

GUIDE TO PEST MANAGEMENT IN PUMPKIN & SQUASH

Nova Scotia Vegetable Crop Guide to Pest Management 2011
[PUM1-11]

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IMPORTANT

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

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

WARNINGS

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

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

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted-Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
WEEDS:							
Preplant <i>Perennial weeds including quackgrass</i>	9	Glyphosate	Roundup Original	2.5-7.0 L/ha	12 hours	7	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control, apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
			Roundup WeatherMAX	1.67-8.0 L/ha			
			Touchdown® 480	2.5-7.0 L/ha			
	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	-	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume.
Preemergence <i>Stale Seedbed technique</i>	22	Diquat	Reglone® Desiccant	2.3-4.6 L/ha	-	-	Apply in 300 – 1100 L of water/ha to foliage of emerged weeds but before the crop has emerged.
		Paraquat	Gramoxone®	2.75-5.5 L/ha	24 hours	-	
Preemergence <i>Broadleaf weeds</i>	19	Naptalam	Alanap 3 L	11-30 L/ha	-	-	Apply prior to crop emergence, up to 48 hours after planting. Do not use on Butternut Squash or Table Queen Squash.
<i>Germinating annual grasses</i>	3	Chlorthal dimethyl	Dacthal W-75	9.0-15.5 kg/ha	-	-	Do not use on Pumpkins. Apply when plants have 4-5 true leaves but before

<i>and some broadleaves</i>							weed seed germination (prior cultivation maybe required)
	13	Clomazone	Command 360 ME	0.78-1.17 L/ha	-	45	Apply as a pre-emergent application before emergence of the crop or weeds. Apply in 95-375 L/ha of spray volume. Apply low rate on coarse soils, high rate on fine textured soils. Do not apply on sandy soils. Apply once per season. Do not incorporate. Do not use on Jack-O-Lantern Pumpkins or the following cultivars as unacceptable whitening of the fruit may occur: NK530, NK580, Turks Turban, Golden Delicious, all Banana Types, and all other <i>Cucurbita maxima</i> types that a pink or burnt coloration at harvest.
	15	Napropamide	Devrinol DF	2.24-4.5 kg/ha	-	-	Use on direct seeded pumpkin and squash only. 1 application per season.
	15	S-Metolachlor and R-enantiomer	Dual II Magnum	1.15 L/ha	12 hours	65	One application per year. Can be applied before weed emergence, preemergence or early post emergence of the crop (1-2 leaf stage). Some risk of crop injury with application of this herbicide.
Postemergence <i>Inter-row shielded</i>	14	Carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	-	1	Apply in minimum spray volume of 100 L/ha. Refer to label for target weeds, buffer zones and rates. Use high flow rate nozzles to apply the highest spray volume.
	22	Diquat	Reglone® Desiccant	2.3-4.6 L/ha	-	-	Do not spray solution on the crop plant since it could be injured or killed. Use gramoxone for best control of grasses.
Paraquat		Gramoxone®	2.75-5.5 L/ha	24 hours	-		
<i>Grass weeds</i>	1	Sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha 1-2 L/ha	12 hours	30	Apply to actively growing grasses at the 1-6 leaf stage.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted-Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS:							
Cucumber Beetle and Flea Beetle	1A	Carbaryl	Sevin XLR Plus	2.5 L/ha	-	5	Do not apply when field is in bloom or adjacent fields are in bloom.
	2A	Endosulfan	Thiodan 4 EC	1.5 L/ha	-	2	Make four applications at 7 day intervals starting in late June.
			Thionex 50 WP	1.1 kg/ha	-	2	
	4	Imidacloprid	Admire 240	Soil: 18 ml/100m row	24 hours	21	Apply in furrow on or below seed in 200 L/ha or as a narrow surface band over seeding line. Max 1 application/season.
				Transplant: 25 ml/1000plants	24 hours	21	Apply into planting hole before planting. Apply dosage in 150 ml of planting water per plant.
	-	Kaolin	Surround WP	12.5-25 kg/ha	-	0	Cucumber beetle control only. Apply at 5-7 day intervals with the first two applications 3 days apart starting prior to infestation of adult beetles. Max 5 applications/yr.
	-	Rotenone	Rotenone 5% (Green earth insect spray)	4.5 kg/ha	-	1	Repeat applications at 5-7 day intervals
Aphids	2A	Endosulfan	Thiodan 4 EC	1.5 L/ha	-	2	Make four applications at 7 day intervals starting in late June.
			Thionex 50 WP	1.1 kg/ha	-	2	
	1B	Malathion	Malathion 500 E	1.8 L/ha	-	3	Do not apply to cucurbits unless plants are dry.
Aphids and Whiteflies	23	Spirotetramat	Movento 240 SC	220-365 ml/ha	12 hours	1	Minimum interval between applications is 7 days. Maximum of 730 ml/ha of product applied per season. This product is TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply this product during crop flowering period or when flowering weeds are present in the field,

							orchard or vineyard.
			Movento 150 OD	347-585 ml/ha	12 hours	1	Minimum interval between applications is 7 days. Maximum of 1.17 L/ha of product applied per season. This product is TOXIC to bees through direct contamination of pollen and nectar. DO NOT apply this product during crop flowering period or when flowering weeds are present in the field, orchard or vineyard.
Cutworms	1A	Carbaryl	Sevin XLR Plus	2.5 L/ha	-	5	Do not apply when field is in bloom or adjacent fields are in bloom. Climbing cutworms only.
Mites	3	Dicofol	Kelthane 50 W	1.0-1.25	-	7	Max 1 application/yr.
	1B	Malathion	Malathion 500 E	1.8 L/ha	-	3	Do not apply to cucurbits unless plants are dry.
	23	Spiromesifen	Oberon	500-600 ml/ha	12 hours	7	Maximum of 3 applications per season. Minimum application volume of 100 L/ha. Also controls whiteflies (including silverleaf, sweetpotato and greenhouse) See label for buffer zone restrictions.

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted-Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
DISEASES:							
<i>Pythium</i> damping -off	4	Metalaxyl-M and S-isomer	Apron XL LS	20–40 ml / 100kg of seed	-	-	One application as a seed treatment.
<i>Alternaria</i> Leaf spot	7	Boscalid	Lance WDG	460 g/ha	12 hours	0	Max 4 applications/yr. Do not make more than 2 applications before rotating to a different fungicide group.
	M3	Mancozeb	Dithane DG Rainshield	1.1-3.25 kg/ha	-	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals.
	M		Manzate Pro-Stick	1.1-3.25 kg/ha			
	11	Pyraclostrobin	Cabrio EG	560-840 g/ha	12 hours	3	Max 4 applications/yr. Do not make more than 1 application before rotating to a different fungicide group.
<i>Anthracnose</i> and Downy Mildew	M	Chlorothalonil	Bravo 500	3.2 L/ha	48 hours	7	Repeat on 7 day intervals. Also controls scab when applied at a rate of 4.8 L/ha.
	M	Copper sulfate	Copper 53W	2.5-3 kg/ha	-	1	Apply in 1000 L of water per ha.
	M3	Mancozeb	Dithane DG Rainshield	1.1-3.25 kg/ha	-	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals.
	M		Manzate Pro-Stick	1.1-3.25 kg/ha			
	11	Pyraclostrobin	Cabrio EG	560-840 g/ha	12 hours	3	Max 4 applications/yr. Do not make more than 1 application before rotating to a different fungicide group.
Downy Mildew	-	<i>Bacillus subtilis</i>	Serenade MAX	1.0-3.0 Kg/ha	-	0	Serenade MAX, Serenade ASO and Rhapsody ASO are biopesticides that will only suppress the indicated diseases. Begin application soon after emergence or transplant, when conditions are conducive to disease development. Repeat as necessary on 7-10 day intervals. When environmental conditions and plant stage are conducive to rapid disease
			Serenade ASO	5.0-15.0 L/ha	-	0	
			Rhapsody ASO	1.0-2.0 L/100 L of water	-	0	

							development, use in a rotational program with other registered fungicides.
	21	Cyazofamid	Ranman 400SC and Sylgard 309 (organosilicone surfactant)	0.15-0.2 L/ha 0.15 L/ha	12 hours	1	Max 6 applications per crop per year. Do not make sequential applications of Ranman or products within the same group. Apply in 200 – 600 L of water per hectare. Apply on a 7-10 day schedule beginning at initial flowering or when disease conditions are favorable but prior to an outbreak. A plant back interval of 30 days is required.
	11	Fenamidone	Reason 500 SC	400 ml/ha	-	14	Begin application as soon as crop and/or environmental conditions become favourable for disease development. Apply in 300-600 L/ha. Applications should be made on a 5-10 day interval. Maximum 4 applications per year. Plant back interval of 30 days. Do not apply more than 1 application of Reason 500 SC or any other Group 11 fungicide before alternating with a fungicide from a different Group.
	40	Mandipropamid	Revus plus Non-ionic adjuvant	400-600 ml/ha plus 0.25% v/v	12 hours	0	Suppression of Downy mildew. Applications should begin prior to disease development and continue throughout the season on a 7-10 day schedule of fungicides, following the resistance management guidelines. Maximum four applications per year. REVUS Fungicide may be tank mixed with Bravo 500 Agricultural Fungicide for any Field Cucurbits listed on that label. Follow the most restrictive use directions of either label.
	U-M	Propamocarb / chlorothalonil	Tattoo C	1.8-2.7 L/ha	48 hours	2	Apply as a foliar spray in a preventative program. Apply in a spray volume of 300-600 L/ha. Begin applications when conditions are favourable for disease development but before infection occurs. Continue on 7-14 day intervals until the

							threat of disease is over. Use the high rate and shorter application interval under high disease pressure and when conditions of rapid disease development exist. When applying using intervals longer than 7 days, alternate with an application of a contact fungicide between TATTOO C applications. Do not apply more than 5 applications per growing season.
	43	Fluopicolide	Presidio (NEW)	220-292 ml/ha	12 hours	2	Maximum of 4 applications per season, Do not make more than 2 sequential applications. Begin when conditions favour disease and repeat on a 7-14 day interval. For resistance management, Presidio Fungicide must be tank-mixed with a labelled rate of another fungicide registered for the target pathogen, but with a different mode of action. Apply Presidio Fungicide in a tank mix with Bravo 500. Follow the most restrictive use directions of either label. Make foliar applications on a 7 to 10 day schedule beginning with initial flowering, or when disease conditions are favourable, but prior to disease development. Use the lower rate and longer interval as preventive applications. Use the higher rate and shorter interval if disease is present.
Powdery Mildew	-	<i>Bacillus subtilis</i>	Serenade MAX	3.0-6.0 Kg/ha	-	0	Serenade MAX and Serenade ASO are biopesticides that will only suppress the indicated diseases. Begin applications soon after emergence or transplant, when conditions are conducive for disease development. Repeat applications on an interval of 7-10 days.
			Serenade ASO	5.0-15.0 L/ha	-	0	

			Rhapsody ASO	1.0-2.0 L/100 L of water	-	0	Rhapsody ASO is a biopesticide that will only suppress the indicated diseases. Powdery Mildew, Cercospora leaf spot, Gummy stem blight. Begin application soon after emergence or transplant when environmental conditions in the greenhouse and plant stage are conducive to rapid disease development. Repeat as necessary on 7 to 10 day intervals. Thorough coverage is essential. Rhapsody can be rotated with other registered fungicides.
	M	Chlorothalonil	Bravo 500	4.8 L/ha	48 hours	1	Begin applications at first true leaf stage and repeat on 7 day intervals. Shorten the spray interval under severe disease pressure. Maximum of 7 applications per season.
	13	Quinoxifen	Quintec	300-440 ml/ha	12 hours	3	Maximum of 4 applications per year. Repeat applications on 10-14 day intervals. Apply before visual symptoms of Powdery Mildew appear. Quintec has no curative properties and will not control established infections. * Note * – product is toxic to bees exposed to direct treatment, drift, or residues on crops or weeds.
	-	Potassium bicarbonate	MilStop	2.8-5.6 kg/ha	4 hours	0	Max 10 applications/yr. Apply at 7-14 day intervals in 500-1000 L/ha spray solution. Start application at first sign of disease. Suppression only!
	11	Pyraclostrobin	Cabrio EG	560-840 g/ha	12 hours	3	Max 4 applications/yr. Do not make more than 1 application before rotating to a different fungicide group.
Scab	M	Copper sulfate	Copper 53W	2.5-3 kg/ha	-	1	Apply in 1000 L of water per ha.
	M3	Mancozeb	Dithane DG Rainshield	1.1-3.25 kg/ha	-	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals.
	M		Manzate Pro-Stick	1.1-3.25 kg/ha			

Gummy Stem Blight	7	Boscalid	Lance WDG	460 g/ha	12 hours	0	Max 4 applications/yr. Do not make more than 2 applications before rotating to a different fungicide group.
	M3	Mancozeb	Dithane DG Rainshield	1.1-3.25 kg/ha	-	14	Start applications when runners begin to form or at first sign of disease, repeat on weekly intervals.
	M		Manzate Pro-Stick	1.1-3.25 kg/ha			
	11	Pyraclostrobin	Cabrio EG	840 g/ha	12 hours	3	Max 4 applications/yr. Do not make more than 1 application before rotating to a different fungicide group.
Phytophthora Blight/Crown Rot	43	Fluopicolide	Presidio (NEW)	220-292 ml/ha	12 hours	2	Apply in 200-1000 L/ha Apply as a soil or foliar application on a 7 to 10-day schedule beginning when conditions are favourable for disease development and prior to disease onset. For best results, application should begin at planting or transplanting. Maximum 2 applications allowed.

Use the following web link to search for any pesticide label mentioned in this guide, or any other pesticide registered in Canada:

<http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>

PESTICIDE EMERGENCY CONTACT INFORMATION

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

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

ABBREVIATIONS & CONVERSIONS

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

Helpful Conversions¹	
kPa X 0.14 = pounds per square inch (psi)	millilitres X 0.035 = fluid ounces
hectares X 2.47 = acres	litres X 35 = fluid ounces
kilograms X 2.2 = pounds	litres X 0.22 = imperial gallons
kilograms per hectare X 0.89 = pounds per acre	litres per hectare X 14.17 = fluid ounces per acre
kilograms per hectare X 0.40 = kilograms per acre	litres per hectare X 0.40 = litres per acre
	degree-days C X 1.8 = degree-days F

¹ **Pesticide Units of Measurement**

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