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Prowl H2O Herbicide label expanded via Minor Use Program for control of labeled weeds on transplanted celery in Canada

J. Chaput, Minor Use Coordinator, OMAFRA



The Pest Management Regulatory Agency (PMRA) recently announced the approval of a minor use label expansion registration for **Prowl® H₂O Herbicide** for control of labeled weeds on transplanted celery in Canada. **Prowl® H₂O Herbicide** was already labeled for use on a number of crops in Canada for control of several weeds.

This minor use project was submitted by Agriculture & Agri-Food Canada (AAFC-PMC) as a result of minor use priorities established by growers and extension personnel.

The following is provided as an abbreviated, general outline only. Users should be making weed management decisions within a robust integrated weed management program and should consult the complete label before using **Prowl® H₂O Herbicide**.

“In This Issue”

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- ◆ Beleaf Insecticide label expanded via Minor Use Program for management of tarnished plant bug on leaf petiole and leafy vegetables in Canada.
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Crop	Target	Rate (L/ha)	Application Information	PHI (days)
Celery	Green foxtail, redroot pigweed, lamb's-quarters (suppression)	2.37	Apply as a broadcast over the top application at least 21 days after transplanting and prior to the emergence weeds. One application per year. Use a minimum of 200 L water per hectare	60
Celery	Barnyard grass, crabgrass, green foxtail, yellow foxtail, common chickweed, lamb's quarters, redroot pigweed	6.6	Apply as a broadcast over the top application at least 21 days after transplanting and prior to the emergence weeds. One application per year. Use a minimum of 200 L water per hectare	60

Prowl H2O Herbicide label expanded via Minor Use Program for control of labeled weeds on transplanted celery in Canada...con't

Prowl® H₂O Herbicide is toxic to aquatic organisms and non-target terrestrial plants. Do not apply this product or allow drift to other crops or non-target areas. Do not contaminate off-target areas or aquatic habitats when spraying or when cleaning and rinsing spray equipment or containers. Do not apply Prowl® H₂O Herbicide more than once in two consecutive years.

Follow all other precautions, restrictions and directions for use on the Prowl® H₂O Herbicide label carefully.

For a copy of the new minor use label contact your local crop specialist, regional supply outlet or visit the PMRA label site <https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/registrants-applicants/tools/pesticide-label-search.html>

What's Growing ON? Podcast Season 2



Kristy and Cassie are back with a second season of the What's Growing ON? podcast. Episodes for this season will feature talks with OMAFRA specialists that cover general horticultural topics across multiple commodities.

We kick off this season talking about labour efficiencies and improving on-farm productivity.

In Part 1, Kristy chats with Engineer Specialist, John Van de Vegte, and Fruit Specialist, Kathryn Carter about ways to evaluate on-farm productivity in orchards and vineyards and the importance of establishing baseline productivity measures.

In Part 2, Cassie continues the conversation with John who provides some examples of value add and non-value add activities in vegetable operations, and discusses the future direction for automation and labour saving technologies in field vegetable production.

Accessible formats of episodes available upon request. Music by Scott Holmes.

Click here(<https://onvegetables.com/podcast/>) to get caught up on previous “What's Growing ON?” episodes.

You can also listen by searching “What's Growing ON?” on Spotify, Apple podcast, or wherever you listen to podcasts.

Have a topic you would like us to cover? Please send us comments and suggestions to onhortcrops@gmail.com.

Beleaf Insecticide label expanded via Minor Use Program for management of tarnished plant bug on leaf petiole and leafy vegetables in Canada

J. Chaput, Minor Use Coordinator, OMAFRA



The Pest Management Regulatory Agency (PMRA) recently announced the approval of minor use label expansion registrations for **Beleaf® Insecticide** for the suppression of tarnished plant bug (TPB) on leafy greens, crop subgroup 4-13A and leaf petiole vegetables, crop subgroup 22B and an increased rate for aphids on stone fruit, crop group 12-09 in Canada. **Beleaf® Insecticide** was already labeled for use against insects on many crops in Canada.

These minor use proposals were submitted by Agriculture & Agri-Food Canada, Pest Management Centre as a result of minor use priorities established by growers and extension personnel.

The following is provided as an abbreviated, general outline only. Users should be making pest management decisions within a robust integrated pest management program and should consult the complete label before using **Beleaf® Insecticide**.

Crop(s)	Additional Target Pests	Rate (kg/ha)	Application Information	PHI (days)
Leafy greens, crop subgroup 4-13A* Leaf petiole vegetables, crop subgroup 22B*	Tarnished plant bug (suppression)	0.2 (3 applications) or 0.3 (2 applications)	Apply when tarnished plant bugs first appear in the field and before populations reach high levels. Scout fields and reapply if necessary. Allow a minimum of 7 days between applications. Do not apply more than 3 applications per year.	0 days

Updates to the label for Brassica leafy greens subgroup, 4-13B, Head and stem Brassica crop group 5-13 and celtuce, fennel and kohlrabi were also part of this label update.

***CG4-13A:** Amaranth, Chinese; Amaranth, leafy; Aster, Indian; Blackjack; Cat's Whiskers; Cham-chwi; Cham-namul; Chervil, fresh leaves; Chipilin; Chrysanthemum, garland; Cilantro, fresh leaves; Corn salad; Cosmos; Dandelion; Dang-gwi; Dillweed, fresh leaves; Dock; Dol-nam-mul; Ebolo; Endive; Escarole; Famefower; Feather cockscomb; Good King Henry; Huazontle; Jute leaves; Lettuce, bitter; Lettuce (head and leaf); Orach; Parsley, fresh leaves; Plantain buckhorn; Primrose, English; Purslane, garden; Purslane, winter; Radicchio (Red Chicory); Spinach; Spinach, Malabar; Spinach, New Zealand; Spinach, tree; Swiss Chard; Tanier Spinach; Violet, Chinese.

***CG22B:** Cardoon; Celery; Celery, Chinese; Fuki; Rhubarb; Udo; Zuiki as well as cultivars and hybrids of these commodities.

Beleaf® Insecticide is toxic to certain beneficial insects and non-target terrestrial plants. Do not contaminate off-target areas or aquatic habitats when spraying or when cleaning and rinsing spray equipment or containers.

Follow all other precautions, restrictions and directions for use on the **Beleaf® Insecticide** label carefully.

For a copy of the new minor use label contact your local crop specialist, regional supply outlet or visit the PMRA label site <https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/registrants-applicants/tools/pesticide-label-search.html>

Vegetable Nematodes 101

Dennis Van Dyk, Vegetable Crop Specialist, OMAFRA

Nematodes are microscopic roundworms that feed on bacteria, fungi, plants, insects or even humans. There are so many of them that it's been said if you removed everything in the world except for nematodes, you would still see the shape of hills, lakes, plants and animals. Not a great picture if worms gross you out.

There is a small sub-section of these nematodes that all vegetables growers should know about; plant parasitic nematodes. Plant parasitic nematodes are sneaky, under-appreciated pests which rob yield and reduce quality in vegetable crops. They often fly under the radar because their patchy symptoms can be tough to diagnose and easily written off as stress, disease or soil issues like fertility, pH or soil moisture. Taking a nematode soil test is key to proper ID.

Nearly all vegetables are impacted by nematodes, in the US alone studies estimate that nematodes account for \$10 billion in vegetable losses per year. That's a huge impact which shouldn't be ignored. So, what are you looking for in your fields and what kind of nematodes are out there? Here are 4 types of nematodes that could be hiding out and costing you yield:

1. Root-knot nematodes

- **Main species in Ontario:** Northern root-knot nematode (*Meloidogyne hapla*)
- **Host Range:** Very wide host range. Beans, carrots, celery, lettuce, onions, potatoes and tomatoes are considered very susceptible, but most vegetables are hosts. Cereal/grain crops seem to be poor or non-hosts.
- **Life Cycle:** Juvenile nematodes infect the roots and establish a feeding site to suck out all the nutrients. This feeding site causes the root to swell into a gall. Females swell up and can release hundreds of eggs.
- **Symptoms:** Typical galling on the roots, causing multiple secondary roots and a hairy root appearance leaving some vegetables unmarketable. Tops may be weak or stunted, reduced yield.
- **Management:** Most of the eggs only survive 1-2 years so crop rotation with >2 years of a grain crop (corn, wheat, rye, barley, oats, sorghum, millet) helps reduce numbers. Eggs are protected by a gelatinous matrix so fumigation has limited effect.



Galling on tomato roots caused by root-knot nematode.



Root-knot nematode female (white) with hundreds of eggs in a gelatinous matrix (red) outside of a root gall.

2. Lesion nematodes

- **Main species in Ontario:** Root lesion nematode (*Pratylenchus penetrans*)
- **Host Range:** Very wide host range. Unlike root-knot nematode, root lesion nematodes will feed on cereals and in particular corn. Potatoes, carrots, tomatoes and soybeans are considered very susceptible but most vegetables can be infected.
- **Life Cycle:** Migratory nematode which feeds extensively through the roots and lays eggs as it goes. Reinforced blunt head and strong stylet (feeding needle to poke and feed on plant cells) allow it to enter and feed on most plant roots.
- **Symptoms:** Stunted roots with brown lesions and black areas that pinch off. Stunted, stressed plants which can die early. The root lesion nematode is often involved in disease complexes like Potato Early Dying (*Verticillium* spp. and root lesion). Root lesion feeding damage provides an entry for disease in a synergistic relationship.
- **Management:** Fumigation can be used to reduce numbers. Crop rotation is important although host range is wide. Sorghum sudangrass and pearl millet have been shown to reduce populations as have Brassicas grown for biofumigation.

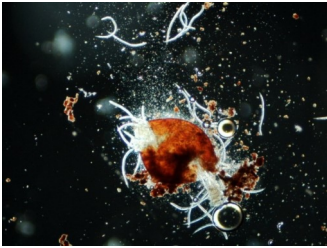


Root lesion nematode with a reinforced head to burrow into plant roots

Vegetable Nematodes 101...con't

3. Cyst nematodes

- **Main species in Ontario:**
 - i. Soybean cyst nematode (*Heterodera glycines*)
 - ii. Sugarbeet cyst nematode (*Heterodera schachtii*)
 - iii. Carrot cyst nematode (*Heterodera carotae*)
- **Host Range:** very specific to the species
 - i. Soybean cyst nematode: beans and some weeds
 - ii. Sugarbeet cyst nematode: sugarbeet, table beet, spinach, swiss chard, Brassica crops.
 - iii. Carrot cyst nematode: carrots only
- **Life Cycle:** Generally, females feed on roots and swell into an enlarged cyst filled with hundreds of eggs. The cyst hardens and protects the eggs. Eggs can stay dormant for years until they hatch in response to host plant root exudates.
- **Symptoms:** Similar to root-knot nematode damage except instead of galls, there are cysts. Hairy root appearance from multiple secondary roots. Above-ground symptoms are stunted plants.
- **Management:** Since cyst nematodes generally have a specific host range, breeding genetic resistance is the key management tool for these nematodes. This also means crop rotation is generally effective if the rotation is long enough. Eggs are protected by the female cyst so fumigation has limited effect.



Female cyst nematode (orange/brown) broke open to release recently hatched juveniles and eggs from their protective cyst.



Carrot cyst nematodes on carrot roots

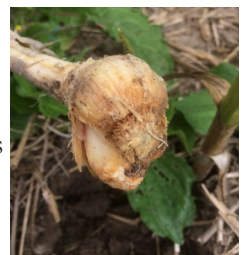
4. Stem and Bulb nematode

- **Main species in Ontario:** Stem and bulb nematode (*Ditylenchus dipsaci*)
- **Host Range:** Alliums (onions, garlic, leeks, chives), carrots, peas, beans
- **Life Cycle:** This nematode is usually found in the above-ground parts of the plant. Even when the nematode is in the soil, it is usually found in the top 1-2 inches of soil.
- **Symptoms:** Sometimes called the bloat nematode, this nematode feeds on the basal plate causing plants to split and grow erratically.
- **Management:** Using clean seed is crucial to prevent introduction into the field. For garlic this is critical as infested cloves used for planting stock allow numbers to build exponentially. Fumigation can be used to reduce numbers.



Stem and bulb nematodes extracted from an infected garlic bulb

Basal plate damage to garlic caused by stem and bulb nematodes



December 08, 2020

Is pepper maggot taking the “bite” out of your crop?

Amanda Tracey, Vegetable Crop Specialist, OMAFRA

Pepper growers in the extreme Southwest of the province have been dealing with a periodically pesky pest known as pepper maggot for a few decades. In recent years it has come back into the spot light as it was often confused for pepper weevil during the outbreaks in 2016 and 2017. This year growers as far north as Wellington County have been reporting pepper maggot infestations. This is a large potential range expansion for this pest.

Pepper maggot is the larval form of the fly *Zonosemata electa* (Say) and is thought to have moved from weed species like horse nettle and ground cherry onto horticulture crops. It is now a pest of pepper, mostly cherry and bell varieties, and occasionally eggplant. Pepper maggot is thought to have only one generation with adult flies mating from mid-July to early August and laying eggs in pepper fruit. The eggs then hatch into maggots (Fig. 1), which tunnel into the fruit and exit at the blossom end to pupate in the soil. Pepper maggot flies are smaller than a house fly with green eyes, clear wings with a distinct banding pattern and three yellow stripes on the thorax (Fig. 2). The middle stripe is usually thicker.



Figure 1. Pepper maggot larva in pepper fruit.



Figure 2. Pepper maggot fly on sticky trap.

Monitoring for pepper maggot adult flies is key to managing this pest. Growers can look for egg laying stings or scars on fruit and use baited traps to capture adults. The best way to trap pepper maggot is to use yellow sticky cards baited with a vial of ammonia. Pre-baited sticky cards are available from some distributors. These cards can be hung just above the crop canopy or even in trees bordering the field. Adult flies only come into the field to lay eggs during the day and remain in shaded areas otherwise. Sugar maple trees seem to be one of their favourites. Traps placed at heights of 2 m or less may fail to detect pepper maggot adults when the population is low. Research has demonstrated that fly capture is enhanced, and the reliability of monitoring is improved when traps are placed high in the tree canopy (6-8 m), although this may be impracticable or difficult to achieve on your farm. Traps can also be combined with indicator plants to increase the likelihood of detection. Cherry peppers planted in the border rows work well as they are a preferred host for pepper maggot.

Once an adult fly is captured, it is best to implement control measures quickly to prevent the adults from laying more eggs and causing more fruit damage. For conventional growers, there are a few products registered for pepper maggot control in peppers: acephate, dimethoate and cyantraniliprole. Always make sure read product labels carefully before every pesticide application. Smaller growers can also use exclusion netting during the 5-8 weeks that adults are active to help minimize damage, but these need to be in place prior to adult emergence.

Even though infestations of pepper maggot have traditionally been patchy and sporadic, it is always best to be on the look out for early signs of this pest. We are interested in exploring the range expansion of this pest in Ontario. If you have experienced losses attributed to pepper maggot, please contact us at amanda.tracey@ontario.ca or 519-350-7134.