

Birch Leafminers

COLLEGE OF AGRICULTURAL, FOOD, AND ENVIRONMENTAL SCIENCES

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Birch leafminers, *Fenusa pusilla* (Lepeletier), are among the most common insects affecting landscape trees and shrubs in Minnesota. They feed inside the leaves of gray, paper, river, and European white birches, forming blotch mines, i.e., partial or whole areas inside the leaves are consumed (Figures 1 and 2). This differs from serpentine leaf mines which form meandering lines throughout the leaves.

Life Cycle

In Minnesota, birch leafminers normally produce two generations a year. They overwinter in the soil as pupae. Adults emerge about mid-May in central Minnesota (including the Twin Cities) or approximately when the leaves first start expanding. Adult birch leafminers are small (about 1/8 inch long), black and fly-like. Females deposit their eggs singly in slits cut in the central areas of young leaves, usually near the tips of branches. More than one female may lay eggs in a leaf.

The eggs hatch into legless, worm-like insects. These immature larvae feed individually between the leaf surfaces, creating kidney-shaped mines. Early mines appear as light green or whitish discolorations on the leaves (Figure 2). Larvae sometimes can be seen easily when leaves are held up to sunlight, especially as the mines and larvae grow larger. The immature leafminers feed for about two weeks, then drop to the ground to develop into pupae. The areas of leaves that are consumed turn brown. Because people often do not see the early signs of birch leafminer feeding, it often appears the birch has suddenly dried up or become diseased.

The leafminers remain as pupae about two to three weeks. The second generation adults emerge around mid-June in central Minnesota (including the Twin

Cities) and lay eggs in newly developing leaves. The larvae again feed for about two weeks and then drop into the soil. They pupate and remain there until the following spring.



Figure 2. First generation birch leafminer damage (left leaf). Early mines of second generation (right leaf).

Damage

Despite its diseased appearance, healthy, mature birch are not seriously injured by first generation birch leafminers if feeding affects 30% of the leaves or less. For most birch, leafminer damage does not exceed 40% of the leaves. In some cases when trees are well watered, birch can tolerate up to 60% leaf damage. Birch are treated most often to protect the tree's appearance and not because birch leafminers seriously damage them.

Research at the University of Minnesota has shown that there is no association between birch leafminer feeding and attacks by bronze birch borers, insects that prefer unhealthy birch. For more information, see *The Bronze Birch Borer and Its Management*, FS-1417.

Birch leafminer and bronze birch borer damage can be distinguished by examining the pattern of damaged leaves. Leaves damaged by birch leafminers are scattered throughout the tree. Bronze birch borer damage starts at the tops of trees and the ends of branches and progressively works down and inward (Figure 3).

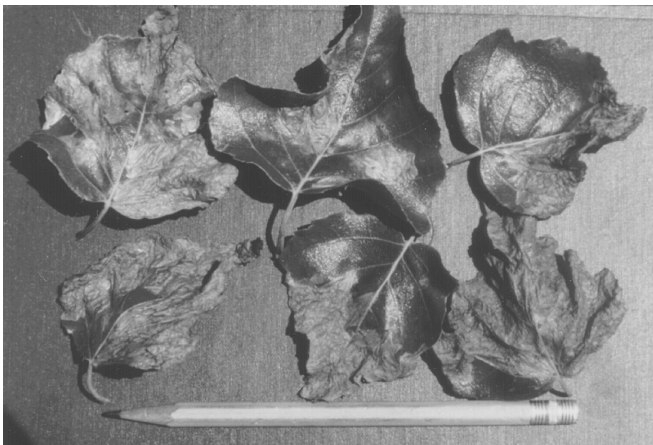


Figure 1. Birch leafminer blotch mines.

In unusual situations when birch are severely stressed and unhealthy, e.g. during the drought conditions of 1987-1989, birch leafminer damage can reduce a tree's vitality and contribute to the tree's death. These circumstances would justify treating birch leafminers for the health of the tree.

Damage caused by second generation leafminers is less serious. This is because only new developing leaves are attacked; they do not attack fully expanded leaves. Control is rarely needed to protect the health of birch from second generation leafminer feeding. An exception to this would be if first generation damage was severe, inducing a heavy flush of refoliation.

Management

Management of birch leafminer is usually unnecessary for the health of the tree, although treatment may be desired to protect its appearance.

The best time to manage birch leafminers is when larvae first hatch inside the leaves and begin to feed. Treatment at this time also minimizes damage to birch. However, this stage is inconspicuous and easily overlooked. It is important to anticipate when birch leafminers first begin mining leaves. Watch for evidence that they are in your trees before you begin control measures.

Birch leafminers in central Minnesota (including the Twin Cities) begin mining leaves on average about May 15. In southern Minnesota, expect first mines approximately 7 days earlier and in northern Minnesota approximately 7-10 days later. Adjust your timing when an early or late season is encountered.



Figure 3. Bronze birch borer damage. (Note dieback occurs at ends of branches, unlike birch leafminer damage, which would appear randomly scattered throughout the tree.)

Another method to estimate occurrence of first mines is to use plant phenology, i.e. a particular plant event. For birch leafminers, first mines appear approximately 10 days after birch bud break (when birch start to leaf out but before leaves are fully expanded). Although the exact number of days can vary, it should be fairly consistent each year. This method does require regular observation of birch when bud break is anticipated.

Keep in mind that calendar schedules and plant phenology are only guidelines for treatment. It is still necessary to monitor birch carefully in the spring.

Once early mines are found, there are several options for managing birch leafminers. One approach is to apply a systemic insecticide, such as acephate (e.g., Orthene) or dimethoate (e.g., Cygon) to the leaves. A systemic insecticide is absorbed into the leaf tissue, killing the insects. Insecticides that are not systemic remain on the leaf surface and do not affect insects inside of them.

Another method of management is to paint undiluted Cygon 2E on the bark of birch at bud break. Cygon, a systemic insecticide, is translocated through the trunk and branches to the leaves. This method greatly reduces the risk of pesticide drift. This method is less effective on large trees.

A plant health specialist, using the Kiornitz injection system, can also apply Metasystox-R into soil when leafminers are first active in the leaves or apply imidacloprid (Merit) as a soil injection the previous fall to manage birch leafminers the following spring. This system greatly reduces the risk of pesticide drift. Neither insecticide nor the Kiornitz injection system is available to the general public for leafminer treatment.

When numerous large blotches are seen, the leafminer has completed its development. At this stage, control is not suggested; the damage is done and the larvae have left the leaves.

CAUTION: Read all product directions very carefully before purchasing insecticides and again before using them to ensure they are used properly.

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