Leafminers are the larvae of flies that feed or “mine” between the upper and lower epidermal leaf surfaces. The larvae tunnel through the leaf creating a narrow, whitish coloured serpentine (winding) mine or blotch type mine. The tunnel is clear, except for the trail of black fecal material left behind as larvae feed. Leaf miners drop to the soil below the affected trees to complete their life cycle.

Birch Leafminer, *Fenusa pusilla*
In mid-May the adult leafminer emerges from the soil. The sawflies are attracted to vigorously growing birches where the females insert their eggs singly in developing leaves as they unfold from the bud. Older leaves are not suitable for egg laying. Damage, including partially or completely discoloured and hollowed leaves, is due to the larvae feeding between the upper and lower epidermis of the leaves. After 10 to 15 days the mature larvae have grown to about 6 mm. They then cut a hole through the leaf and drop to the ground where they bury themselves and pupate, with adults emerging 2 to 3 weeks later. The complete life cycle takes about 5 weeks. Most of the damage caused by the birch leafminer occurs in the spring, since at that time all the leaves are suitable for infestation by the first generation of sawflies. The second and succeeding generations of sawflies attack only new foliage at the top of the tree or at the ends of the branches, causing less damage. Birch leafminer feed on Grey, White, and European white birches. They rarely feed on black, yellow, or river birches. The birch leafminer occasionally damage Alder trees.

**English mountain ash sawfly, Pristiphora geniculata**
The mountain-ash sawfly has one or two generations per year depending on your location. It overwinters in a pupa in the soil. Adults emerge from the end of May to the first days of July. The young larvae are clustered initially, but as they grow, they disperse throughout the tree crown. The damage they cause is concentrated in the summit of the crown and then spreads to the lower branches where it is usually more severe. The second generation, if there is one, starts at the end of July and causes less damage than the first generation. English mountain ash sawfly feeds on mountain ash trees.
Elm leafminer, *Fenusa ulmi*

Elm leafminer winters as a prepupal larva in a brown paper-like cocoon found in the topsoil. Pupation takes place in the spring. The adults emerge in early May and can still be found during the first week of June. The adults are tiny four-winged sawflies. Females insert the eggs into the leaf tissue near the vein that runs up the middle of the leaf. Sometimes as many as 25 eggs are laid per leaf. The tiny white larvae, with pale brown heads, soon hatch from the eggs. Full-grown larvae are found by late June and are about 6 mm long. They vacate their mines in the leaf around the middle of July and drop to the ground where they spin cocoons in which to pupate. There is one generation a year. Elm leafminer feed on Camperdown, English, Scotch and American elms.

Nic's Birch Leafminer Guard

Canadian beneficial nematodes are a natural product that is safe for the homeowner, pets, plants and the environment! *Birch Leafminer Guard* contains specific beneficial nematodes, *Steinernema feltitia*, *Steinernema carpocapsae* and *Heterohabditis bacteriophora* which give rapid control of leaf miners.

**Before Application**

- Store *Birch Leafminer Guard* in a refrigerator 6-8°C (43-46°F) for a maximum of 8 weeks; do not freeze.
- Water below trees and 1ft beyond the tree drip line. Once *Birch Leafminer Guard* is applied a light watering daily for 3 to 4 days is required. Nematodes use the water channels to travel to find their prey.
- Soil temperature must be 10°C (50°F) for nematodes to be active and able to find leafminer larva.
- Do not apply in bright sunlight. The best time for application is on a cloudy day or late in the afternoon.
- *Birch Leafminer Guard* should not be mixed with fertilizers or pesticides. Fertilizer can be applied prior or after *Birch Leafminer Guard* applications.

**Application**

1. Open *Birch Leafminer Guard* beneficial nematode package, remove sponge and place in 1L (.26 gal) of water and wring out the sponge 5 to 10 times. Also, rinse plastic bag to release any remaining nematodes, then remove bag and sponge (please recycle). This will make a nematode concentrate.
2. Apply nematode concentrate with an additional 20L (5.28gal) of water to your treatment area of 5 -10m² (50-100ft²). Nematodes can be applied with a Hose End Sprayer.
3. Use a Hose End Sprayer, set sprayer to allow the most water to be applied. Fill bottle of hose end sprayer with nematode concentrate and water into your treatment area. Each time the bottle is filled stir the nematode concentrate vigorously to prevent the nematodes from settling to the bottom of the concentrate container.

4. Use all Birch Leafminer Guard within a 2-hour period.

For further Information Contact: NATURAL INSECT CONTROL, 3737 Netherby Road, Stevensville, Ontario, L0S 1S0
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For further Information on Sod Guard go to www.naturalinsectcontrol.com