

Turnip and Rutabaga Management Schedule

*A guide to weed, insect and
disease management in turnip
& rutabagas in Nova Scotia*



2019



GUIDE TO PEST MANAGEMENT IN TURNIP & RUTABAGA



Nova Scotia Vegetable Crop Guide to Pest Management 2019
[TUR1-19]

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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.** The label is the best source of information on: registered crop uses, rates, days to harvest, compatibility with other pesticides, toxicity and other special information on its effective and safe use

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. If you have an old label, your pesticide supplier should be able to give you the newest label. 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 356 Sn	1.25-2.5 L/ha	-	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	12 hours	7	
			Touchdown 480	2.5-7.0 L/ha	12 hours	7	
	14	carfentrazone-ethyl	Aim EC	36.5-117 mL/ha	12 hours	1	
Preplant Incorporated <i>Germinating annual grasses</i>	3	trifluralin	Treflan EC	1.7-2.3 L/ha	12 hours	-	Incorporate within 24 hours of application. Ragweed and mustards are not controlled. This product has a carryover effect on corn and cereal the following year.
			Rival	1.6-2.2 kg/ha	12 hours	-	

<i>and some broadleaves</i>	15	napropamide	Devrinol 50 DF	2.2-4.4 kg/ha	12 hours	60	Incorporate within 24 hours of application. Do not apply to soils with over 10% organic matter.
	15	s-metholachlor / benoxacor	Dual II Magnum	1.25-1.75 L/ha	12 hours	-	Apply PPI or PRE
Preemergence <i>Stale Seedbed Technique</i>	22	paraquat	Gramoxone 200 Sn	2.75-5.5 L/ha	24 hours	-	Apply in 300 – 1100 L of water/ha to foliage of emerged weeds but before the crop has emerged
		diquat	Reglone 240, Dessicash	2.3-4.6 L/ha	24 hours	-	
Postemergence <i>Grasses</i>	1	fluazifop-p-butyl	Venture L	2.0 L/ha	12 hours	45	Apply to actively growing grasses at the 1-6 leaf stage. One application /season.
		sethoxydim	Poast Ultra plus Merge	0.32-1.1 L/ha 1-2 L/ha	12 hours	77	Apply to actively growing grasses at the 1-6 leaf stage.
<i>Broadleaf Weeds</i>	4	clopyralid	Lontrel 360	0.42-0.56 L/ha	12 hours	Rutabaga: 83 Turnip roots: 30 Turnip greens: 15	Max 1 application/yr. Apply when ragweed is 5-10 cm tall.
	4	Clopyralid	Pyralid	0.672 L/ha in 200 to 300 L/ha of water	12 hours	83	For control of common ragweed in rutabaga . Apply with a boom sprayer. Apply as a postemergent spray when ragweed plants are 5 to 10 cm tall. Application to larger ragweed plants will result in reduced weed control. Make only one application per season.

	2	Ethametsulfuron-methyl	Muster	15 g/ha		45	Laurentian Rutabaga only. For postemergent control of wild mustard, apply Muster® Toss-N-Go® at 15 g/ha with a recommended non-ionic surfactant (Ag-Surf®, Agral® 90, or Citowett® Plus) at 2 L/1000 L of spray volume OR a recommended adjuvant (Sure-Mix™) at 5 L/1000 L of spray volume. Apply Muster® Toss-N-Go® from the cotyledon to the 6-leaf stage of wild mustard. For best results apply to the main flush of young, actively growing weeds. Apply before the crop canopy prevents thorough coverage of the small target weeds. Weeds that emerge after application may not be controlled.
<i>Inter-row shielded</i>	22	paraquat	Gramoxone 200 Sn	2.75-5.5 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.
	22	diquat	Reglone 240, Dessicash	2.3-4.6 L/ha	24 hours	-	
	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
INSECTS:							
Cabbage Root Maggot <i>Treatment at Planting</i>	1B	chlorpyrifos	Lorsban 15 G	0.6-1 kg/1000 m of row	24 hours	30	Rutabaga only.
<i>Treatment after Planting</i>	1B	chlorpyrifos	Lorsban 4 E	210 ml/1000m of row in 125 L of water	24 hours	30	Apply on soil, 10 cm on either side of the plant, 10, 28, 49 and 70 days after seeding. Max 4 applications/yr. Rutabaga only.
			Warhawk 480 EC				
Cutworms	1B	chlorpyrifos	Lorsban 4E	1.2-2.4 L/ha	24 hours	30	Apply once at seedling stage when damage first appears. Apply a 15 m strip into adjacent fence rows. Rutabaga only.
			Warhawk 480 EC				Soil treatment: Apply once, 3-7 days before transplanting. Do not incorporate. Also apply to a 15 m strip into adjacent fence rows. Seedling treatment: Apply once as a broadcast spray at the 2- to 5-leaf stage of the crop. Rutabaga only.
Leaf Feeding Caterpillars	5	spinosad	Success 480 SC	182 ml/ha	12 hours	3	Max 3 applications/yr. Allow 7-10 days between applications
			Entrust 80 W	109 g/ha	12 hours	3	Max 3 applications/yr. Allow 7-10 days between applications. Works best on small larvae.
	5	spinetoram	Delegate WG	140-200 g/ha	12 hours	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.

							Max 3 applications/year with a minimum re-treatment interval of 7 days. Diamondback Moth, Cabbage Looper, Imported Cabbageworm.
	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	Cabbage looper, Cross-striped cabbageworm, Diamondback moth, Imported cabbageworm. Apply sufficient spray volume to ensure uniform deposition on all plant surfaces; recommend 500 L per ha.
Flea Beetle	1A	carbaryl	Sevin XLR Plus	1.25-2.5 L/ha	5 days (hand harvest, irrigation), 12 hours (scouting, hand weeding, thinning).	7	Repeat on 7-10 day intervals or as necessary.
	3	permethrin	Pounce 384 EC	180 ml/ha	12 hours	-	Apply between the 2-8 leaf stage, but no later than the 8 leaf stage.
	3	cypermethrin	Mako	123 ml/ha	-	21	Apply as insects appear, repeat as necessary.
			UP-Cyde	200 ml/ha	12 hours	21	Apply as insects appear, repeat as necessary. Roots and tops may be fed to lactating dairy animals after PHI.
	5	Spinetoram	Delegate WG	200 g/ha	12 hours	3	Suppression Only. Apply when pests appear. Maximum of three applications per year with a minimum re-treatment interval of 5 days.
	5	Spinosad	Entrust	364 ml/ha	12 hours	3	For the suppression of flea beetle, apply at the emergence of adults and reapply in 7-10 day intervals as necessary.

Aphids	29	Flonicamid	Beleaf 50SG	0.12-0.16 kg/ha	12 hours	3	Thorough spray coverage of plant foliage is essential. Minimum of 94 L water/ha. Maximum 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 applications/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 per 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.
	-	Mineral oil	Purespray Green Spray Oil 13E	10 L in 550-1100 L of water/ha.	-	21	Thorough coverage is essential. Application should be made at 2500 kPa with hollow cone nozzles. Spray at one week intervals beginning in mid-June or at the first appearance of aphids in the local area. Application may be required for up to 10 weeks of aphid activity. CAUTION: Do not apply in direct sunlight. Spray rutabagas early in the morning or in the evening. Allow at least 24 hours to elapse after the application before applying other insecticide sprays. Do not apply in more concentrate solutions than recommended as crop injury may occur.

Swede midge	4	Acetamiprid	Assail 70 WP Aceta 70 WP	86 g/ha	12 hours	7	Begin application when insect populations reach recognized economic threshold levels. Do not make more than 5 applications per season. Do not apply more than once every 7 days.
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:							
Rhizoctonia root rot, Crown rot and Stem canker	11	azoxystrobin	Quadris	4-6 ml/100m of row in 50-100 L water/ha	12 hours	40	Max 1 application/yr. Apply either in-furrow at seeding or as a banded application over the row soon after emergence, or within 30 days of emergence.
			Azoshy 250 SC				
Powdery Mildew	3	propiconazole	Topas 250 E / Tilt 250 E	400 ml/ha	12 hours	21	Apply in a minimum of 200L/ha. A second application may be made 20 days after the first.
			Mission 418 EC / Bumper	240 ml/ha	12 hours	21	Apply in a minimum of 200L/ha. Make 2 applications per season with the first at 50 days after planting and the second 20 days later.
			Propi Super 25EC	400 ml/ha	12 hours	21	Make two applications per season with the first application at 50 days after planting and the 2nd application 20 days later. Apply to vegetative foliage. Use 200 L of water per hectare.
	11	pyraclostrobin	Cabrio EG	560-840 g/ha	3 days	3	Max 3 applications/yr. Do not make more than 2 applications in a row before rotating to another chemical.
	M1	sulfur	Microscopic Sulfur	6.8 kg/ha	-	0	Max 5 applications/yr. Apply in 675-1125 L of water/ha.
Downy Mildew	33	fosetyl AL	Aliette	2.25-3.125 kg/ha	12 hours	7	Maximum of 5 applications per year, repeated at 7 day intervals as needed.

	44	<i>Bacillus subtilis</i>	Serenade Opti	1.4 Kg/ha	-	0	Biopesticide that will only suppress the indicated diseases. Downy Mildew: Begin application when environmental conditions are conducive to disease development; repeat on 7-10 day intervals.
	43	fluopicolide	Presidio	220-292 ml/ha	12 hours	7	Apply in 200-1000 L/ha. For resistance management, Presidio must be tank-mixed with a labeled rate of another fungicide registered for the target pathogen, but with a different mode of action. Apply Presidio in a tank mix with Bravo 500. Follow the most restrictive use directions of either label. Make foliar applications on a 7 - 10 day schedule beginning with initial flowering, or when disease conditions are favourable, but prior to disease development. Use the lower rate and longer interval as preventive applications. Use the higher rate and shorter interval if disease is present.
	11	Fenamidone	Reason 500 SC	400-600 mL/ha		2	For turnip greens only. Begin applications as soon as crop and/or environmental conditions become favourable for disease development. Applications should be made on a 5-10 day interval depending upon disease conditions. Apply on the shorter application interval and/or switch to the higher rate under conditions favourable to high disease pressure. Max 2 applications/year.

White mould (<i>Sclerotinia sclerotiorum</i>)	44	<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	12 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	12 hours	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 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://www.hc-sc.gc.ca/cps-spc/pest/registrant-titulaire/tools-outils/label-etiq-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
EC, E	Oil-based emulsifiable concentrate	kPa	kilopascal
EG	Water dispersible granule	kg	kilogram
G	Granular	g	gram
L	Liquid	L	litre
SC	Suspension concentrate	BIU	Billions of International Units
Sn	Solution	ppm	parts per million (1000 ppb)
WP, W	Wettable powder	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!