta 50SL	1.2 L/ha	12 hours	1	
		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.

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 at time of planting. For direct seeded head lettuce, calibrate to deliver 115g/100m row. Do not use it on transplants. Maximum 1 application per year.
		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 USE 2024	90 g/25kg seed	24 hours	-	Apply as a slurry treatment to seed. Apply listed rate in 225mL of water.
	BM02	<i>Bacillus subtilis</i>	Serenade Soil	2.7-14 L/ha	4 hours	0	Suppression only. May be applied at planting and/or post-planting. See the label for application instructions. For broadcast or banded applications, incorporate into the seed zone with rainfall or overhead irrigation within 24 hr.
		<i>Trichoderma harzianum</i> Rifai strain T22	Trianium P	After Sowing: 1.5 g/m ² cultivated area in 1.33 L water After transplanting: 6 g/1 L of water and apply 500 L/ha of suspension.	-	-	Biological fungicide. Suppression only. Post-emergence damping off (<i>Rhizoctonia solani</i>). Starting drench application immediately after sowing seeds or transplanting, repeat every 10 weeks.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Damping Off (cont.)	BM02	<i>Trichoderma asperellum</i> strain T34	Asperello T34	Incorporation in the growing media: 10 g/m ³ growing media Spray/drench: 0.5 g/m ² in sufficient water (5 L/m ²) Chemigation after planting: 5 – 10 g/ (50 – 100 L/m ³ growing media)	4 hours	0	Greenhouse Vegetable Transplants. Partial suppression of Fusarium wilt. See label for instructions specific to each application method.
	NC	<i>Trichoderma harzianum</i> Rifai strain KRL-AG2 and <i>Trichoderma virens</i> 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 Fungicide	2.0 kg/ha	12 hours	14	Greenhouse lettuce only. Max 1 application/year at three-leaf stage. Apply in in 2000L water/ha
	7	boscalid	Cantus WDG	285 g/ha	12 hours	14	Field use only – head and leaf lettuce. Maximum 2 applications/year, with a 10–20-day interval between sprays.

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	Field and greenhouse use. Begin applications prior to disease development, continue a 7–10-day interval. Use higher rate and shorter intervals when disease pressure is high. Max seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
	BM02	<i>Bacillus subtilis</i>	Serenade Opti	0.6-1.7 Kg/ha	4 hours	0	Field use only. Begin applications soon after emergence or transplant and continue as necessary every 7–10-days. When conditions are conducive to rapid disease development, use in a rotational program. Good coverage is essential.
		<i>Bacillus amyloliquefaciens</i> strain MBI 600	Serifel	0.25 – 1.0 Kg/ha	4 hours	0	Suppression only. Begin applications prior to infection and continue 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	<i>Trichoderma harzianum</i> 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.
	-	Tea Tree Oil	Timorex Gold	1.5 – 2.0 L/ha	4 hours	2	Greenhouse use only. Make applications preventatively or in the early stages of disease infestation for the best results. Recommended spray volume is 400-800L/ha to penetrate the canopy until runoff. Reapply at 7–14-day intervals.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Downy Mildew	4M	Metalaxyl-M/mancozeb	Ridomil Gold MZ 68 WP	2.5 kg/ha	24 hours	14	For head lettuce only. Must be applied before disease outbreak. 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	Field and greenhouse use. Apply as a foliar spray in sufficient water to provide thorough coverage. Begin as preventative spray when conditions favour disease development and continue 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	Leaf and head lettuce. Suppression only. Make the first application after seeding or once transplants are set in the field. Subsequent applications initiated when weather conditions are favourable for disease or when disease first appears. 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.
	40	mandipropamid	Revus plus Non-ionic adjuvant	400-600 ml/ha plus 0.25% v/v	12 hours	1	Field and greenhouse use. For control of Downy Mildew and Blue Mold. Applications should begin prior to disease development and continue through the season on a 7–10-day schedule of fungicides, following resistance management guidelines. Maximum 4 applications per year.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Downy Mildew (cont.)	40, 45	Ametoctradin, dimethomorph	Zampro	0.8-1 L/ha	12 hours	0	Greenhouse use (do not use on greenhouse-grown transplants). Use in rotation with other fungicides having a different mode of action active against downy mildew. Begin applications prior to disease development and continue a 5-7-day interval. Max 3 applications.
	43	fluopicolide	Presidio	292 ml/ha	12 hours	2	Apply using spray volume of 200-1000 L/ha. Must be tank-mixed with a labelled rate of another fungicide 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. Use lower rate and longer interval as. Use the higher rate and shorter interval if disease is present.
	49, 40	Oxathiapiprolin & Mandipropamid	Orondis Ultra	175-350 mL/ha	12 hours	1	Begin applications prior to disease development and continue a 5-14-day interval. Use shorter intervals when disease pressure is high. Do not make more than 2 consecutive sprays before switching to a non-group 49 and 40 fungicides. Max seasonal use is 1.4L/ha.
	U15	Oxathiapiprolin	Zorvec Enicade	175-350 mL/ha	12 hours	0	Begin applications prior to disease development and continue a 5–14-day interval. Use higher rate and shorter intervals when disease pressure is high. Max seasonal use is 1.4L/ha.
	P07	fosetyl-al	Aliette WDG	2.8 kg/ha	12 hours	7	Field use. Max 5 applications/year. Apply in a minimum of 150L water/ha.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Downy Mildew (cont.)	P07	Mono and dibasic sodium and potassium and ammonium phosphites	Phostrol	2.9-5.8 L/ha	12 hours	1	Preventative control. Begin foliar applications when conditions favouring disease development exist and continue a 7–21-day interval, if needed. Max 7 applications per year.
	BM02	<i>Bacillus amyloliquefaciens</i> strain MBI 600	Serifel	0.25 – 1.0 Kg/ha	4 hours	0	Partial suppression. Begin applications prior to infection and continue 7-10-day intervals if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.
		<i>Bacillus subtilis</i>	Serenade Opti	1.7-3.3 Kg/ha	4 hours	0	Field use only. 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.
		<i>Bacillus amyloliquefaciens</i> strain D747	Double Nickel LC	5-12.5 L/ha	When dry	0	Greenhouse and field use. Begin applications preventatively when conditions are favorable for disease. Repeat application every 7-10 days while conditions favor disease development.
			Double Nickel 55	1-2.5 kg/ha			
Sclerotinia (Head and Leaf Drop)	7	boscalid	Cantus WDG	0.385 kg/ha	12 hours	14	Field use. Max 2 applications/year, maintaining 10-20 days between sprays.
		Isofetamid	Kenja 400SC	0.90 L/ha	12 hours	14	Field use. 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.

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	Field and greenhouse use. Begin applications prior to disease development; continue a 7–10-day interval. Use higher rate and shorter intervals when disease pressure is high. Max seasonal rate is 5.25 L/ha. Do not make more than 2 sequential applications.
	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. Do not apply more than 1.12L/ha/season.
		Pyraclostrobin & Fluxapyroxad	Merivon	0.3 – 0.4 L/ha	12 hours <u>Hand harvesting:</u> 9 days <u>Mechanical harvesting,</u> <u>scouting,</u> <u>hand-set irrigation</u> 1 days	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. Maximum 3 applications per year.
	7, 12	Pydiflumetofen, fludioxinil	Miravis Prime	800-1000 mL/ha	12 hours	3	In transplanted leafy vegetables, apply immediately after transplanting/ prior to disease. A second application should be made if 1) the soil is disturbed by cultivation/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.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Sclerotinia (Head and Leaf Drop) (cont.)	11	Mandestrobin	Intuity® NEW 2023	439-877 mL/ha	12 hours	<u>Head lettuce:</u> 18 days <u>Leaf lettuce:</u> 9 days	Field use only. Do not apply more than two applications per year. Do not apply more than 1754 mL/ha per year. Make the first application at emergence and the second one 10 days after thinning.
	BM02	<i>Bacillus subtilis</i>	Serenade Opti	0.6-1.7 Kg/ha	4 hours	0	Field use only. Make the first application at planting (or immediately following planting, prior to emergence). Make a 2 nd application as a directed spray with multiple nozzles per seed line in sufficient water to ensure 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.
		<i>Bacillus amyloliquefaciens</i> strain D747	Double Nickel LC	<u>Foliar:</u> 5-12.5 L/ha <u>Low disease pressure:</u> 1-5 L/ha <u>Soil:</u> 1-2.5 L/ha	When dry	0	Field and greenhouse use. Can be applied from planting to formation of the head of lettuce. Repeat application every 3- 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. Incorporation with light irrigation after application may improve disease control. Repeat at 10–14-day intervals if conditions promoting disease persist.
			Double Nickel 55	<u>Foliar:</u> 1-2.5 kg/ha <u>Low disease pressure:</u> 0.2-1 kg/ha <u>Soil:</u> 0.2-0.5 kg/ha			

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-harvest Interval (days)	Remarks
Sclerotinia (Head and Leaf Drop) (cont.)	BM02	<i>Bacillus amyloliquefaciens</i> strain MBI 600	Serifel	0.3 – 1.0 Kg/ha	4 hours	0	Partial Suppression. Begin applications prior to infection and continue a 7-10-day interval if conditions are favourable for disease development. Use the highest rate and the shortest interval when conditions favour high disease pressure.
		<i>Trichoderma asperellum</i> strain ICC 012 <i>Trichoderma gamsii</i> strain ICC 080	Foretryx™ NEW 2023	2.8-3.4 Kg product/ha	4 hours	0	Partial Suppression. Diluted broadcast spray application to the soil surface in a minimum of 100 L water per ha.
Powdery Mildew	7	Penthiopyrad	Fontelis	1.0 – 1.75 L/ha	12 hours	3	Field and greenhouse use. Begin applications prior to disease development and continue 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 <u>Hand harvesting:</u> 9 days <u>Mechanical harvesting, scouting, hand-set irrigation:</u> 1 days	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	<i>Bacillus subtilis</i>	Serenade Opti	1.7-3.3 Kg/ha	4 hours	0	Field use only. 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.

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, using a minimum of 1000L/ha spray volume.
		Potassium bicarbonate	Sirocco <i>FINAL USE 2024</i>	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. Use adequate spray volume to obtain good coverage of foliage (minimum 1000L/ha) Make applications on a 7–14-day interval, maximum of 10 applications per season.
		Garlic Powder	Influence LC <i>NEW 2023</i>	1.8%	When dry	0	Greenhouse Only. Suppression. Repeat applications at 7–10-day intervals to maintain disease reduction. Do not exceed 18 L/ha.

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>