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The Locust Borer

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The locust borer, *Megacyllene robiniae* (Forst.), is a native insect. Its original range probably coincided with that of its host tree, the black locust, which once grew only along the Allegheny Mountains from Pennsylvania to Georgia and in the Ozark Mountain region.

Black locust grows readily on poor sites and is used extensively in land-reclamation plantings. Its widespread use to reclaim land damaged by farming and strip mining, its use as a shade tree, and its use in reforestation have dispersed the borer with its host tree over most of the United States. The borer is now found from eastern Canada south to the Gulf States and west to Washington, Colorado, and Arizona.

The borer attacks only black locust (*Robinia pseudoacacia* L.) and its cultivars (horticulturally derived varieties in the genus *Robinia*); the honey locust (*Gleditsia triacanthos* L.) is not affected.

Damage and Signs of Infestation

Borer larvae tunnel into a tree's trunk and branches, weakening the tree and making it susceptible to wind breakage (fig. 1). The damage from borer tunneling and wind breakage often results in deformed trees or clumps of sprout growth.

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Figure 1—*Top breakage resulting from locust borer damage.*

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Figure 2—*Locust borer damage. Left: external indications are swellings and holes: middle: internal damage; right: undamaged trunk.*

The most obvious signs of severe borer attack in a stand of black locust are the many dead and broken limbs and the knotty swellings on the trunks (fig. 2).

Depending on the season, symptoms of borer attack vary. In the early spring, at about the time of bud swell, wet spots appear on the bark. These wet spots are the result of young larvae tunneling in the inner bark. In late spring or early summer, white-colored wood dust can be seen on the bark; the dust is pushed out of holes in the bark by the developing larvae, which are boring into the sapwood. By late summer, the larvae burrow into the heartwood, and the boring dust on the bark appears yellow. If the tree is heavily infested, the wood dust may accumulate in a ring around the tree's base.

Tree and Stand Susceptibility

The degree of damage varies in different locations according to the vigor of the trees and the influence of environmental factors such as light, temperature, drought, grazing, and pruning. The healthier the tree the lower the incidence of borer damage.

In locust stands 10 or more years old, fast-growing dominant trees are usually able to withstand attack, but slower growing overtopped trees are badly damaged or killed. Older trees also have thicker bark, and therefore, are often less damaged. However, during severe epidemics, the branches and tops of older trees frequently become infested. Sometimes even dominant large trees are killed by epidemic borer populations (fig. 3).

Figure 3—*Older stand killed back to main trunks.* F-702995

Light and temperature influence attack by their effects on egg-laying behavior. When the air is warmer than 75° F (24° C), the female locust borers prefer to lay eggs on the shady part of the tree trunk; below 70° F (21° C), they prefer trunks receiving full sunlight. Thus, when the weather is cool during the egg-laying season, the beetles lay fewer eggs in densely shaded locust stands. Consequently, the trees in these stands are subjected to fewer attacks.

Black locust trees are shallow rooted but grow readily on poor sites. Trees growing on such sites are subject to serious damage during periods of prolonged drought. Drought-weakened trees are especially susceptible to borer attack.

Grazing of livestock also contributes to borer damage in black locust. In addition to weakening the tree by feeding on young succulent growth and bark, cattle reduce site quality and tree vigor by compacting the soil.

Pruning creates favorable conditions for egg laying: callus tissue around pruning wounds is ideal for oviposition.

Individual trees in infested stands may show little or no sign of borer attack. This suggests possible genetic resistance to locust borers. However, studies using genetically identical cuttings of such trees planted in different locations have shown that good growing conditions are more important than genetic resistance in reducing susceptibility to borer damage.

Figure 4—*Left: mature larva; middle: pupa; right: adult.* F-702996

Description

The adult locust borer is a slender, "long-horned" beetle, about three-quarters of an inch (1.9 cm) long, with reddish legs and black antennae. Bright yellow bands encircle its jet-black body. A W-shaped band extends across the elytra, or wing covers. Males and females are similar in appearance.

Mature larvae are white, about 1 inch (2.5 cm) long and one-quarter of an inch (0.6 cm) in diameter (fig. 4). Newly formed pupae are creamy white and about three-quarters of an inch (1.9 cm) long. Both the larval and pupal stages are spent within the tree and are not readily seen.

Life History

The conspicuous, brightly colored adults appear when goldenrod (*Solidago* sp.) is in bloom. (See cover photo.) Adults are most abundant during September, when they are commonly found feeding on pollen of goldenrod blossoms.

Egg laying occurs from early afternoon until late evening from late August through early October. The females lay eggs prolifically under bark scales, in callus tissue around pruning wounds, in cracks in the bark, and in other hiding places. The eggs are rarely laid where they can be seen.

In about a week, the eggs hatch and small, white larvae bore into the inner bark. Each larva makes a small hibernation cell and overwinters there. In the spring when the leaf buds begin to swell, the larvae begin to bore into the woody part of the tree, causing sap to ooze around small holes. Throughout the spring and early summer, the larvae enlarge their tunnels until they are 3 to 4 inches (7.6–10.2 cm) long and about one-quarter of an inch (0.6 cm) in diameter.

By mid-July, most of the larvae have matured and transformed into the pupal stage, which is completed between the end of July and the first 2 weeks of August. Mature beetles emerge from the trees through the openings made by the larvae.

The timing of these events in the life history of the locust borer varies in different parts of the country because of differences in climate.

Control

Black locust shade trees or lawn specimens can be protected from borers by spraying the trunks and the larger limbs with a lindane emulsion. To prepare small amounts of the spray, add 2 tablespoons (30 ml) of a 20-percent emulsifiable concentrate to 1 gallon (3.8 l) of water. For larger amounts, add 3 pints (1.42 l) of the concentrate to 50 gallons (190 l) of water. In the spring at the time the buds are opening, spray trunks and limbs until wet. Repeat the application in 10 to 14 days. This treatment kills active young larvae that are enlarging their galleries just under the bark.

The same lindane spray also may be applied in late summer to protect the trees from newly hatched larvae attempting to penetrate the bark. Spraying may be done anytime from late August through September, since the female bettles continue to lay eggs during this period.

Control may also be achieved by spraying the trunks and longer limbs with carbaryl. To prepare, add 1 tablespoon (½ oz or 15 ml) of a 27-percent sprayable concentrate of carbaryl per gallon (3.8 l) of water. Apply in the spring when the buds are opening. Spray limbs and trunks until wet.

Spraying with chemicals is not considered practical for the protection of black locust in a forest. Severely injured forest stands can be regenerated by clearcutting during the dormant period. The sprouts that follow clearcutting should be thinned by removing all but the most vigorous in each group. This procedure has resulted in a good second crop of trees with very light subsequent injury.

Moderately to lightly injured stands on medium-to-good sites benefit from thinning. In such stands, injury is confined mainly to overtopped, intermediate, or decadent trees. Removal of these trees should reduce the borer population and thereby help protect the more desirable trees.

Borer injury is usually less serious when black locust is grown with other tree species. Mixed stands usually produce denser shade and more leaf litter than do pure stands of locust. Trees are more vigorous when nutrients from decomposed leaf litter are available. In pure locust stands, the addition of several inches of hardwood leaves results in accelerated growth for several years after the treatment and should reduce chances of serious borer damage.

Old black locust trees with dying tops serve as brood trees for the borer. Removing these trees from the vicinity of planting areas should be helpful in reducing damage to the young planted trees. These large brood trees should be cut during the dormant period and either peeled or burned to destroy the borer larvae.

Pesticide Precaution

The pesticides discussed herein were registered for the use described at the time this manuscript was prepared. Since the registration of pesticides is under constant review by State and Federal authorities, an appropriate State agency responsible for pesticide review should be consulted for the current status of these pesticides.

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Pesticides used improperly can be injurious to human beings, animals, and plants. Follow the directions and heed all precautions on labels. Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides where there is danger of drift when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment, if specified on the label.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S Environmental Protection Agency, consult your local forest pathologist, county agriculture agent, or State extension specialist to be sure the intended use is still registered.

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Pesticide-Information Disclaimer

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