Dead patches of grass? Skunks, raccoons digging your lawn? See grubs in your garden?

Lawn grubs are the larval stage of June Bugs, Japanese Beetles, European Chafer, Cranefly etc. Nematodes are living organisms – natural parasites! They are microscopic worms that occur naturally in the soil. Nematodes hunt down and kill GRUBS! 100% SAFE for people, pets, plants and earthworms.

**LAWN GUARDIAN™** is the only **CANADIAN Nematode**!

**CANADIAN NEMATODES EH!**
- More cold tolerant, apply when soil is 10°C
- More aggressive to Canadian Pest insects
- Fresher & Stronger
- Live Host Raised
- Non Toxic – Chemical FREE

**Complete Solution for Natural Lawn Grub Control!**

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**When Do I Apply?**

Grubs start feeding in April and again in August. Apply Beneficial Nematodes in May or when grubs are seen in the soil, ensure the soil temperature is 10°C or above. Apply in Autumn from August to October to eliminate new grubs that hatched in the summer.

|-----|------|------|--------|------|-----|

**Coverage Area**

2,000 – 3,000 ft² (186m² - 279m²)

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**Common Insect Pests controlled**

- Lawn Grubs
- Japanese Beetles
- European Chafer
- May / June Beetle
- Iris Borer
- Root Weevils
- Cutworms
- Fleas
- Webworms
- + 250 other Insect Pests

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**EASY TO APPLY 1-2-3**

1. Pre-water area being treated 2 – 3” (5 – 8cm) deep.
2. Mix Beneficial Nematodes in 4L water, to make a concentrated solution. Use a hose end sprayer or watering can to apply.
3. Keep soil watered for 3 – 4 days after application to ensure the nematodes get into the soil to find grubs.
Steinernema and Heterorhabditis nematodes have emerged as the only alternative candidate to chemical insecticides for the control of a wide range of soil inhabiting insects particularly when they are introduced into environmental conditions that favor their activity, survival and host seeking capability. Fortunately nematodes do not adversely affect earthworms, the most important organism involved in organic matter breakdown in turf. Thus, the potential benefits (safe to vertebrates, reduced insecticide use and no environmental contamination) to the lawn care industry through the application of “Canadian” LAWN GUARDIAN™ or GUARDIAN™ are great, especially since workers can mix, handle and apply LAWN GUARDIAN™ without protective clothing and people can continue to enjoy their yards immediately after application. Since LAWN GUARDIAN does not contain harmful chemicals, will not harm people, pets or plants and will not contaminate soil or ground water.

Natural Insect Control is the only Beneficial Nematode producer in Canada. We have isolated and are now producing Canadian strains of nematodes, the only Canadian nematodes on the market! What does this mean?

- Canadian strains are more colder tolerant (50°F/10°C)
- More aggressive (specifically selected nematodes)
- Fresher (harvested daily)
- Live Host Raised = organic faster control & natural affinity for grubs.

Natural Insect Control offers Canadian nematodes in the following products:
- LAWN GUARDIAN™ for Lawn Grubs eg, June, Japanese Beetle larva, European Chafer
- GUARDIAN™ – for Crane flies (Leatherjackets)
- VEGGIE / PLANT GUARD – Iris Borer, Onion + Carrot Maggots, Flea Beetles
- STOP FLEA - Fleas

Life Cycle:
Both Steinernema and Heterorhabditis nematodes have similar life cycles. It is a non-feeding infective (juvenile) nematode that seeks out an insect host and releases its bacteria to initiate an infection in the host. The resulting infection causes the insect to die, and nematodes to feed and reproduce. Nematodes using their symbiotic bacteria kill insect hosts within 24-48 hours, thus release hundreds of thousands of new infective nematodes. It has been demonstrated that numerous insect pests are susceptible to nematode infections, but there is no adverse effects in non-target insects like ladybugs. This bacteria is specific to beneficial nematodes and their host. It is NOT harmful to people, pets, plants, etc.

APPLICATION PROCEDURE

For successful application of nematodes the following steps should be taken into consideration:

Soil Conditions:
Adequate soil moisture is essential to successful use of nematodes since they require a film of water in which to migrate to and penetrate a grub. Therefore it is important to irrigate both before and after applying nematodes. As much as 2 to 3 inch of water may be required to ensure that nematodes are washed down through the grass to the soil, and that the soil is moist enough to provide a suitable habitat for the nematodes in the root zone. The soil
must be wet to below the level of the grubs. Field application of nematodes to dry turf with 3 inch pre-treatment irrigation followed by 3 inch post treatment irrigation with normal rainfall resulted in Japanese beetle grub control comparable to a standard insecticide (Sheltar 1987). While nematodes can survive when grass is at the wilting point, they are far less mobile and thus less effective at searching out grubs. Attention to irrigation is particularly critical when applying nematodes to control summer populations of grubs.

**Application Timing:**
Apply beneficial nematodes in early spring thru fall as long as the soil temperature does not fall below 50°F (10°C) or rise above 82°F (28°C) and when pests larvae are in the soil. To avoid the effects of solar radiation, as nematodes are ultraviolet sensitive (Gaugler & Boush 1979), & temperature extremes, application in early morning or early evening is recommended. More than one application of nematodes may be required for acceptable control when soil environments are not conducive for nematode persistence. **Spring applications** are necessary if grubs are present in the soil. **Summer applications** are less likely, but can control second and third year May/June beetle larvae that may be found in soil. **Fall applications** can begin in late August when grubs are present in soil again and continue until soil temperature drops below 50°F (10°C). Fall applications provide the highest efficacy (kill) rate as the grubs are small and close to the surface. Fall application can prevent spring grub damage. Prevention should be part of all Lawn Care Companies offerings in a grub infested area with a Fall application.

**Application Equipment:**
Nematodes can be applied using variety of spraying equipment:

- **Hose End Sprayer** (adjust the setting to allow maximum water – depending on the type of Hose End Sprayer – if it mixes water into the container you need to add coloring to determine when the nematode concentrate has been dispersed) and attached to your customers water supply.
- **Back Pack Sprayer** (remember to tip the container periodically to keep the nematodes in suspension).
- **Tanker Truck** with agitator in the tank (nematodes are heavy and tend to fall to the bottom) therefore must be kept agitated.

Nematodes can tolerate pressure up to 300psi. The tank screening should be at least 50 squares /inch either metal or plastic. Remove any finer screens that are metal as they will damage the nematodes during application. We recommend a shower head nozzle to deliver large droplets which are able to penetrate the deeper thatch.

**Application Sizes and Formats:**
LAWN GUARDIAN - 10 or 25 million on a sponge contains live, infective stage juveniles only. The largest quantity on a sponge is 25 million so larger quantities are multiples of 25 million. Refrigerated storage time for 10 million is 6 weeks for 25 million is 2 weeks. On sponge application is ideal for Hose End Sprayer or Backpack applications. Nematodes are also available in a liquid formulation for larger quantities. Pure nematodes in a plastic container shipped with ice must be used within 24 hours of receipt and most be kept refrigerated. The storage time can be extended with aeration.

**Nematode Coverage:** Nematode coverage is very precise, while nematode dilution is not. The nematodes should be applied with sufficient water to allow them to penetrate the soil to the level of grubs. If using a watering can or pail, remember to keep mixture well agitated as the nematodes will sink to the bottom preventing even distribution. Once mixed with water, the nematodes should be applied within 2 hours or aerated to keep them alive. The chart below is only a guideline, more water can be used.

<table>
<thead>
<tr>
<th>Nematode Quality</th>
<th>Turf Coverage</th>
<th>Mixed with Water (concentrate)</th>
<th>Applied with Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 million</td>
<td>2000 ft² (185m²)</td>
<td>1 gallon (3.8L)</td>
<td>15 gallons (56.8L)</td>
</tr>
<tr>
<td>25 million</td>
<td>5,000 ft² (464m²)</td>
<td>2.5 gallons (9.5L)</td>
<td>40 gallons (151.4L)</td>
</tr>
<tr>
<td>50 million</td>
<td>10,000 ft² (929m²)</td>
<td>5 gallons (18.9L)</td>
<td>80 gallons (302.8L)</td>
</tr>
<tr>
<td>100 million</td>
<td>20,000 ft² (1858m²)</td>
<td>10 gallons (37.8L)</td>
<td>160 gallons (605.7L)</td>
</tr>
</tbody>
</table>
**Nematodes Species Available**

*Heterorhabditis bacteriophora* (Canadian)  
Soil Temp. 10- 30°C (50 - 86°F)  
White Grubs, European Chafer, Strawberry Root Weevil, Black Vine Weevil

*Steinernema carpocapsae* (Canadian)  
Soil Temp 10 - 29°C (50 - 85°F)  
Fleas, Iris Borer, Flea Beetles, White Grubs, Caterpillars

*Steinernema feltiae PLUS* (Canadian)  
Soil Temp 10 - 29°C (50 - 85°F)  
Crane Flies (Leather jacket)-Fungus Gnats, Scariad Flies

*Steinernema feltiae* (European; NEMS)  
Soil Temp 13- 29°C (55 - 85°F)  
Fungus Gnats, Scariad Flies

All Canadian Strains of Beneficial Nematodes will over winter as they have all been isolated from Northern Ontario. But not enough will remain to keep control each year. We highly recommend Fall applications in infested areas to prevent turf damage.

Natural Insect Control has two Entomologist on full time staff:
Stacey will help you with your orders and she will ensure that you receive the correct strains and amounts you require with the proper timing.
We also do special blends if required for your situations.
Sean is our research specialist – working this season primarily on Beneficial Nematodes to control Black Vine Weevil in a variety of situations.
Black Vine Weevil is becoming more of an issue on private landscapes due to the introduction by trees and shrubs that are infested. Many of the cedar trees coming from Western Canada come with Black Vine Weevils.
SOME SPECIES INFESTED BY BENEFICIAL NEMATODES

Algae gnats    Apple leaf roller    Army worms
Banded cucumber beetle    Bark beetle    Bean leaf roller
Bess beetle    Billbugs    Black fly
Boll weevil    Cabbage aphid    Cabbage looper
Cabbage worm    Can e weevil    Carpenter moth
Checkered beetle    Click beetle    Coding moth
Colorado potato beetle    Corn earworms    Corn root weevil
Cutworms    Earwig    European corn borer
Fall army worm    Field cricket    Fleas
Yellow fever mosquito    Fungus gnats
Gal l gnats    Gall midges    German cockroach
Grasshoppers    Gypsy moth    Horn worms
House fly maggots    Imported fire ant    Iris borer
Japanese beetle    June beetle    Leaf miner
Leather jackets    Lea ther skeletonizer    Leaf beetle
Meal moth    Meal worm    Measuring worms
Melon worms    Mexican bean beetle    Mormon cricket
Onion borer    Oriental fruit moth    Pear aphids
Ear weevil    Pine beetle    Flea beetles
Fruit fly    Pink bollworm
Potato tubeworm    Powder post beetle    Red bugs
Rice weevil    Round headed borers    Sawflies
Scarab beetle    Seed corn maggot    Southern pine beetle
Southern root worm    Sod webworm    Sow bugs
Sting bugs    Strawberry root weevil    Spruce budworm
Squash bugs    Termites    Thrips
Tobacco budworm    Tobacco hornworm    Webworms
White fringed beetle    White grubs    Winter moth
Wireworms    Wood borers    Pine tip moth
Pine weevil

PLEASE LET NIC KNOW WITHIN 24 HOURS UPON RECEIPT IF THERE ARE ANY PROBLEMS WITH YOU LIVE NEMATODE ORDER.