

Turnip and Rutabaga Management Schedule

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



2018



GUIDE TO PEST MANAGEMENT IN TURNIP & RUTABAGA



Nova Scotia Vegetable Crop Guide to Pest Management 2018
[TUR1-18]

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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 | - | |

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| <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. |

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| | 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. |

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|--|-------|-------------------|---|---------------------------------------|---------------------------------|-----------------------------|--|
| 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 Warhawk 480 EC | 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. |
| Cutworms | 1B | chlorpyrifos | Lorsban 4E Warhawk 480 EC | 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. 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 |

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| | | | | | | | 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 | 12 hours | 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 <i>NEW 2018</i> | 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 <i>NEW 2018</i> | 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 |

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| | | | | | | | 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 days | 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. |

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|--|-------|-------------------|---------------------------------|---|---------------------------------|-----------------------------|---|
| 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. |

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| | 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. |

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| 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) | |
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| 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 | | | |
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| 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 | |
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| 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!