



**United States
Department of
Agriculture**

Animal and
Plant Health
Inspection
Service

Program Aid
No. 1655

WANTED: **The Asian Longhorned Beetle**





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Revised June 2001

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Introduction

The Asian longhorned beetle (*Anoplophora glabripennis*) has earned the title of pest both here and in its home country of China. This beetle is a serious threat to hardwood trees and has no known natural predator in the United States. If the Asian longhorned beetle becomes established here, it has the potential to cause more damage than Dutch elm disease, chestnut blight, and the gypsy moth combined, destroying millions of acres of America's treasured hardwoods, including national forests and backyard trees. The beetle has the potential to damage such industries as lumber, furniture, maple syrup, nursery, and tourism.



Figure 1—This photo illustrates an adult Asian longhorned beetle and several holes bored by larvae.

But thanks to observant homeowners in both Chicago and New York, the beetle's sneak attack on the United States has been thwarted. The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS), together with State and local governments and local residents, works diligently to halt the spread of this devastating pest. However, in order to be completely successful, USDA's eradication efforts must have the cooperation of everyone.

The Beetle

Asian longhorned beetles are about 1 to 1.5 inches long, are shiny and black with white spots, and have long antennae that are banded with black and white. They attack many different hardwood trees, including maple (Norway, sugar, silver, red, and boxelder), birch, horsechestnut, poplar, willow, elm, ash, and black locust. Individual beetles typically attack a single host tree but migrate to nearby host trees when beetle populations become too dense.

Female Asian longhorned beetles chew depressions (oviposition sites) in the bark of trees to lay eggs. One female can lay 35 to 90 eggs. Hatching within 10 to 15 days, the white, wormlike grubs develop into caterpillars (larvae) and tunnel just beneath the tree bark in the cambium layer. They feed in the cambium for several weeks before entering woody tree tissue (xylem). There the larvae continue to feed and develop during the winter. Beetle larvae pupate through the spring inside host trees. During summer, the adult beetles emerge, mate, and feed on the bark of small twigs for several days. Adult beetles remain active only during summer and early fall months before perishing.



Figure 2—If the Asian longhorned beetle becomes established here, it has the potential to cause more damage than Dutch elm disease, chestnut blight, and the gypsy moth combined.



Figure 3—Asian longhorned beetle damage.

Battling the Beetle

The Asian longhorned beetle's life cycle makes conventional insect eradication measures such as pesticides ineffective. Because the majority of the beetle's life is spent deep within the host tree, surface-applied insecticides are not an option. At present, the only effective method of eliminating the beetle is to cut, chip, or burn infested trees and replace them with nonhost species.



Figure 4—Asian longhorned beetle larva.



Figure 5—Insecticides injected into trees via small injection capsules then spread systemically through the wood, killing insects infesting that wood.

Research to find better control options is ongoing. Scientists are experimenting with traps using sex attractants (pheromones)—an approach that has worked well for the gypsy moth—and using host-plant (tree) odors to aid in locating infested trees. Researchers are also studying the efficacy of insecticides delivered directly into host trees via small injection capsules.

In the absence of a trap, APHIS and cooperating State inspectors must tackle the difficult task of completing

a survey of beetle-infested areas by individually examining trees for signs of beetle damage. Many Federal agencies contribute resources to USDA's tree inspection effort—APHIS, the Forest Service, the Bureau of Land Management, and USDA's Agricultural Marketing Service. State and local government cooperators include the New York State Department of Agriculture and Markets, New York

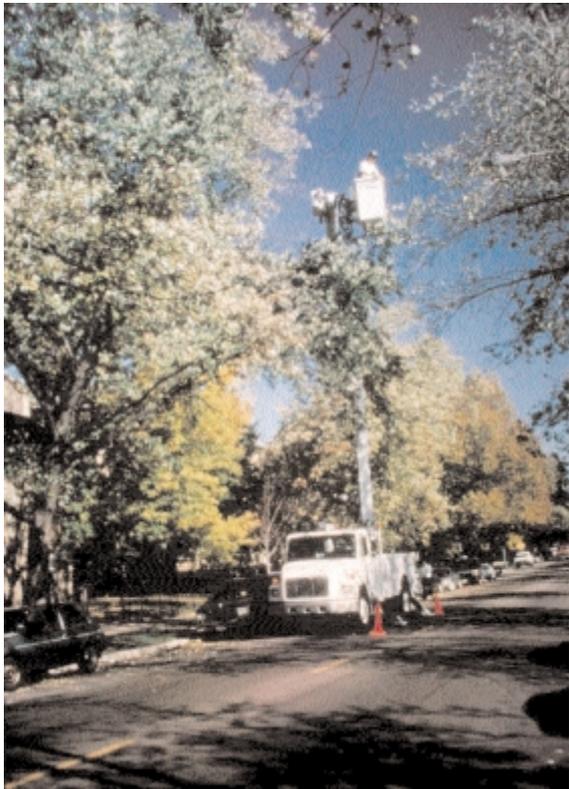


Figure 6—Aerial tree inspections are performed by trained professionals using bucket trucks.

City Department of Parks and Recreation, Illinois Department of Agriculture, Chicago Department of Streets and Sanitation, and Chicago Bureau of Forestry. These agencies also contract with local tree service professionals.

Inspectors search for beetle exit holes, oviposition sites, and piles of frass (insect waste and sawdust) at the base of infested trees and in branch crotches. Sap flows may also indicate Asian longhorned beetle wounds in infested trees. Unseasonable yellowing or drooping of leaves when the weather has not been especially dry are also signs

that the Asian longhorned beetle is present. Leaf symptoms show up when the immature insects, growing inside the tree, have bored through tissues that carry water (xylem) from tree roots and nutrients (phloem) from the leafy canopy above. Once the pest has sufficiently disrupted those pathways, the infested branch or the entire tree will die.

Inspectors utilize innovative methods to conduct Asian longhorned beetle surveys. Trained professionals perform aerial tree inspections using bucket trucks, and Forest Service and Bureau of Land Management smokejumpers (forest firefighters) climb trees in difficult areas. Ground observations involve the participation of many interest groups and organizations; however, anyone with a keen eye and set of binoculars can contribute to this effort.



Figure 7—In difficult areas, smokejumpers (forest firefighters) from the USDA Forest Service and the U.S. Department of the Interior’s Bureau of Land Management climb trees to inspect for Asian longhorned beetles.

Beetle Migration

Asian longhorned beetles normally do not spread quickly on their own. However, people can unintentionally increase the speed or spread of an infestation. Because beetle larvae live deep inside trees during the majority of the year, people can easily and unknowingly move the pest in firewood, live trees, or fallen timber.

Although Asian longhorned beetles can fly distances greater than 400 yards, migration often depends on the abundance of suitable host materials. To limit human-caused spread of the Asian longhorned beetle, officials from State and Federal governments establish quarantines in areas known to be infested. The infested areas in New York and Chicago have both been quarantined to prevent the movement of infested wood. No one may remove firewood, trimmed branches, stumps, roots, or other wood debris from these quarantine areas.

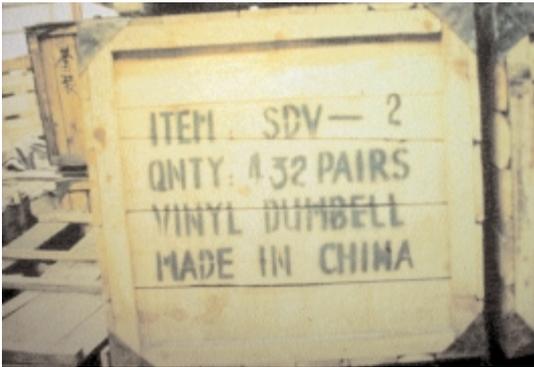


Figure 8—The Asian longhorned beetle is believed to have entered the United States in solid wood crates from China.



Figure 9—APHIS Plant Protection and Quarantine (PPQ) officers at U.S. ports are the first line of defense against exotic plant and animal pests and diseases.

APHIS' Role in Excluding Foreign Pests

How did the Asian longhorned beetle get to the United States?

APHIS pest risk analysis determined that it hitchhiked its way into the United States in wood from China used to make solid wood packing materials (SWPM), such as pallets and crates.

APHIS analyzes threats to U.S. agriculture and develops rules for importing commodities based on the risks they present. U.S. trade with China has increased tremendously, from \$5 billion in 1983 to \$95 billion in 1999. As a result, the volume of pallets and crates passing through ports of entry has grown exponentially. SWPM can conceal a broad spectrum of wood-boring pests.

The best way to fight the Asian longhorned beetle and similar nonnative wood borers is to exclude such pests from the country in the first place. To inhibit this specific beetle's mode of transportation, APHIS regulations require all SWPM imported into the United States from China and Hong Kong to be heat treated, fumigated, or treated with preservatives prior to departure from China. APHIS also requires that each shipment from China that contains SWPM be accompanied by a certificate, issued by the Chinese national government, stating that the SWPM have been treated. Importers of Chinese goods must closely adhere to such directives to ensure their continued effectiveness. APHIS will continue to educate cooperators and stakeholders about the importance of excluding the Asian longhorned beetle and other foreign pests.

APHIS Plant Protection and Quarantine (PPQ) officers at U.S. ports are the first line of defense against exotic plant and animal pests and diseases. APHIS port personnel will continue to inspect high-risk cargoes for the Asian longhorned beetle and other pests. In addition, all international passenger baggage, cargo, packages, mail, and conveyances are subject to inspection upon entry into the United States to exclude the presence of exotic pests.

A United Effort

The fight against the Asian long-horned beetle is hard work. USDA requests the help and cooperation of residents, business owners, and workers in identifying possible new infestations, reporting them to the authorities, and providing assistance to the Asian longhorned beetle eradication program. Citizens of New York and Chicago are encouraged to remain aware of signs of an infestation and

know current quarantine areas and regulations governing the sale and transport of tree-based products in and around restricted areas.



Figure 10—Currently, the only way to eradicate the beetle is to cut, chip, and burn infested trees.

USDA’s Forest Service works with State and local governments to reforest communities where the Asian longhorned beetle has forced authorities to cut down trees. Preferably, for each tree destroyed, a new one is planted, using a species that is not susceptible to the Asian longhorned beetle.

Tree removal continues to take place in New York and Illinois. Survey crews return to infested areas to check and recheck trees for further signs of infestation. Thanks to tips from the public, crews can check specific trees that are exhibiting signs of the beetle.

For more information regarding the Asian longhorned beetle, reporting an infestation, SWPM, the insecticide used for tree injection, or quarantine limits and regulations, please visit www.aphis.usda.gov on the World Wide Web and click on the button for Asian longhorned beetle under "Hot Issues." To report a sighting of the Asian longhorned beetle, please contact your local USDA–APHIS office.



Figure 11—APHIS inspectors, teamed with State and local cooperators, survey the quarantine area to look for infested trees.

Key Terms

ALB—Asian longhorned beetle

APHIS—Animal and Plant Health Inspection Service, an agency of the USDA.

Cambium—The thin layer between the phloem and xylem, which contributes to tree development.

Eradicate—Exterminate.

Forest Service—An agency of the USDA.

Frass—Combination of sawdust and insect waste.

Host trees—Hardwood species that provide food and shelter to Asian longhorned beetles.

Invasive species—Nonnative species intentionally or unintentionally introduced to the United States.

Larva(e)—The caterpillar life stage of an insect.

Oviposition site—Egg deposit site.

Pheromone—Sexual chemical attractant.

Phloem—Essential tree tissue carrying nutrients from the leafy tree canopy to the roots.

Pupa—The insect life stage between the larval and adult stages.

SWPM—Solid wood packing materials.

USDA—U.S. Department of Agriculture.

Xylem—Essential tree tissue carrying water from the tree root system to the leafy canopy.

The Beetle's Story

In August 1996, a man in the Greenpoint neighborhood of Brooklyn, NY, noticed perfectly shaped round holes in the maple trees in front of his home. When he saw sawdust all over the ground near the base of the trees and on the sidewalks, he thought vandals had drilled holes in his trees. He called the department of parks and recreation. An inspector determined that the holes were being drilled by a black-and-white beetle that had taken up residence in the man's trees.

After sending the beetle to entomologists for identification, the parks department learned their find was the dreaded Asian longhorned beetle. Officials were amazed at the extent of damage the beetles had done to the trees. They quickly notified USDA-APHIS of the infestation.

Within weeks, another infestation was found on Long Island, in Amityville, NY, after officials learned that wood from an infested tree had been moved from Greenpoint to Amityville. Inspectors from USDA and New York State began to comb both affected neighborhoods to determine the extent of the infestations. Quarantine areas were soon established to prevent infested wood from being moved.

The Asian longhorned beetle was a new pest to the United States, and it quickly proved to be a challenge to entomologists. Scientists began researching trapping and other methods to stop the

beetle. One thing became clear from the research: the only way to win the war with the pest, at this time, was to cut, chip, or burn infested trees. APHIS, the Forest Service, and New York swung into action.

Almost 2 years later, in July 1998 in Chicago, a city parks employee stopped to pick up cut wood from a friend's house in the Ravenswood neighborhood. When he went to unload his truck a few days later, he found a black-and-white beetle on the mirror of his truck. Curious about the unusual beetle, he went to the Internet and typed a description of the bug into a search engine. What he found shocked him: an APHIS pest alert picturing the insect he saw on his mirror—the Asian longhorned beetle. He quickly called USDA.

After positively identifying the insect, State, city, and Federal authorities established a quarantine area. Hundreds of trees in Ravenswood were found to be infested. Two more areas of infestation in greater Chicago were found: one in Addison in DuPage County to the west and the other in Summit, south of the city. Infested trees in all those areas will be removed, chipped, and replaced.

APHIS continues to survey and look for this and other wood-boring pests. By detecting these pests early, APHIS and its partners can work to save the rest of America's precious street trees and forests.



