




**United States
Department of
Agriculture**

**Animal and
Plant Health
Inspection
Service**

**Program Aid
No. 1655**

WANTED: **The Asian Longhorned Beetle**





The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Issued June 1999
Revised June 2004

Photo credits: All photographs in this brochure except the images in figures 8 and 11 are the property of USDA and may be reproduced freely. APHIS employee Ken Law took the shots in figures 1, 4, 7, 9, and 10. Figures 2 and 3 come from the APHIS photo collection. Photos in figures 5 and 6 were taken by APHIS public affairs specialist Daniel J. Parry. The image in figure 8 was supplied by the U.S. Customs and Border Protection division of the Department of Homeland Security. The photo in figure 11 was taken by Dave Smela, a public information specialist with the Rutgers Cooperative Extension Service, and is reproduced by permission.

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 Illinois, New York, and New Jersey, 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, mimosa (silk tree), hackberry, London plane-tree, and mountain ash. 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 and leaves 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

Officials from USDA's Animal and Plant Health Inspection Service, Forest Service, and Agricultural Research Service are working with State and local governments to find novel methods to eradicate the Asian longhorned beetle from the United States. This job is made much harder by the fact that the beetle spends most of its life deep inside the trees it attacks.



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.

One control method currently in use is the treatment of susceptible trees within the infested areas of New York, New Jersey, and Illinois with the insecticide imidacloprid, which has displayed promising results.

Consumers use imidacloprid in some over-the-counter lawn and garden products, and some lawn-service companies use it to kill lawn grubs.

Imidacloprid is also an ingredient in some domestic-pet treatments to kill fleas.

In Asian long-horned beetle control work, imidacloprid is administered in liquid form, by either injecting it into the tree through small capsules placed at the base of the tree or by injecting it into the soil surrounding the tree. The insecticide is dispersed throughout the tree through its vascular system. This enables the insecticide to reach Asian longhorned beetle adults as they feed on small twigs and leaves and the larvae as they feed beneath the bark of host trees.



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

APHIS officials are optimistic that using imidacloprid will decrease beetle populations and future tree loss but advise that, if a tree is found to be infested, it will be removed regardless of treatment. The goal is to eradicate this highly destructive insect from the United States.

Research to find better survey and 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.

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 U.S. Department of the Interior's Bureau of Land Management, and USDA's Agricultural Marketing Service, Grain Inspection, Packers and Stockyards Administration, and Agricultural Research Service. State and local government cooperators include the New York State Department of Agriculture and Markets, New York Department of Environmental Conservation, New York City Department of Parks and Recreation, Illinois Department of Agriculture, Chicago Department of Streets and Sanitation's Bureau of Forestry, New Jersey Department of Agriculture, and the New Jersey Department of Environmental Protection. These agencies also contract with local tree-service professionals.

Inspectors search for beetle exit holes, egg-laying 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.

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, Illinois, and New Jersey have 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 7—The Asian longhorned beetle is believed to have entered the United States in solid wood crates from China.



Figure 8—CBP Agriculture Specialists at U.S. ports inspect high-risk cargoes for the Asian longhorned beetle and other pests.

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 non-native 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, working with the U.S. Customs and Border Protection (CBP) Agriculture Specialists at U.S. ports, are the first line of defense against exotic plant and animal pests and diseases. CBP inspectors 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, Illinois, and New Jersey are encouraged to remain aware of signs of an infestation and



Figure 9—Currently, the only way to eradicate the beetle is to cut, chip, and burn infested trees.

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

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, Illinois, and New Jersey. 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 <http://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 10—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. Due to public participation, intensive surveys, and inspection practices, additional sites have been identified over the years around the Chicago area, with the most recent being near the city's Oz Park. Infested trees in all the areas will be removed, chipped, and replaced.

In October 2002, the president of a New Jersey-based graphics design group spotted the Asian longhorned beetle flying onto a tree in Jersey City. After

watching a news report that called his attention to the potential threat the Asian longhorned beetle can cause, he contacted the New Jersey Department of Agriculture.

This discovery marks the first time since 1998 that the invasive exotic pest has been discovered outside the quarantined regions of Illinois and New York. After considerable delimiting surveys, APHIS employees removed more than 100 infested trees on the 9-acre site where the beetle was found. Since then no

further New Jersey infestations have been located, and APHIS and the Forest Service are working cooperatively with the owner of the 9 acres to plant nonhost tree species to replace those that were removed.

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.



Figure 11—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.

