

Bronze Birch Borer

Birch is a popular landscape tree planted in Minnesota. The variations in bark texture and color, as well as foliage characteristics of the different species and cultivars, make them highly attractive landscape specimens (Fig. 1). Unfortunately, birch trees are often stressed in the urban environment and become susceptible to a devastating insect, the bronze birch borer (*Agrilus anxius*). Fortunately, there are ways to reduce problems with this pest through proper tree and site selection, cultural practices, and direct control of the bronze birch borer.



Fig. 1. Healthy birch tree (Richard Webb, bugwood.org).

Appearance

Adult borers are slender, metallic-coppery beetles about 3/8 inch (10 mm) long and are rarely seen (Fig. 2). They are in the family Buprestidae and are often termed metallic wood boring beetles. Larvae occur underneath the bark and are white, segmented, legless grubs with an enlarged area behind the head (giving them the name flatheaded borers, Fig. 3). They are about 1/2 inch (10-15 mm) long when mature.



Fig. 2. Bronze birch borer adult and D-shaped exit holes (Steven Katovich, bugwood.org).



Fig. 2 Bronze birch borer larva and galleries (Aaron Bergdahl, NDSU, Bugwood.org)

Hosts

All birch species can be attacked; however, some species are more susceptible to bronze birch borer (Table 1).

Table 1. Birch trees and their susceptibility to bronze birch borer.		
Common Name(s)	Scientific Name	Susceptibility to Bronze Birch Borer
Jacquemonti Birch, Whitebarked Himalayan Birch	<i>Betula jacquemontii</i>	High
European White Birch, Silver Birch	<i>Betula pendula</i>	High
Young's Weeping Birch, European White Weeping Birch	<i>Betula pendula</i> 'Youngii'	High
Yellow Birch	<i>Betula alleghaniensis</i>	Moderate
Sweet Birch, Black Birch, Cherry Birch	<i>Betula lenta</i>	Moderate
Paper Birch, White Birch, Canoe Birch	<i>Betula papyrifera</i>	Moderate
Whitespire Birch	<i>Betula platyphylla japonica</i> 'Whitespire'	Moderate
Gray Birch	<i>Betula populifolia</i>	Moderate
River Birch, Red Birch	<i>Betula nigra</i>	Very Low
Heritage Birch, Heritage River Birch	<i>Betula nigra</i> 'Heritage'	Very Low
Crimson Frost Birch	<i>Betula platyphylla</i> var. <i>szechuanica</i> x <i>Betula pendula</i> 'Purpurea' Crimson Frost'	Unknown

Damage

The larvae of the bronze birch borer feed in the phloem tissue [photosynthate (food) transporting tissue just beneath the bark] of the trunk and larger branches. This feeding girdles the phloem, reducing the amount of photosynthate (food) transported from the canopy to the roots. Eventually, this root starvation leads to decreased root growth and function. Unable to take up adequate amounts of water, the tree begins to die back, often starting in the upper crown.

Symptoms

- Initially, foliage on some branches in the upper crown begins to yellow in midsummer, progressing to brown/dead leaves. This results in the death of smaller branches in the upper crown. Over time, large branches begin to die back and eventually the entire tree may die (Fig. 4).

Note: Brown leaves may not always be the result of bronze birch borer attacks. Another insect, the birch leafminer, also causes leaves to turn brown.

- Ridges begin to appear on the bark of the trunk and larger branches in response to larval feeding activity beneath the bark in the phloem tissue (Fig. 5).
- D-shaped exit holes where adult borers have emerged from the tree begin to appear on the trunk and larger branches (see Fig. 2).



Fig. 4. Dieback associated with bronze birch borer feeding (Whitney Cranshaw, bugwood.org).



Fig. 5. Ridges caused by bronze birch borer feeding (Daniel Herms, The Ohio State University, Bugwood.org).

Life History and Habits

Bronze birch borer overwinters in feeding galleries as a mature larva, pupating in early spring. Adult beetles begin to emerge from late May to early June in central Minnesota (including the Twin Cities). Activity will be approximately 7 days earlier for southern Minnesota and 7-10 days later for northern Minnesota. Emergence will typically last into July with peak emergence around mid-late June. Adult beetles feed on leaves and mate shortly after emergence. Female beetles then lay eggs in bark cracks and crevices, other protected locations, or

in small niches they chew in the bark. Tiny larvae emerge in about a week and chew through the bark and enter the phloem tissue. Larvae make zigzag patterns in the phloem tissue as they feed through the growing season, permanently damaging the phloem tissue (see Fig. 3). Mature larvae then overwinter before emerging as adults the following spring.

Management

Reducing problems with bronze birch borer starts with understanding your birch tree's requirements. The following steps will help promote healthy, vigorous birch trees that are less susceptible to borer attacks than unhealthy trees. Bronze birch borers are not capable of successfully attacking healthy trees.

1. *Select an appropriate location for your birch tree when planting.*

Ideal locations for birch trees are sites where the soil will remain cool and moist, but where the tree will receive full sunshine on its leaves most of the day. East and north sides of homes are generally best.

2. *Select the most appropriate species or variety of birch when planting.*

The white-barked birch trees are more susceptible to bronze birch borer attacks than species without white bark (River Birch, Heritage River Birch, Yellow Birch, Sweet Birch); see Table 1.

3. *Follow cultural practices that will create conditions conducive to tree survival.*

Sufficient watering is probably the most important factor in maintaining a healthy birch tree. During the growing season, a slow (2-3 hours), deep (8-18 inches) watering once per week is a general rule for maintaining adequate soil moisture.

- a. Mulching (2-4 inches deep) over the tree's root system will help moderate soil temperatures and keep soils moist. Good materials are wood chips, shredded bark, or leaf compost. Likewise, planting ground covers using shade tolerant plants in the tree's root zone will also help keep soils moist and cool.
- b. Fertilizing is beneficial only when nutrients are lacking. Thus, unless your tree is deficient of nutrients, fertilizing will have little effect on reducing bronze birch borer attacks. If fertilizer is needed, it is important to provide sufficient water when applying.
- c. Pruning should not be done from May 1 to July 1. This is during the borer flight period, and it has been shown that female borers are attracted to fresh pruning wounds. Wound dressings should not be used; they are ineffective at repelling borers and do not promote closing of wounds. In addition, excessive pruning (more than 25% of the canopy) should be avoided as this increases light penetration to the root zone and can increase soil temperatures and reduce moisture levels.

4. *Chemical controls.*

Following the previous three steps is the best course of action for preventing birch borer problems. However, if your tree becomes vulnerable to borers, chemical control may be helpful. Chemical applications should not be made on a preventive basis, but only if symptoms of borer activity appear. Insecticides (Table 2) can be applied to the bark of trees to prevent new attacks. Thorough coverage of the trunk and larger branches is required (this is often best done by a professional applicator). This

treatment will not kill borers already present in the tree but will prevent newly hatched larvae from entering the tree. Three applications should be applied at approximately two-week intervals (late May, mid-June, late June).

Remember, cultural controls (step 3) are most important for reducing birch borer problems and the insecticide applications are worthwhile only if done in combination with proper cultural practices.

Existing borer infestations can be controlled by injecting an insecticide into the tree (Table 2). The insecticide is injected around mid-July after larvae have entered the tree. It is not recommended as a preventive measure because repeated injections will damage the tree’s vascular system. Also, this method of treatment should not be considered for trees that are heavily infested and near death.

Table 2. Insecticides labeled for bronze birch borer control.

Common Name	Trade Name
Bark Drench	
chlorpyrifos*	Dursban, Pageant
Permethrin*	Astro
bifenthrin	Talstar, Onyx Pro
dinotefuran	Safari
Trunk Injection	
imidicloprid	Imicide
emamectin benzoate	TREE-age

**Foliar application NOT recommended.*

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