

2023



EXTENSION AND ADVISORY TEAM

SPRAY GUIDE FOR ONION (DRY BULB AND GREEN)

Nova Scotia Vegetable Crop Spray Guide 2023
[ON1-23]



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LIABILITY STATEMENT

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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.
	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	-	For best results, apply to emerged, young actively growing weeds. Weeds that emerge after application will not be controlled.
	22	Diquat	Reglone, Dessicash	2.3-4.6 L/ha	24 hours	-	Apply in 300 – 1100L of water/ha to foliage of emerged weeds but before the crop has emerged.
Pre-emergence Germinating annuals	3	Chlorthal dimethyl	Dacthal W-75	9-18 kg/ha	12 hours	-	Apply uniformly over the soil. Dacthal can be sprayed directly over transplants. A layby application can be made on onions up to 14 weeks after planting or transplanting. Max 18 kg/ha/year.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Pre-emergence Germinating annuals (cont.)	14	flumioxazin	Chateau WDG	140g/ha	12 hours	45	Dry Bulb only. Do not apply on sands with greater than 90% sand plus gravel. Do not apply on fine textured soils. Do not apply in a tank-mix or with an adjuvant. Apply to transplanted onions between the 2 and 6 leaf stage. On direct seeded onions apply between the 3 and 6 leaf stage prior to emergence of weeds.
			Chateau EZ	149 mL/ha			
	15	Dimethenamid-P	Frontier Max	0.963-1.29 L/ha	24 hours	30	For green onion grown on mineral and muck soils and transplanted leeks. Apply a single application at the loop stage before weed emergence. Use low rate on mineral soils and high rate on muck soils. Avoid applying under cool conditions as stunting may result.
Postemergence <i>Inter-row shielded</i>	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	12 hours	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume.
	22	Diquat	Reglone, Dessicash	2.3-4.6 L/ha	24 hours	-	Do not spray solution on the crop plant since it could be injured or killed.
Postemergence Emerged broadleaf	4	Clopyralid	Lontrel 360	0.42 – 0.56 L/ha	12 hours	45	Apply a single application applied at the 4 to 8 leaf stage of the crop. To limit any crop injury, especially on mineral soils, apply after at least 2 days of sunny weather and do not apply if rainfall is expected within 24 hours.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Postemergence Emerged broadleaf <i>(cont.)</i>	6	Bromoxynil	Pardner	0.5 L/ha	24 hours	75	Dry bulb onions only. Apply in 200 L water/ha at a pressure of 170 kPa. Make two applications at intervals of 10-18 days apart. The first application should be made when onions are at the 2-3 leaf stage; make the second application when onions are the 4-5 leaf stage. Severe leaf burns may occur if the weather has not been conducive to the development of the outer waxy layer of the onion leaf. Redroot pigweed and common groundsel.
	14	Oxyfluorfen	Goal 2XL	0.25-0.5 L/ha	48 hours	56	Apply in 500 L/ha of water when onions have 2 fully developed leaves. Use only on dry bulb onions and do not apply when crop is under stress. Do not apply in excess of 2.0 L/ha per year.
Postemergence Emerged grasses	1	Clethodim	Select	0.38 L/ha	12 hours	45	Apply when crop is at the 1-4 leaf stage and weeds are at the 2-6 leaf stage.
		Fenoxaprop-P-ethyl	Excel Super EC	670 ml/ha	12 hours	38	Dry bulb onions only. Apply to actively growing annual grasses at the 1-6 leaf stage.
		Fluazifop-p-butyl and S-isomer	Venture L	1.0-2.0 L/ha	12 hours	Dry bulb: 42 (annual grasses) 60 (annual grasses & quackgrass) Green onion: 14	Dry bulb onions & Green onions. Annual Grasses: A repeat application may be made after a minimum re-treatment interval of 14 days, if required. Apply at the 2-5 leaf stage of the grass. Use the high rate for quack grass and the lower rate for volunteer cereals.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Postemergence Emerged grasses <i>(cont.)</i>	1	Sethoxydim	Poast Ultra	0.32-1.1 L/ha	12 hours	50 (bulb onion) 30 (green onion)	Dry bulb and green onions. Most effective control is achieved when application is made at the 2 to 5 leaf stage when annual grasses are small and actively growing, soil moisture is good, and the crop is small enough to permit thorough spray coverage.
Postemergence Yellow Nutsedge	15	Dimethenamid-P	Frontier Max	1.29 L/ha	24 hours	60	Dry bulb onions grown on muck soils only. Apply a single application at the loop stage before yellow nutsedge emerges.
Postemergence Emerged crop. (Broadleaves and grasses)	3	Pendimethalin	Prowl H₂O	2.2-3.3 L/ha	24 hours	-	Mineral Soil Max 2 applications per year. Apply it as a foliar spray. Apply in 250 L water /ha. Apply at 2-6 leaf stage. 21-day interval between sprays
				6.6 L/ha	24 hours except for direct seeded green onions on muck soil: 4 days scouting, 7 days hand-set irrigation, 15 days hand weeding.	30	Muck Soils (direct seed only): Apply at the loop and 2-leaf stage of crop. Apply in 250 L of water /ha. Destroy existing weeds before applying Prowl H ₂ O. Need adequate rainfall or overhead irrigation within 7 days of application.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Postemergence Emerged crop. (Broadleaves and grasses) <i>(cont.)</i>	15	Pyroxasulfone	Pyroxasulfone 85 WG	176 g/ha	12 hours, 5 days (hand weeding)	60	Pre-emergent weed control. Apply when crop is in the 2 – 6 leaf stage. May result in temporary growth suppression if extreme conditions of high rainfall or extended periods of water-saturated soil occur. One application per year only.
	-	Acetic acid	Serene NEW 2023	179-219.5 L/ha	When residue is dry	-	Apply as a uniform band or spot application directed at weeds on the ground between the crops. Use hooded or shielded application equipment. Do not spray the crop directly. Do not apply it when plants are under stress. Retreatment is required for regrowth of weeds.
Plant Growth Regulator-Sprout Control	-	Maleic hydrazide	Royal MH-30 XTRA	8.36 L in 300 L water/ha	12 hours	10	Should be applied when the bulbs are fully mature, have at least 5 - 8 green leaves, and have necks soft enough for the tops to fall over if they have not already done so. The spray is often applied when 50 percent of the tops have fallen but all tops are still green. This condition usually occurs about 10 days to two weeks before harvest time. Green tops are essential for the absorption of Royal MH-30 XTRA. Caution: Spongy hollow necked bulbs may result if spraying is done earlier than two weeks before maturity. Apply to healthy plants. Max 1 application/year.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Plant Growth Regulator-Sprout Control <i>(cont.)</i>	-	Denatured ethanol	Restrain Fuel	19.0 mg/m ³ 0.015 L/m ³	Ventilate well		Restrain Fuel is only to be used with the proprietary Restrain Generator B100 and B200. Apply continuously until onions are removed from storage. Monitor storage area temperature and commence application once onions have been cured and dried. Check the Restrain Generator and sensor daily during operation to ensure the proper rate of ethylene gas is being generated continuously. Maintain an appropriate level of Restrain Fuel to ensure the proper delivery of the ethylene gas. Monitor the onion storage area temperature and ventilation to ensure the appropriate dispersion of the ethylene gas during application. The machine and sensor should be checked DAILY for correct operation.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS:							
Thrips	1B	Malathion	Malathion 85E	1100 mL/ha	12 hours	3	Apply in enough spray volume to ensure thorough spray coverage.
		Naled	Dibrom	530 ml/ha	48 hours	4	Dry bulb onions. Max two applications per season. Do not apply when temperature is over 32°C.
	3	Cypermethrin	Mako	175 ml/ha	12 hours	3	Apply at 10-day intervals. Max 3 applications/season.
			UP-Cyde	280 ml/ha			
		Deltamethrin	Decis 5.0 EC	200 ml/ha	12 hours	5	
	Poleci 2.5 EC		400 ml/ha	Apply in 200-500 L water/ha. Apply as foliar spray mid-season at proper thrips threshold. Do not apply more than once per season.			
		Lambda - cyhalothrin	Matador 120 EC or Labamba	188 ml/ha	24 hours	14	Max 3 applications/season. Allow 7 days between treatments
	5	Spinetoram	Delegate WG	200-336 g/ha	12 hours	3	Suppression only. Dry bulb onions. Apply in 300-500 L water per hectare, when thrips first appear: targeting egg hatch and small nymphs. Max 3 applications/year at 7–10-day intervals.
		Spinosad	Success	218-262 ml/ha	When dry	3	Target small nymphs and eggs at hatching. Allow 7-10 days between applications. Max 3 applications per year. Apply in 300-500 L/ha.
			Entrust 80	131-158 g/ha			
Entrust			437-527 ml/ha				

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Thrips (cont.)	6	Abamectin	Agri-Mek 1.9% EC	0.6-1.2 L/ha	12 hours (13 days: hand weeding, 4 days: hand-set irrigation, 1 day: thinning & scouting)	Green onion: 7 Bulb onion: 30	<p>Green onion. Foliar application only. Allow 7 days between applications. Apply when pest populations are building but before damage occurs. Consult local extension specialists, professional consultants, or other qualified authorities to determine appropriate threshold levels in your area. Use the higher application rate under heavy pest pressure. Max 4 applications/season.</p> <p>Bulb onion: should be applied with a non-ionic surfactant to improve wetting of foliage and to smooth out spray deposits. Spreading and penetrating surfactants can improve insect control. Do not use binder or sticker-type surfactants. Max 3 applications/season.</p>
			Agri-Mek SC	135-270 mL/ha 0.25-0.5% v/v non-ionic surfactant (NIS)		<p>Green onion: Apply by foliar application when pest populations are building but before damage occurs. Consult local extension agents, professional consultants, or other qualified authorities to determine appropriate threshold levels in your area. Use the higher application rate under heavy pest pressure. Max 4 applications/season.</p> <p>Bulb onion: Apply when onion thrips or signs of onion thrips feeding first appear. Should be applied with a non-ionic surfactant to improve wetting of foliage and to smooth out spray deposits. Spreading and penetrating surfactants can improve insect control. Do not use binder or sticker-type surfactants. Max 3 applications/season.</p>	

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Thrips (cont.)	6, 28	Abamectin Cyantraniliprole	Minecto Pro	778 mL/ha	12 hours	30	Apply a methylated seed oil (MSO) surfactant at an application rate of 0.25% v/v. Apply when thrips are at economical threshold. Make up to 2 consecutive applications then switch to a non-Group 6 and non-Group 28 insecticide.
	23	Spirotetramat	Movento 240 SC	365 ml/ha	12 hours	3 (dry bulb) 7 (green onion)	Apply in minimum volume of 200 L water/ha. Maximum 2 applications per crop season with a minimum of 7 days between applications. Maximum allowed per crop season: 730 mL/ha. Apply when thrips are first noticed. Movento should be used during the first half of the season when adult populations are relatively low or building. Reductions in numbers of thrip larvae may take 3-4 days after application.
	28	Cyantraniliprole	Exirel	1000-1500 ml/ha	12 hours	1	Suppression only. Begin applications when thrip populations are low. Thorough coverage is essential for 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. If thrip populations are high, use a registered insecticide with a different mode of action to reduce thrip populations before applying Exirel. Make no more than 4 applications per season. Do not apply more than once every 5 days.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Onion Maggot	1B ¹	Chlorpyrifos	Lorsban 15 G <i>FINAL USE 2023</i>	7.9-15.7 kg/ha	24 hours	109	Larvae. In furrow application. Do not make more than one application per season. DO NOT apply more than 73.5 kg product/day.
	1B	Naled	Dibrom	530 ml/ha	48 hours	4	Maximum 2 applications per season.
	3	Cypermethrin	Mako	175 ml/ha	12 hours	3	Spray for onion maggot flies . Apply when flies become numerous and repeat at 7-10- day intervals. Max 3 applications/season.
			UP-Cyde	280 ml/ha	12 hours	3	
Leek Moth	3	Lambda - cyhalothrin	Matador 120 EC or Labamba	188 ml/ha	24 hours	14	Max 3 applications/season. Allow 7 days between treatments
	5	Spinosad	Success	218-262 ml/ha	When dry	3	Suppression only. Apply in high water volume to ensure spray solution penetrates leaf axils. Reapply at 7–10-day intervals. Do not apply more than 2 sequential applications. Max 3 applications per year. Target eggs at hatch or small larvae.
			Entrust 80	131-158 g/ha			
			Entrust	437-527 ml/ha			
		spinetoram	Delegate WG	200-336 g/ha	12 hours	3	Suppression. Recommended water volume of 300-500 L water/ha with sufficient pressure to ensure spray solution penetrates leaf axils. Apply one week after peak pheromone trap capture targeting eggs at hatch or small larvae. Use higher applications when insect pressure is high, or insects are at an advanced stage of growth. Max 3 applications /year at 7-10 days intervals. Do not apply more than 2 consecutive applications of group 5 insecticides. Rotate to another class of insecticide for at least one application.
11	<i>Bacillus thuringiensis, subsp. aizawai,</i>	XenTari WG	500-1000 g/ha	4 hours	0	Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 1000 L per ha.	

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Leek Moth <i>(cont.)</i>	28	chlorantraniliprole	Coragen	250-375 ml/ha	12 hours	1	Green onion. Suppression. Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Max 4 applications/season. Do not apply more than once every 5 days.
Cutworms	1B	Chlorpyrifos	Warhawk 480 EC <i>FINAL USE 2023</i>	2.4-4.8 L/ha	24 hours	60	Bulb onion. Soil treatment: Apply once per season before planting or transplanting. Application is also permitted on a 15 m strip adjacent to fence rows. Use the low rate except under conditions of low soil moisture. Use the high rate if the top 1 cm of soil is dry. When preplant soil applications are being made to muck soil, do not incorporate. Incorporation on mineral soils should be no deeper than 5 cm. Seedling treatment: Apply as a broadcast spray at the 2- to 5-leaf stage. Use the low rate except under conditions of low soil moisture. Use the high rate if the top 1 cm of soil is dry.
	3	Cypermethrin	Mako	175 ml/ha	12 hours	21	Spray under warm moist conditions and do not disturb the soil surface for at least 5 days. Applications may be made to adjacent fence rows, but do not allow drift to contaminate adjacent crops.
	28	chlorantraniliprole	Coragen	250-375 ml/ha	12 hours	1	Green onion. Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Max 4 applications/season. Do not apply more than once every 5 days.
Allium leafminer	28	Cyantraniliprole	Exirel	1000-1500 mL/ha	12 hours	1	<i>Do not make more than 4 applications per season. Do not apply more than once every 5 days.</i>

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
DISEASES:							
Pythium	4	Metalaxyl-M and S-isomer	Apron XL LS	20 ml / 100kg of seed	-	-	One application as a seed treatment.
Purple Blotch	7	Benzovindiflupyr	Aprovia	750 ml/ha	12 hours	7	Begin applications when the plants are 5-10 centimeters high or when conditions become favourable for disease development. Make applications on a 7 – 14 days interval. Use the shorter interval when conditions are more conducive to disease. Also controls garlic rust (<i>Puccinia allii</i>).
		Boscalid	Cantus WDG	475 g/ha	12 hours	7	Apply at 7–14-day intervals. Max 6 applications/yr. Do not apply more than 2 sprays in succession before alternating to another fungicide family.
		Penthiopyrad	Fontelis	1.25-1.75 L/ha	12 hours	3	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.
	7,3	Pydiflumetofen & Difenoconazole	A20259 Fungicide	1.0 L/ha	12 hours	7	Green Onions and Bulb Onions. Apply on a 7-14-day interval, starting prior to disease establishment. Apply as a broadcast spray in sufficient water (minimum of 150 L/ha) for thorough coverage. Maximum amount of product per season: 3.0 L/ha green onions, 4.0 L/ha bulb onions.

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Purple Blotch (cont.)	7,3	Benzovindiflupyr & Difenoconazole	Aprovia®Top NEW 2023	967 mL/ha	12 hours	7	Begin applications when the plants are 5-10 centimeters high or when conditions become favorable for disease development. Make applications on a 7 – 14 days interval. Use the shorter interval when conditions are more conducive to disease. Apply specified rates in a minimum of 150 L of water per hectare up to 600 L of water per hectare.
	7, 9	Fluopyram & pyrimethanil	Luna Tranquility	1200 ml/ha	24 hours	7	Begin fungicide applications preventatively. Continue as needed, on a 7-12-day interval.
	7, 11	Boscalid and Pyraclostrobin	Pristine WG	1.0-1.3 kg/ha	3 days (thinning) When dry (general)	7	Max 6 applications/yr. Apply at 7–14-day intervals.
		Pyraclostrobin & Fluxapyroxad	Merivon	0.4 – 0.6 L/ha	12 hours, 7 days (Hand harvesting, mechanical harvesting)	7	Begin applications prior to onset of disease development. Use the shorter interval and/or the higher rate, where applicable, when disease pressure is high. Apply subsequent applications (7–14-day interval) if disease persists or weather conditions are favourable for disease development.
	7, 12	Pydiflumetofen & Fludioxonil	A20560 Fungicide	0.8 L/ha	12 hours	7	Apply on a 7-14-day interval, starting prior to disease establishment. Within the stated range, use the shorter interval under conditions favouring high disease pressure. Apply as a broadcast spray in sufficient water (minimum of 150 L/ha) for thorough coverage.
	9, 12	Cyprodinil and Fludioxinil	Switch 62.5 WG	775-975 g/ha	12 hours (general) 3 days (hand weeding)	7	Suppression only. Begin when conditions are favorable for disease but before infection. Max 3 applications/yr. Apply at 7-14-day intervals.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Purple Blotch <i>(cont.)</i>	11	Pyraclostrobin	Cabrio EG	0.56-0.84 kg/ha	12 hours	7	Max 3 applications/yr. Do not apply more than 2 sprays in succession before alternating to another fungicide family. Use on a 7–14-day schedule.
	29	Fluazinam	Allegro 500 F	1.16 L/ha	3 days (hand weeding)	7	Bulb onion. Suppression only. Begin applications when conditions are favourable for disease development or when first disease symptoms appear. Max 5 applications per year. No more than 3 sequential applications before alternating to a fungicide belonging to a different chemical family. Application interval: 7-10 days.
	M3	Mancozeb	Manzate Pro-Stick	2.25 kg/ha	24 hours (hand weeding) 12 hours (other activities)	14	Dry bulb onions only. Repeat applications on 7–10-day intervals.
	P07	Fosetyl-al	Aliette WDG	2.8 kg	8 days (hand weeding) 12 hours (other activities)	7	Max 5 applications/yr.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Botrytis & Stemphylium leaf blights and Botrytis Neck Rot	7	Benzovindiflupyr	Aprovia	750 ml/ha	12 hours	7	Suppression of Leaf blight (<i>Stemphylium vesicarium</i>). Begin applications when the plants are 5-10 centimeters high or when conditions become favourable for disease development. Make applications on a 7-14-day interval. Use the shorter interval when conditions are more conducive to disease.
		Boscalid	Cantus WDG	475 g/ha	12 hours	7	Apply at 7–14-day intervals. Do not apply more than 2 sprays in succession before alternating to another fungicide family.
		Fluxapyroxad	Sercadis	333-666 mL/ha			
		Penthiopyrad	Fontelis	1.25-1.75 L/ha			
	7, 3	Pydiflumetofen & Difenconazole	A20259 Fungicide	1.0 L/ha	12 hours	7	Bulb Onions, Botrytis and Stemphylium leaf blights. Apply on a 7-14-day interval, starting prior to disease establishment. Apply as a broadcast spray in sufficient water (minimum of 150 L/ha) for thorough coverage. Maximum amount of product per season: 4.0 L/ha.
	7, 9	Fluopyram & pyrimethanil	Luna Tranquility	1200 ml/ha	12 hours	7	Begin fungicide applications preventatively. Continue as needed, on a 7-12-day interval. Apply maximum of 2 applications per season for Botrytis.
7, 11	Boscalid and Pyraclostrobin	Pristine WG	1.0-1.3 kg/ha	3 days (thinning) When dry (general)	7	Max 6 applications/yr. Apply at 7–14-day intervals.	

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Botrytis & Stemphylium leaf blights and Botrytis Neck Rot <i>(cont.)</i>	7, 11	Pyraclostrobin & Fluxapyroxad	Merivon	0.4 – 0.6 L/ha	12 hours, 7 days (Hand harvesting, mechanical harvesting)	7	Suppression only for Stemphylium. Begin applications prior to onset of disease development. Use the shorter interval and/or the higher rate, where applicable, when disease pressure is high. Apply subsequent applications (7–14-day interval) if disease persists or weather conditions are favourable for disease development. Use higher rate for botrytis leaf blight.
	7, 12	Pydiflumetofen & Fludioxonil	A20560 Fungicide	0.8 L/ha	12 hours	7	Suppression only for Stemphylium. Apply on a 7–14-day interval, starting prior to disease establishment. Within the stated range, use the shorter interval under conditions favouring high disease pressure. Apply as a broadcast spray in sufficient water (minimum of 150 L/ha) for thorough coverage.
	9, 12	Cyprodinil and Fludioxinil	Switch 62.5 WG	775-975 g/ha	3 days (hand weeding) 12 hours (general)	7	Max 3 applications/yr. Begin when conditions are favorable for disease but before infection. Apply at 7–14-day intervals; no more than 2 sequential applications.
	11, 3	Azoxystrobin, difenoconazole	Quadris Top	710-1000 mL/ha	12 hours	7	Apply it as a broadcast foliar spray in sufficient water for thorough coverage. A minimum spray volume of 150 L/ha is recommended. Apply on a 7-14-day interval, starting prior to disease onset when conditions are conducive to disease.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Botrytis & Stemphylium leaf blights and Botrytis Neck Rot (cont.)	29	Fluazinam	Allegro 500 F	1.16 L/ha	3 days (hand weeding), 24 hours (general)	7	Suppression only. Bulb onion. Initiate applications when conditions are favourable for disease development or when first disease symptoms appear. Maximum of 5 applications per year. No more than 3 sequential applications before alternating to another fungicide belonging to a different chemical family. Application interval: 7-10 days.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha	4 hours	1	Re-apply using 5–10-day intervals.
	M3	Mancozeb	Manzate Pro-Stick	2.25 kg/ha	24 hours (hand weeding) 12 hours (general)	14	Dry bulb onions only. Apply at 7–10-day intervals beginning when disease is reported in the area. Do not use on exposed bulbs.
			Dithane DG Rainshield	2.25-3.25 kg/ha	10		
	M3, 22	Mancozeb-Zoxamide	Gavel DF	1.7-2.25 kg/ha	48 hours	10	Neck rot in Bulb Onion: Apply preventatively when diseases are first reported in the area and repeat at 7-day intervals throughout the season as required. Use the high rate under moderate to high disease pressure. Do not allow spray or drift to contact bulbs after lifting from soil. Maximum 8 applications/season.
	M5	Chlorothalonil	Bravo ZN	2.4-4.8 L/ha	12 hours (general)	7 (dry bulb) 14 (green bunching)	Begin applications when conditions favor disease. Repeat applications every 7-10 days to obtain control. DO NOT exceed 2 applications per season.
			Echo 90WSP	1.4-2.6 kg/ha	6 days (hand weeding)		
Echo 720			1.7-3.3 L/ha	1 day (scouting)			

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Botrytis & Stemphylium leaf blights and Botrytis Neck Rot <i>(cont.)</i>	BM02	<i>Bacillus subtilis</i>	Serenade Opti	1.7-2.5 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.
Botrytis leaf blight	17	Fenhexamid	Decree® 50 WDG NEW 2023	1.12 kg/ha	12 hours	1	Greenhouse onions for transplant. Do not make more than 1 application per crop cycle. Applications can be made when conditions are favorable for disease development. Use sufficient water to obtain thorough coverage.
Bacterial blight (<i>Xanthomonas campestris</i>)	-	Hydrogen Peroxide & Peroxyacetic acid	OxiDate® 2.0 NEW 2023	Dilute 1.0 L product in 100 L water + non-ionic surfactant at 0.125% (v:v)	4 hours when dry	0	Apply at 7-day spray intervals, depending upon the level of disease pressure. The maximum number of applications per year is 8.
Downy Mildew	7, 11	Boscalid and Pyraclostrobin	Pristine WG	1.3 kg/ha	3 days (thinning) When dry (general)	7	To suppress downy mildew, apply when disease first appears. Follow up 5-7 days later with a fungicide of a different chemistry that is also effective against downy mildew. Do not make sequential applications of Pristine when downy mildew occurs.
		Pyraclostrobin & Fluxapyroxad	Merivon	0.6 L/ha	12 hours, 7 days (Hand harvesting, mechanical harvesting)	7	Suppression only. Begin applications prior to onset of disease development. Use the shorter interval and/or the higher rate, where applicable, when disease pressure is high. Apply subsequent applications (7–14-day interval) if disease persists or weather conditions are favourable for disease development.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy Mildew (cont.)	11	Fenamidone	Reason 500 SC	400 ml/ha	When dry	7	Suppression only. Begin application as soon as crop and/or environmental conditions become favourable for disease development. Apply in 300-600 L/ha on a 5–10-day interval. Maximum 4 applications per year. Plant back interval of 30 days. Do not apply more than 2 sequential applications of Reason 500 SC or any other Group 11 fungicide before alternating with a fungicide from a different Group.
		Pyraclostrobin	Cabrio EG	0.56-0.84 kg/ha	12 hours	7	Max 3 applications/yr. Do not apply more than 2 sprays in succession before alternating to another fungicide family. Use on a 10-day schedule (suppression only).
	40	Mandipropamid	Revus plus Non-ionic adjuvant	400 ml/ha plus 0.25% v/v	12 hours	7	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 four applications per year. May be tank mixed with Bravo ZN Agricultural Fungicide. Follow the most restrictive use directions of either label.
	40, 45	Ametoctradin, dimethomorph	Zampro	1.0 L/ha	Hand harvesting – 1 day All other activities – 12 hours	0	To reduce the risk of the development of fungicide resistance Zampro must be used in rotation with other fungicides having a different mode of action active against downy mildew. Begin applications of Zampro prior to disease development and continue a 5-7-day interval. Max 3 applications.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy Mildew (cont.)	49, 4	Oxathiapiprolin, Metalaxyl-M and S-isomer	Orondis Gold <i>NEW 2023</i>	1 L/ha	12 hours	7	Apply as a foliar spray with the 1st application at beginning of infection risk (preventively). Subsequent applications should be at an interval of 5 to 10 days. Min water volume = 200 – 800 L/ha. Max number of applications per year = 3.
	49, 40	Oxathiapiprolin & Mandipropamid	Orondis Ultra	0.4 L/ha	12 hours	7	Begin applications prior to disease development and continue a 7-10-day interval. Use shorter intervals when disease pressure is high. The use of a penetrating surfactant is recommended.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha	4 hours	1	Re-apply using 5–10-day intervals.
	M3	Mancozeb	Manzate Pro-Stick	2.25 kg/ha	24 hours (hand weeding) 12 hours (general)	14	Dry onions only. Repeat applications on 7–10-day intervals.
	M3, 22	Mancozeb-Zoxamide	Gavel DF	1.7-2.25 kg/ha	48 hours	10	Suppression only. Apply preventatively when diseases are first reported in the area and repeat at 7-day intervals throughout the season as required. Use the high rate under moderate to high disease pressure. Do not allow spray or drift to contact bulbs after lifting from soil. Maximum 8 applications/season.
	U15	Oxathiapiprolin	Zorvec Enicade	0.0875-0.35 L/ha	12 hours	0	Begin applications prior to disease development and continue a 5-10-day interval. Use higher rate and shorter interval when disease pressure is high.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
Downy Mildew <i>(cont.)</i>	P07	Fosetyl-al	Aliette WDG	2.8 kg	8 days (hand weeding) 12 hours (general)	7	Max 5 applications/yr.
		Mono- and dibasic sodium, potassium, and ammonium phosphites	Phostrol	2.9-4.3 L/ha	12 hours	0	Suppression only. Begin foliar applications when conditions favouring disease development exist and continue for a 7–14-day interval. Do not apply more than 7 applications per year.
	BM02	<i>Bacillus subtilis</i>	Serenade <i>Opti</i>	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.

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>