

# NEMATODES



## HUMBER NURSERIES 'GREEN THUMB GUIDE'



### WHAT ARE NEMATODES?

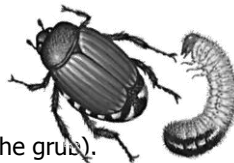
Nematodes are microscopic worm-like organisms that have been found in almost every habitat on earth, from the bottom of the ocean to mountain tops. Most types of nematodes are parasitic and some of those, (which live in soil) are commercially grown to attack different types of lawn and garden pests.

Once nematodes enter the body of a pest, they feed and reproduce. Within as little as 48 hours, the pest will be dead and the nematodes will move on in search of more pests to feed on.

Although nematodes attack many different types of pests, this guide describes only the most common ones nematodes are used to control. Speak with our staff to learn more about which pests can be controlled.

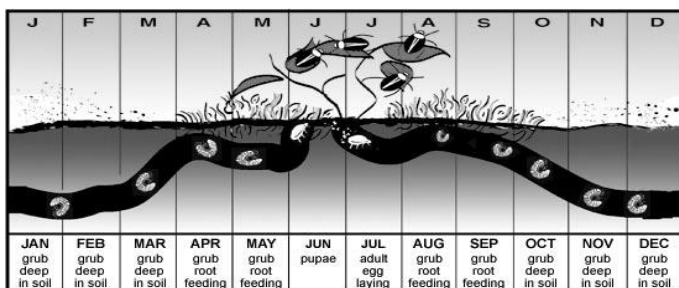
### JAPANESE BEETLE

The Japanese beetle was accidentally introduced to North America. They have since spread quickly and have become a serious lawn and garden pest. The picture on the left shows the adult, while the picture on the right shows the larval form of the beetle (commonly known as the grub).



The grub, which is white/brown in colour and approximately 1 inch (2.5 cm) long, is normally found just under the surface of the soil, feeding on the roots of lawn grasses. Although it is normal to find one or two grubs per square foot in a healthy lawn, large numbers of them can cause extensive damage (large patches of yellow/brown grass that can sometimes be easily pulled up by hand). Digging the soil underneath these damaged areas is the best way to indicate if you have white grubs in your lawn.

The adult beetle is about half an inch (1.5 cm) long, and has a greenish head with a shiny brown wing cover and white spots along their sides. They are normally found feeding on the foliage of many types of ornamental shrubs and trees. When found in large numbers, they can easily defoliate a small plant in a few days.



The life cycle of the beetle is shown in this diagram. The grub will spend the colder part of the year (late October – early April) deep in the soil, and do not actively feed. In late April, they will move back up to the surface and feed. In late May/early June, the grub will emerge as an adult and feed on foliage. The eggs they lay in July will hatch in August, feed in August and September and will then return to deeper soil to repeat the cycle again.

### CONTROLLING WITH NEMATODES

Nematodes will attack and kill the grub (they do not have any effect on adults). Apply nematodes for grub control in late August/early September, as these grubs are small and soft, making it easier for nematodes to attack them. Nematodes can also be sprayed in late April through May, but the treatment will not be as effective (these grubs are older and larger, which makes it more difficult for the nematodes to enter their bodies). See the last section of this guide for application instructions, and speak with our staff for information on controlling the adult stage of the beetle.

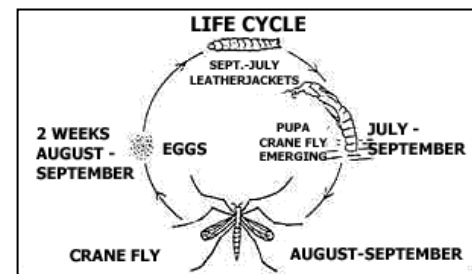
### CRANE FLY

The crane fly is a type of native insect whose larval stage (known as a leatherjacket) is a serious lawn pest. The picture on the left shows the adult, while the picture on the right shows the leatherjacket.



The larva is black/brown in colour and is approximately 1 inch (2.5 cm) long. Unlike the white grub, leatherjackets do not have a distinctive head or legs. Like the white grub, they are normally found under the surface of the soil, feeding on the roots of lawn grasses. In large numbers, they can cause significant damage (usually in the form of yellow/brown patches of grass that are very thin). As with white grubs, dig under damaged areas of the lawn in order to identify them.

The adult crane fly is approximately 2 inches (5 cm) in length, with very long legs and wings (they are sometimes mistaken for very large mosquitoes). Unlike the Japanese Beetle, the adult crane fly does not feed on anything at all.



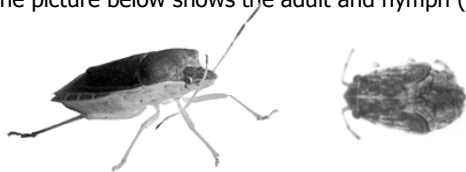
The life cycle of the crane fly is shown above. The leatherjacket will spend the colder months (November – April) deep in the soil, and do not feed. They will return to the surface and feed in May and June. The adult will normally emerge in July (sometimes in August as well) and lay eggs shortly thereafter. These eggs will hatch in late August/early September, feed in September and October, and then return to deeper soil to repeat the cycle again.

### CONTROLLING WITH NEMATODES

Nematodes attack and kill the leatherjacket (they do not have any effect on the adult). Apply nematodes for leatherjacket control in September – October, as these leatherjackets are small and soft, making it easier for nematodes to attack them. Nematodes can also be applied in May and June, but it is more difficult to control them at this time. See the last section of this guide for application instructions. There is no effective control for the adult crane fly.

## **CHINCH BUG**

The chinch bug is an insect native to southern Ontario and is a serious lawn pest. The picture below shows the adult and nymph (immature) forms of the insect.



The adult (the larger sized insects in the picture) is very small – only a quarter of an inch (4 mm) in length and is grey/brown in colour. The nymph is much smaller and is brick red in colour, with a white stripe across its body. Unlike grubs and leatherjackets, chinch bugs live above the surface of the soil and suck the sap out of the blades of grass. Chinch bugs will cause grass to go yellow/brown in roughly circle shaped patches, especially in sunny parts of the lawn. In order to check for chinch bugs, take a metal can (a soup can, for example) and cut both the top and bottom off. Push the can at least 1 inch (2.5 cm) into the soil on the edge of a damaged patch of your lawn, and fill it with water. If chinch bugs are present, they will float to the surface.

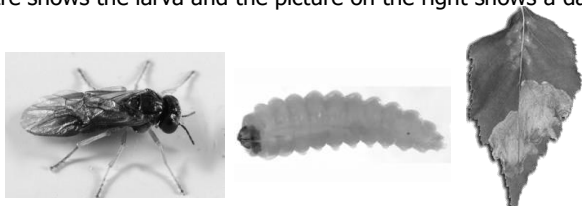
The adult form spends the winter in sheltered areas of the garden (underneath shrubs and hedges, or at the edge of a flowerbed) and will come out in early/mid May to lay eggs in the lawn. The eggs hatch in late May/early June, and the nymphs start feeding shortly thereafter. These nymphs will turn into adults in July and continue to feed until the weather starts to cool down.

### **CONTROLLING WITH NEMATODES**

Nematodes can be used to control all stages of the chinch bug, and can only be applied in July and August. It is also important to note that lawns that are generally healthy are better able to resist chinch bug damage (see our Green Thumb Guide to Lawn Care for more information).

## **BIRCH LEAFMINER**

The birch leafminer is a native insect that attacks birch trees in spring and early summer. The picture on the left shows the adult, the picture in the centre shows the larva and the picture on the right shows a damaged leaf.



The adult is a small, brown/black insect (somewhat similar to a wasp) that is normally seen in late April/early May. They will cut a small slit into the leaves of birch trees and lay eggs, which hatch in late May/early June. The larvae, which are whitish in colour and somewhat flat will then dig into the leaf and feed between the layers of the leaf causing the leaf to blister and turn brown. The best way to detect leafminer is to hold a damaged leaf up to direct light. The larva will be easily seen between the layers of the leaves.

### **CONTROLLING WITH NEMATODES**

Nematodes will attack and kill the adult leafminer while they are still in the soil (they will not affect the larvae). Nematodes should be applied to the soil underneath the birch tree in late April/early May. See the last section of this guide for application instructions. There is no effective control for the leafminer larvae.

## **HOW DO I APPLY NEMATODES?**

### **WHITE GRUB/LEATHERJACKET/CHINCH BUG**

- 1) **In order to properly apply nematodes for white grub, leatherjacket and chinch bug control, the temperature of the soil must be at least 10° C (50° F) and the lawn should be watered before application (unless you have had heavy rainfall in the preceding 24 hours).**
- 2) Take the contents of the package (either sponge or powder) and place them into a Green Earth Grub Busters Hose End Sprayer (if you have a similar product, you may use it if it is clean and has NEVER been used with pesticides). Fill the sprayer with lukewarm water up to the top of the label, and shake it several times to help mix the contents properly.
- 3) Attach the sprayer to your hose and switch it to the ON position (some sprayers have a WATER position, but this will only spray water from the hose, not the contents of the sprayer). Spray the entire lawn, not just affected areas and shake the sprayer occasionally to keep it mixed well.
- 4) Unless you are expecting rainfall, keep your lawn moist for the next 3 – 4 days after applying nematodes.

It is important to note that you must use the entire mixed product, as it will not keep after adding water. One package of nematodes for white grubs, leatherjackets, or chinch bugs will cover up to 3000 sq. ft. (275 sq. m.). If your lawn is much smaller, you can divide the package into portions and keep the unused part in your refrigerator until it expires (the package will be labeled). Also note that if you want to control leatherjackets in the spring, you must use twice as much as normal for the nematodes to be effective.

### **BIRCH LEAFMINER**

- 1) **In order to properly apply nematodes for leafminer control, the temperature of the soil must be at least 10° C (50° F) and the soil under the tree – including 1 foot (30 cm) past the edge of the canopy – should be watered before application (unless you have had heavy rainfall in the preceding 24 hours).**
- 2) Take the sponge out of the package and mix it with 0.26 gallons (1 L) of water. Wring out the sponge at least five times for best results. This concentrate can be put into your hose end sprayer and applied to the soil underneath the tree, including 1 foot (30 cm) past the edge of the canopy. Remember to shake the sprayer occasionally as you are applying the nematodes.
- 3) If you cannot reach your tree with a hose, mix the concentrate from step two with an additional 5.28 gallons (20 L) of water and apply with a pump sprayer or watering can.
- 4) Unless you are expecting rainfall, keep the soil underneath the birch tree moist for the next three to four days after applying nematodes.

It is important to note that you must use the entire mixed product, as it will not keep after adding water. One package of leafminer nematodes will cover 50 – 100 sq. ft. (5 – 10 sq. m.).

## **HOW OFTEN SHOULD I APPLY NEMATODES?**

Because nematodes are a biological method of controlling insect pests, they are not likely to completely eradicate the pest as a chemical control would. As such, it is important to apply them on a yearly basis at the correct time in order to keep damage to a minimum. It is also important to note – especially in the case of chinch bugs – that a healthy lawn is better able to resist and recover from insect damage, so good lawn care practices are just as important. Please read our Green Thumb Guide to Lawn Care for more information.

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