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Pest on the Horizon: Asian Longhorned Beetle

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General Information

The Asian longhorned beetle [*Anoplophora glabripennis* Motschulsky (Coleoptera: Cerambycidae)], a native of eastern Asia, poses a new threat to Arkansas' forests (Figure 1).

FIGURE 1. The Asian longhorned beetle is a large black beetle with white spots and unusually long antennae.
(Photo courtesy of Melody Keena, USDA Forest Service, Bugwood.org)

At present, the closest known established population to Arkansas is in Ohio. Presence of the beetle at ports of entry scattered around the U.S. and at some inland sites, together with the fact that many shipments into coastal ports of entry are then shipped into Arkansas packed in solid wood materials, indicates a great potential for the beetle to be introduced into Arkansas as well. Arkansas' climate and flora are similar to that of parts of the beetle's native range, leading to the conclusion that the beetle could survive well in Arkansas.

Asian longhorned beetles (ALB) prefer maples (*Acer* L.) but will attack many of our native hardwoods including elms (*Ulmus* L.), willows (*Salix* L.), birches (*Betula* L.), poplars (*Populus* L.), ashes (*Fraxinus* L.) and hackberries (*Celtis* L.). All of these are components of hardwood timber harvests in Arkansas, and several of them are important species to wildlife. If the beetle becomes established in Arkansas, it may alter our forests, impact our wildlife and impact the economic value of many landowners' forest investments.

Like many of our introduced insect pests, ALB arrived in solid wood packing materials. This gives us some clues indicating how the beetle might be spread to Arkansas. Packing crates from Asia are shipped to coastal U.S. ports and then by truck and rail into Arkansas. Hardwood lumber and other solid wood products are also shipped into Arkansas from parts of the U.S. potentially infested with ALB. Because of the potential to spread ALB by moving wood, quarantine zones have been established around known infestations. Arkansas is not in one of these quarantine zones yet, but looking at the list of materials that cannot be exported from quarantine zones will give us some idea of how to avoid bringing this pest to Arkansas. Quarantines generally restrict movement of hardwood logs, hardwood lumber or other solid hardwood materials from quarantine zones.

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Identification

The ALB is a large insect, ranging from 1 to 1½ inches (25 to 38 mm) long. It has antennae that, as the name implies, are very long – up to 4 inches (100 mm). The beetles are glossy black with scattered white spots that give them the alternate name "starry sky."

There are several native longhorned beetles that could be confused with the ALB. In Arkansas, the native cottonwood borer (Figure 2) is the pest most commonly mistaken for ALB. Since ALB has not been found in the South, information on look-alike beetles for this area has not been previously developed. Information has been developed for parts of the U.S. where ALB has been found (Table 1).

FIGURE 2.The native cottonwood borer (top) is often mistaken for the ALB (middle and bottom) in the South.
(Photo courtesy of Gerald J. Lenhard, Louisiana State University, Bugwood.org)

The primary characteristics to look for are very long black and white banded antennae of the males, a shiny black body with bold white spots and bluish tinged legs (Figure 3). Some similar beetles have long antennae that are NOT black and white banded, have small white spots or have dull black bodies; but they don't have the combination of antennae and color pattern that the ALB has.

FIGURE 3. The Asian longhorned beetle has a shiny black body with bold white spots, distinct black and white banded antennae, and bluish tinged legs.
(Photo courtesy of Michael Bohne, Bugwood.org)

Biology

Asian longhorned beetles breed throughout the summer months. The male and female beetles stay together, with the male guarding the female as she prepares sites to lay eggs (Figure 4).

FIGURE 4. After breeding, the male Asian longhorned beetle guards the female beetle until she completes laying eggs.
(Photo courtesy of Karen Snover-Clift, Cornell University, Bugwood.org)

The female beetle chews ¾-inch (18 mm) diameter craters of various shapes into the bark of the host tree (Figure 5). The craters extend through the bark down to the wood. The female lays one egg in each crater at the interface of the cambium and wood. Asian longhorned beetles can lay up to 90 eggs.

FIGURE 5. Female Asian longhorned beetles chew pits into the bark of trees. Eggs are laid singly on the fresh cambium at the bottom of the pit.
(Photo courtesy of Pennsylvania Department of Conservation and Natural Resources – Forestry Archive, Bugwood.org)

Once the larva hatches, it feeds on the cambium of the tree around the oviposition site. Eventually, the larva burrows into the wood of the tree where it continues to feed on the wood until maturity. Larvae may be up to 2 inches (50 mm) long at maturity (Figure 6). Larvae spend the winter in the trunk of the tree. In the spring, larvae resume growth then pupate (Figure 7) for about 20 days. After pupation the 1- to 1½-inch (25 to 38 mm) adults bore to the surface of the tree and exit, leaving a half-inch (12 mm) diameter circular hole (Figure 8). The complete life cycle takes 12 to 18 months.

Table 1. Asian Longhorned Beetle Look-Alikes

A few beetles and borers in Arkansas may be mistaken for the Asian longhorned beetle at first glance. However, attention to the primary characteristics will quickly reveal whether the pest is ALB. ALB and the potential look-alike pests are presented in the table below.

Key Characteristics	Photo
Asian Longhorned Beetle *Anoplophora glabripennis* Motschulsky (Coleoptera: Cerambycidae) • Shiny black body, head and legs. • Back with nearly paired white spots. • Long black and white banded antennae. • Black legs often with blue markings. • Distinct “shoulders.” • Body 1 – 1½ inches. • Antennae up to 4 inches.	 *(Photo courtesy of Melody Keena, USDA Forest Service, Bugwood.org)*
Cottonwood Borer *Plectrodera scalator* Fabricius (Coleoptera: Cerambycidae) • Back with black bars on a cream background. • Long black antennae. • Gray, not blue, legs with black markings. • Body 1 – 1½ inches. • Antennae 1 – 1½ inches.	 *(Photo courtesy of Charles T. Bryson, USDA Agricultural Research Service, Bugwood.org)*
Southern Pine Sawyer Beetle *Monochamus titillator* Fabricius (Coleoptera: Cerambycidae) • Back with gray and brown mottles. • Long black antennae. • Black legs with gray, not blue, markings. • Body ½ – 1¼ inches. • Antennae 1 inch (female) or 2 – 3 inches (male).	 *(Photo courtesy of Lacy L. Hyche, Auburn University, Bugwood.org)*
Red-Headed Ash Borer *Neoclytus acuminatus* Fabricius (Coleoptera: Cerambycidae) • Back with yellow bars on a reddish brown background. • Short brown antennae. • Reddish brown legs with no blue markings. • Body ½ – ⅝ inch. • Antennae ⅜ inch.	 *(Photo courtesy of Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org)*

(continued)

Table 1. ALB Look-Alikes *(continued)*	
Key Characteristics	**Photo**
Ivory Marked Beetle *Eburia quadrigeminata* Say (Coleoptera: Cerambycidae) • Brown back with 4 pairs of white spots. • Tan to brown antennae. • Tan to brown legs with no blue markings. • Body ½ – 1 inch. • Antennae 1 inch.	 *(Photo courtesy of Whitney Cranshaw, Colorado State University, Bugwood.org)*
Red Oak Borer *Enaphalodes rufulus* Haldeman (Coleoptera: Cerambycidae) • Tan back with fine reddish brown mottles. • Tan antennae. • Tan legs with no blue markings. • Body ½ – 1 inch. • Antennae 1½ (female) or 2 – 3 inches (male).	 *(Photo courtesy of Kansas Department of Agriculture Archive, Bugwood.org)*
Large Flathead Pine Heartwood Borer *Chalcophora virginiensis* Drury (Coleoptera: Buprestidae) • Gray back with paired linear markings. • Short gray antennae. • Gray legs with no blue markings. • Body ¾ – 1¼ inches. • Antennae ⅜ inch.	 *(Photo courtesy of Johnny N. Dell, Bugwood.org)*
Eastern-Eyed Click Beetle *Alaus oculatus* Linnaeus (Coleoptera: Elateridae) • Shiny gray back with white mottles and two large black eye spots near the head. • Short gray antennae. • Gray legs with no blue markings. • Body 1 – 1¾ inches. • Antennae ¼ inch.	 *(Photo courtesy of Whitney Cranshaw, Bugwood.org)*
White Oak Borer *Goes tigrinus* Degeer (Coleoptera: Cerambycidae) • Light brown back with fine dark brown to black mottles. • Light brown antennae. • Light brown legs with no blue markings. • Body ⅞ – 1½ inches. • Antennae 1½ – 2 inches.	 *(Photo courtesy of James Solomon, USDA Forest Service, Bugwood.org)*

FIGURE 6. Asian longhorned beetle larvae can get up to about 2 inches (50 mm) long before they pupate.
(Photo courtesy of Steven Katovich, USDA Forest Service, Bugwood.org)

FIGURE 7. Asian longhorned beetle larvae pupate in a chamber within a tree trunk for about 20 days.
(Photo courtesy of Pennsylvania Department of Conservation and Natural Resources – Forestry Archive, Bugwood.org)

FIGURE 8. Exit holes made by the Asian longhorned beetle are up to about ½ inch (13 mm) diameter.
(Photo courtesy of Joe Boggs, Bugwood.org)

Distribution and Hosts

The ALB is a native of eastern Asia that was discovered in North America in 1996 and also has been found in several European countries. In Asia, trees typically infested include maples, poplars, willows and elms. Among Arkansas' native species, ALB will also attack buckeye (*Aesculus* L.), birch, ash, sycamore (*Platanus occidentalis* L.) and cherry (*Prunus* L.). Alders (*Alnus Mill.*), beeches (*Fagus* L.) and hornbeams (*Carpinus* L.), in addition to the genera listed for Arkansas, have been attacked in Europe. Unlike many pests, Asian longhorned beetle will attack healthy trees.

Evidence of ALB was first observed in North America in Brooklyn, New York. This finding prompted a search that revealed ALB infestations in several boroughs of New York and several cities adjacent to New York City. Two years later an infestation was identified in Chicago, IL, and then in 2002 another infestation was identified in New Jersey. It has subsequently been found in Boston, MA. Since that time, beetles have been found in warehouses in 15 states and 5 Canadian provinces.

Since 2005, all solid wood packing materials imported to the U.S. from anywhere in the world must be heat treated or fumigated prior to arrival in the U.S. However, because USDA Animal and Plant Health Inspection Service (APHIS) lacks resources to inspect every crate shipped into the U.S., these materials still present a risk of importing Asian longhorned beetle.

Signs and Symptoms

ALB larvae damage trees in two ways. First, the young larvae mine the cambium around the site of oviposition (Figure 9). A heavy infestation can kill limbs in the host tree. Second, as the larvae grow, they bore into the wood and weaken the structure of the tree, making it more susceptible to storm damage. Repeated infestation can seriously weaken a tree, resulting in tree death.

FIGURE 9. After Asian longhorned beetle eggs hatch, the larvae mine the cambium immediately under the bark, then bore into the wood.
(Photo courtesy of Melody Keena, USDA Forest Service, Bugwood.org)

Visible symptoms include dying branches in the crown (Figure 10), yellowing leaves, large exit holes in limbs (Figure 11) and "sawdust" on the ground

around a tree. If you see limbs dying in a tree, attempt to examine the tree to determine the cause. You should be able to see the large exit holes, up to ¾-inch (19 mm) diameter, if ALBs are causing the damage. A pair of binoculars may be helpful. Note that many types of wood-boring pests can generate "sawdust" similar to that generated by the ALB. Examine the tree more closely, especially upper branches, to identify the large exit holes created by the ALB.

Unfortunately, once a tree is infested with ALB, it will die within one to two years. The only treatment option is to remove the tree to reduce spread of the pest. Treatment with insecticides will not kill all of the larvae in the tree. The infested tree will continue to pose a risk to the trees around it. Non-infested trees in the vicinity of infested trees can be treated with insecticides during spring to reduce the risk of infestation while adult Asian longhorned beetles are actively flying.

FIGURE 10. Dying branches in a tree crown are one of the indications of an Asian longhorned beetle infestation. If you see these symptoms, examine the tree carefully.
(Photo courtesy of Dennis Haugen, USDA Forest Service, Bugwood.org)

FIGURE 11. Egg craters and large diameter exit holes often are signs of an Asian longhorned beetle infestation.
(Photo courtesy of Pennsylvania Department of Conservation and Natural Resources – Forestry Archive, Bugwood.org)

Stop the Spread

There are several things we can do to slow or stop the spread of the Asian longhorned beetle. First, educate yourself about the ALB. Learn to recognize the symptoms displayed by infested trees and learn how the pest is moved by people. Second, if you see symptoms of an ALB infestation, report it to the Arkansas State Plant Board. You can contact them at 501-225-1598. Third, be careful about moving firewood. Firewood transport is one of the prime movers of ALB and many other invasive pests. Never haul firewood out of an ALB quarantine area. Fourth, if you buy or sell hardwood logs, follow ALB quarantine regulations for handling and processing those logs.

Let's work together to keep the Asian longhorned beetle out of Arkansas.

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