

Birch Leafminer & Bronze Birch Borer



Birch Leafminer



Birch Leafminer is perhaps the most common insect pest of birch in the northern United States. Few trees escape attack in years when this leaf mining sawfly (a type of wasp) is abundant.

Damage Symptoms: Blistering and browning of birch foliage in late May, early June or on new growth in mid-July.

Hosts: Paper, gray, European white and cut leaf birches seem to be preferred. Black, yellow and river birches are less susceptible.

Identification: The sawfly adult is black, 1/8 inch long, with dark, translucent wings. The flattened white larvae are 1/16 of an inch in length with a brown head capsule and very small legs. Tiny black squares are present on the lower body surface near the head.

Life Cycle: Birch leafminer adults emerge from earthen cells in early to mid-May when the birch foliage is half to fully expanded. The black adults can easily be seen hovering around host trees or moving about on foliage. Mated females insert eggs singly in the upper surface of expanding leaves. Egg hatch occurs in 7 to 10 days and larvae begin to feed or "mine" in the tissue between the leaf surfaces producing the characteristic blistered or

translucent spots on the leaves. Initially, larvae feed singly but as they develop individual mines may coalesce creating large, hollowed out areas containing several miners. Larvae feed for approximately two weeks, enlarging the mine until most of the leaf is damaged. Mature larvae chew an exit hole in the leafmine, drop to the ground and construct earthen cells for pupation. The pupal stage may last for several weeks. A second adult generation emerges in late June to early July but damage is usually restricted to newly developed leaves in the upper tree canopy. However, all leaves may be attacked in years when leafminers are extremely abundant. A third generation may occur in mid to late August. Mature leafminer larvae overwinter in earthen cells 12 inches below the soil surface and pupate in late April of the following spring.



Destructive stages: All of the foliar damage is caused by the feeding activity of the larval stage. Adults cause no damage except for tiny oviposition (egg laying) scars.

Tree impact: Tree mortality from birch leafminer is rare in ornamental plantings. However, heavy attack by this miner stresses the trees by reducing the leaf area available for photosynthesis. Birch trees losing more than 50% of their foliage are probably more susceptible to attack by other insects, especially bronze birch borer and disease. The

first (spring) generation of miners may attack nearly 100% of the available foliage, producing an unsightly browning of the trees. These damaged trees will put out new leaves, but this often coincides with the emergence of second generation leafminer adults in late June.

Chemical Control: Since most of the damage is caused by the spring generation, early control is imperative where valuable ornamental trees are involved. Controls aimed at the second generation may not be necessary. Late summer (August) application are not effective. Foliar sprays of insecticides should be applied in early to mid-May (May 10-15) to control ovipositing adults. Two applications at a 10 day interval are recommended. Most insecticides labeled for tree and shrub insect control can be used for these applications. A soil applied systemic insecticide (imidacloprid) is also effective. For best results, apply in late fall or just before leaf flush begins in the spring, and be sure to water the material thoroughly into the soil. Having the trees injected by a professional certified arborist is also an option.

Bronze Birch Borer



The bronze birch borer has been a serious pest of urban ornamental birch plantings for nearly 80 years. Today there is still

no single method that will ensure complete control of this borer. If you have white birch, you should know about the borer's biology and its suggested control method.

Symptoms: The first sign of borer attack is usually a dieback of the uppermost branches followed by a gradual decline and eventual death of the entire tree in 2 to 3 years. Vein like ridges or swollen bands may occur in the bark of the trunk and branches. The presence of "D" shaped adult emergence holes (size of a pencil) in the tree trunk is a positive sign of

borer activity. Trees attacked: European white birch (*Betula pendula*) and its cutleaf variety are particularly susceptible to borer attack. Paper or cane birch (*Betula papyrifera*), yellow birch (*Betula alleghenensis*), and gray birch (*Betula populifolia*), are also attacked but to a lesser degree. River birch (*Betula nigra*) is resistant.

Damage: Tree injury is caused by excessive larval tunneling in the inner bark or sap conducting vessels (phloem) and cambium (the region of tree diameter growth). The girdling of the trunk or branches interrupts sap flow downward to the roots and destroys the tree's cambium (growing) tissue. The interruption and subsequent accumulation of sap flow above larval tunnels often causes the characteristic swollen bands or ridges in trunks and affected branches. Bronze Birch borer is a native insect which occurs throughout the range of birch in North America.

How to Identify: Bronze birch borer adults are small, slender, olive to copper bronze colored beetles nearly ½ inch in length. All larval stages are white, slender and legless. Mature larvae may be up to ½ inch long.

Life cycle: Adults begin to emerge through semicircular or "D" shaped holes in the bark of infested trees in early June and may continue to emerge for 5 to 6 weeks. They feed on the foliage of alder, aspen, birch, willow or poplar for at least a week before the first eggs are laid in bark crevices or beneath loose bark flakes. Like other flatheaded borers, the beetles are attracted to the sunny side of trees for feeding and egg laying. However, areas of recent mechanical or other injury appear to be the most attractive egg laying sites. As many as 76 eggs may be deposited by a single female. Egg hatch occurs approximately two weeks later and the young larvae bore into the tree to begin feeding in the inner bark (phloem) and cambium. The tunnels behind active feeding larvae become packed with excrement and wood particles which turn dark brown with age. Most larvae mature by fall and construct oblong cells in the xylem just beneath the cambium or

in thick bark. Pupation occurs in late April or early May of the following spring. There is only one generation a year in Michigan.

CONTROL

Host Selection

One of the most effective methods of bronze birch borer control is to avoid planting susceptible trees. A recent survey of a Michigan suburban community showed that most of the bronze birch borer attacks were concentrated on a single variety of birch. Of the trees surveyed, 50% of the European white birch and its cutleaf varieties were infested with borer while only 30% of the gray birch and 5% of the paper birch showed signs of borer activity. European white birch is extremely susceptible to bronze birch borer attack and should be avoided in new plantings. Gray birch, a native species with white bark, also appears to be susceptible to borer attack and is therefore not recommended for urban/suburban plantings. Paper birch, also native to Michigan, lacks the graceful pendulous branches of European white birch but does have a creamy white bark that peels readily. More importantly, it seems to have substantially fewer problems with bronze birch borer and should be given stronger consideration for use in yard planting in lieu of or as a replacement for European white birch. River Birch, a native North American species with salmon-pink papery bark is resistant to bronze birch borer attack. This species is a good selection if white bark is not of prime importance

Cultural Practices

Water and Fertilizer: Trees under stress are more susceptible to borer attack than trees in a vigorous state of growth. It is imperative that susceptible trees receive yearly fertilization and frequent deep watering during dry periods to reduce stress and promote growth. Trunk damage by lawn mowers or other yard equipment may weaken the tree and provide an attractive egg laying site for adults. Mulching around the tree base can help eliminate the need for close mowing and potential trunk injury. The mulch also helps to retain soil moisture and cools the environment around the tree base which helps moderate root temperatures.

Tree Recovery or Removal: How to Judge

The gradual decline of birch can be classified as follows: trees with small twigs and branch dieback that don't exceed approximately 30% of the canopy may be saved by pruning out the branches below the point where they have died to minimize the number of borers emerging from the tree. The tree should then be returned to a more vigorous condition through a program of proper watering and fertilization. A preventative insecticide application program should also be initiated. Trees with major limb death and/or more than 30% loss of the canopy are generally beyond recovery and should be removed. Wood from trees which have died during the summer or fall should be destroyed or used as firewood before the following May to prevent adult borers from emerging and infesting new trees in the area.

Chemical Control

Lightly infested trees often recover with a regular preventative insecticide program. Two insecticides are available to homeowners and professional applicators: permethrin and imidacloprid. Permethrin acts as a chemical barrier that kills young larvae as they try to tunnel into the bark. It must be applied before the adults lay eggs. Apply the first spray thoroughly to the bark and foliage the first week of June when adults usually emerge. Since the adult flight period may last for 6 weeks or more, 2 additional sprays at 3 week intervals are suggested. For large trees commercial applicators are recommended. These applications do not kill larvae already tunneling beneath the bark, but they prevent succeeding generations from infesting the tree. Imidacloprid is a systemic insecticide that can be applied as a soil injection or as a soil drench near the base of the trunk. Treatment timing depends on the size of the tree. For tree trunks larger than 4 inches in diameter at chest height, treatments must be made in the fall (late September until early November). Smaller trees can be treated in the early spring. Be sure to water the material thoroughly into the soil. Treat only once per year. Having the trees injected by a professional certified arborist is also an option. Always read and follow label directions.

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