

Carrots Management Schedule

*A guide to weed, insect and
disease management in carrots
in Nova Scotia*



2019



GUIDE TO PEST MANAGEMENT IN TABLE BEETS



Nova Scotia Vegetable Crop Guide to Pest Management 2019
[BEET1-19]

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IMPORTANT

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

By printing this publication, Perennia does not offer any warranty or guarantee, nor do they assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused 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, Perennia has only listed a couple for reference purposes and as such does not endorse one brand over another. If you have purchased a generic product not specifically in this guide but has your crop and pest on the label, always follow that product label.

If any information in this or any other publication conflicts with the information on the label, always use the label recommendation. You are legally responsible for the safe use of pesticides you purchase. This means the safe transport and storage of these materials, the label rates used on crops, and the safe disposal of 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. Allow 3 or more days after treatment before tillage. Best control of quackgrass is obtained when these herbicides are applied in the fall.
			Roundup WeatherMAX	1.67-8.0 L/ha	12 hours	7	
			Touchdown® 480	2.5-7.0 L/ha	12 hours	7	
	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 Treatments <i>Germinating broadleaved weeds</i>	5	Pyrazon	Pyramin FL	8.25-10.25 L/ha	12 hours	-	Do not apply on soils with less than 3% organic matter. Use high rate on medium to heavy soils. Apply in 200-500 L of water / ha. At least 1.25 cm rain after application is necessary for good weed control.
<i>Broadleaf weeds and grasses</i>	15	S-metolachlor	Dual II Magnum	1.25 L/ha	12 hours	-	Make only one application per year in a minimum of 150 L of water per ha. DUAL II MAGNUM may result in injury to the red beet crop which may include stand loss, delayed maturity and even loss of yield. Irrigate after application to activate the herbicide if rainfall is not expected, but use only 0.5 inches of water to incorporate the

							herbicide. Excessive irrigation will increase the risk of crop injury. Mechanical incorporation of DUAL II MAGNUM will increase the risk of crop injury. DO NOT use DUAL II MAGNUM if the planting operation creates a furrow or trough over the seed-row into which rain or irrigation water will collect and thus concentrate the herbicide over the row.
<i>Stale seedbed technique</i>	22	Diquat	Reglone, Dessicash (NEW 2017)	2.3-4.6 L/ha	24 hours	-	Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
		Paraquat	Gramoxone®	2.75-5.5 L/ha	24 hours	-	
Postemergence Treatments <i>Annual broadleaf weeds</i>	5	Pyrazon	Pyramin FL plus Citowett Plus	8.25 L/ha plus 250ml/100 L of spray volume	-	-	Apply after the first true leaf of beets is 2.5 cm long and before weeds have reached the 4 th true leaf stage. Apply in 300-400 L of water / ha
	2	Triflusaluron methyl	Upbeet plus Non-ionic surfactant (Agral 90, Citowett plus, Agsurf)	36 g/ha plus 0.25% v/v	-	30	For the control of broadleaf weeds, apply up to 3 times per year, post emergent to the crop, when beets are 2-4 leaf, 4-6 leaf and 6-8 leaf stages. In situations of stress, delay application until both weeds and crop resume growth. See label for mixing and application instructions. Do not apply more than 108 g/ha per year.
	5	Phenmedipham Desmedipham	Betamix β EC	1.15-1.75 L/ha	24 hours	30	May be applied to red garden beet at any growth stage when necessary to control early germinating weeds. Apply in 100-200 L /ha of water. Apply a maximum of 3 applications per season.
<i>Grasses</i>	1	Sethoxydim	Poast® Ultra Plus Merge® (adjuvant)	1.1 L/ha plus 1% v/v	12 hours	49	Can apply up to two applications per year, but total product applied cannot exceed 1.1 l/ha per season. Do not apply with Spray droplets smaller than the ASAE medium classification. See label for buffer zone restrictions.

	1	Clethodim	Centurion + Amigo (adjuvant)	0.125-0.19 L/ha Quackgrass : 0.38 L/ha 0.5% v/v Quackgrass : 1.0% v/v	12 hours	30	<i>To be used only with the adjuvant AMIGO.</i> <u>Annual grasses:</u> Apply Centurion when the annual grasses and volunteer cereals are in the 2 to 6 leaf stage. Most effective control is achieved when application is made prior to tillering when grasses are small and actively growing. <u>Quackgrass:</u> Apply Centurion when the quackgrass is in the 2 to 6 leaf stage and 6 to 15 cm in height. Most effective results are achieved when application is made at the 3 to 5 leaf stage, when the canopy is uniform and actively growing. Apply a maximum of two applications per year. If repeat application is required, allow at least 14 days between first and second application. <i>* Refer to section "MINOR USES" in the label for additional use instructions.</i>
<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, Dessicash	2.3-4.6 L/ha	24 hours	-	Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
		Paraquat	Gramoxone®	2.75-5.5 L/ha	24 hours	-	

Pest	Group	Active Ingredient	Pesticide Product Name	Rate	Restricted-Entry Interval (REI)	Pre-Harvest Interval (days)	Remarks
INSECTS							
Leaf miner	1B	Malathion	Malathion 500 E	1.1-2.75 L/ha	12-24 hours	7	Use enough water volume to ensure plant coverage.
Aphids	1B	Malathion	Malathion 85E	535-1345 ml/ha	-	7	Use enough water volume to ensure plant coverage.
			Malathion 500 E	1.1-2.75 L/ha	-	7	
	29	Flonicamid	Beleaf 50SG	0.12-0.16 kg/ha	-	3	Thorough spray coverage of plant foliage is essential. Minimum of 94 litres of water/ha. Maximum of 3 applications per season, allow 7 days between applications. Avoid overnight storage of spray mixtures, do not use liquid fertilizer as a carrier and do not use adjuvants.
	4	Thiamethoxam	Actara 25 WG	105 g/ha	12 hours	7	Also controls Aster leafhopper. Apply before pests reach damaging levels. Scout fields and treat again if populations rebuild to potentially damaging levels. Max of 2 app/season. Application interval: 7 days. Apply in sufficient water volume to ensure adequate coverage. Do not use less than 100 L/ha.
	4C	Sulfoxaflor	Closer SC	50-150 ml/ha	12 hours	7	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. Minimum 100 L/ha spray volume for ground application.
Flea beetles and leaf hoppers	1A	Carbaryl	Sevin XLR Plus	1.25-2.5 L/ha	5 days (hand harvest, irrigation), 12 hours (scouting, hand weeding, thinning).	1	Use a lower rate on young plants. Repeat on a 7-10 day interval.

	1B	Malathion	Malathion 85E	535-1345 ml/ha	-	7	Use enough water volume to ensure plant coverage.
Tarnished plant bug	1A	Carbaryl	Sevin XLR Plus	2.5-5.25 L/ha	-	7	Use a lower rate on young plants. Repeat on a 7-10 day interval.
	1B	Dimethoate	Lagon 480 E	0.7 L/ha	-	12	Maximum of 3 applications per season.
Cutworms	3	Permethrin	Pounce 384 EC	180 – 390 ml/ha	-	-	Only apply up to the 5-leaf stage. Applications should be made in warm moist conditions in the evening. Do not disturb soil for 5 days after treatment. Will only control surface feeding or climbing stages of cutworms.
Diamondback Moth, Cabbage Looper, Imported Cabbageworm, Beet armyworm	28	Chlorantranili prole	Coragen	250-375 ml/ha	12 hours	1	Begin applications when treatment thresholds have been reached. Thorough coverage is important to obtain optimum control. Do not apply more than once every 3 days. Max 4 applications/season.
Diamondback Moth, Cabbage Looper, Imported Cabbageworm	5	Spinetoram	Delegate WG	140-200 g/ha	-	3	Time application with peak egg hatch or small larvae. Repeat applications based on population monitoring. Use higher rate for higher infestations or advanced growth stages. Maximum of 3 applications per year with a minimum re-treatment interval of 7 days.
Beet armyworm, Beet webworm	11	<i>Bacillus thuringiensis</i> , subsp. <i>aizawai</i> , (Strain ABTS-1857 fermentation solids, spores, and insecticidal toxins)	XenTari WG	500-1000 g/ha	-	0	Beet armyworm, beet webworm. Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L per ha.
Carrot weevil	28	Cyantraniliprole <i>NEW 2019</i>	Exirel	1000-1500 ml/ha	12 hours	1	Begin applications at the 2-3 leaf stage or when scouting indicates the presence of weevils. Consult local agricultural authorities to determine appropriate threshold levels for carrot weevil in your area. Do not make more than 4 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
DISEASES							
Cercospora leaf spot	11	Pyraclostrobin	Cabrio EG	0.56-1.1 Kg/ha	12 hours	3	Maximum 2 sequential applications and three in total. Also controls alternaria and powdery mildew. **Can be used on beet tops to control <i>Alternaria</i> , <i>Cercospora leaf spot</i> and powdery mildew. Begin applications prior to disease development at 0.56-1.1 kg per hectare at 7-14 day intervals for <i>Alternaria</i> and 0.56-0.84 kg per hectare at 7-14 day intervals for <i>Cercospora</i> and at 7 day interval for powdery mildew. Use the higher rate and shorter interval when disease pressure is high. Do not apply more than one (1) application. **
	-	<i>Bacillus subtilis</i>	Serenade Opti	0.5-1.1 kg/ha	-	0	Serenade Opti is a biopesticide that will only suppress the indicated diseases. Begin application soon after emergence and when conditions are conducive to disease development. Repeat as necessary on a 7-10 day interval. Serenade Opti must be applied with a non-ionic surfactant at a rate of 0.25% v/v or at labeled rates. Under conditions of moderate to high disease pressures, use the higher rate and shorter application interval indicated.
	M1	Copper	Cueva	0.5% to 2% solution, applied at 470-940 L/ha	4 hours	1	Re-apply using 5-10 day intervals.
	11	Azoxystrobin	Quadris		-	40	

Rhizoctonia root rot, crown rot and stem canker (<i>Rhizoctonia solani</i>)			Azoshy 250 SC	4-6 mL per 100 m row in 50-100 L water/ha	12 hours		Maximum of one application per year. Apply either in-furrow at seeding or as a banded application over the row soon after emergence or within 30 days of emergence.
White mould (<i>Sclerotinia sclerotiorum</i>)	-	<i>Bacillus subtilis</i>	Serenade Opti	1.1-2.2 Kg/ha	-	0	Serenade Opti is a biopesticide that will only suppress the indicated diseases. Begin application soon after emergence and when conditions are conducive to disease development. Repeat as necessary on a 7-10 day interval.
Gray Mold	7	Penthiopyrad	Fontelis	1.0-1.75 L/ha	4 hours	0	Begin applications prior to disease development, continue on a 7-14 day interval. Use higher rate and shorter interval when disease pressure is high. Max seasonal rate is 4.5 L/ha. Do not make more than 2 sequential applications before switching to another mode of action.
Leaf blight (<i>Alternaria spp.</i>)	11	Trifloxystrobin	Flint	140-210 g/ha	-	7	Begin applications preventatively and continue as needed on a 14-day interval. Use the higher rate and shorter spray interval when disease pressure is severe. Use sufficient water to obtain thorough coverage. DO NOT apply more than 840 g of FLINT Fungicide per hectare 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>

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	
		mL	millilitre
EC, E	Oil-based emulsifiable concentrate	kPa	kilopascal
EW	Water-based concentrate	kg	kilogram
EG	Water dispersible granule	g	gram
L	Liquid	L	litre
SC	Suspension concentrate	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!