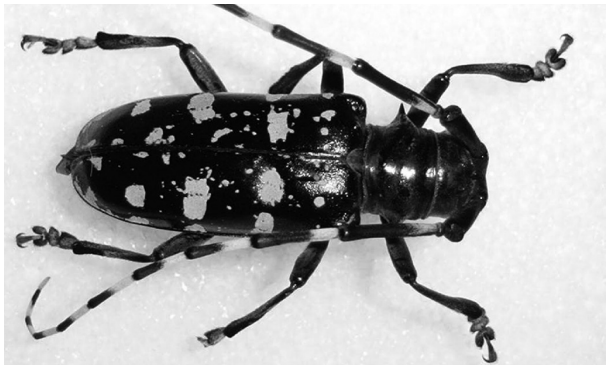
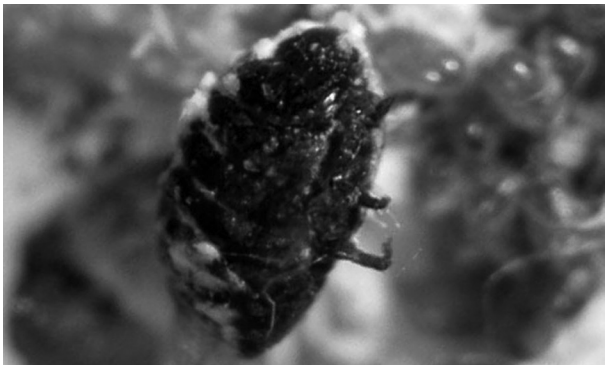
Invasive Species in North American Forests



Asian longhorned beetle. Photo by Michael Bohne.



Hemlock woolly adelgid. Photo by Michael Montgomery, USDA Forest Service.

Asian Longhorned Beetle is an invasive insect that was first discovered in the United States in 1996. The beetle is believed to have come from its native China in untreated wooden packing crates and wooden pallets. The beetle currently presents a serious threat to the urban forest of New York City and has also infested parts of Long Island and Chicago. Foresters worry that if the beetle is able to spread, it could devastate much of the hardwood forests of the eastern United States.

Asian longhorned beetles attack many different species of hardwood trees, including ash, birch, elm, horse chestnut, maple, poplar, and willow trees. Females chew depressions in the bark of trees to lay their eggs. After the eggs hatch, the larvae tunnel into the tree, feeding on and damaging the tree's tissues, which leads to dieback of the crown and death of the tree.

As most of the beetle's life is spent deep within the host tree, the beetle is generally safe from predators and difficult for people to kill. Currently the only effective means for controlling the beetle is to remove infested trees and destroy them by chipping or burning. To prevent further spread of the insect, quarantine zones have been established so that people will not unknowingly transport infested firewood, wood, or fallen timber from affected areas.

Hemlock Woolly Adelgid (uh-DEL-jid) has killed 80 percent of the hemlock trees in Virginia's Shenandoah National Park. Those tall trees with thick evergreen foliage were destroyed by the tiny sucking insect, which is related to aphids. The hemlock woolly adelgid feeds on sap at the base of the hemlock needles, causing them to fall off. Without needles, the tree starves to death, usually within a few years of the initial attack.

Native to Japan and China, the hemlock woolly adelgid was accidentally brought to the western United States in 1924 on imported wood. Western hemlocks have a natural resistance to the insect. But when the adelgid traveled to the eastern United States in the 1950s, it became clear that eastern hemlocks are not resistant to the adelgid. The adelgid now threatens entire hemlock forests in the eastern United States. As the trees die, the plants and animals that depend on the hemlock forest are also placed at risk.

Hemlock woolly adelgids are spread by wind or carried by migratory birds, mammals, and humans. Infested nursery plants have carried the insects into some areas. Once an area is infested, adelgid populations can increase dramatically; one individual adelgid can yield up to 90,000 new adelgids in 1 year.

Balsam woolly adelgid, which is related to the hemlock woolly adelgid, has also destroyed about three-quarters of the fir trees in the southeastern United States since first introduced in that region about 50 years ago.

Invasive Species in North American Forests (cont.)

Adult emerald ash borer in tunnel. Photo by Eric R. Day, Virginia Polytechnic Institute and State University.

Norway rat.

Emerald Ash Borer is a very small, metallic green beetle that is devastating North America's ash trees. Native to China and eastern Asia, it probably came to the United States hidden in wooden crates or pallets commonly used to ship goods and materials. Although the beetle was discovered in southeastern Michigan in 2002, it may have been present there for several years before then.

Since its discovery, the emerald ash borer has spread to 13 U.S. states and to parts of Canada. It is responsible for the death of more than 30 million ash trees in southeastern Michigan alone.

Adult emerald ash borer beetles nibble on ash leaves but cause little damage. It is the borer's wormlike larvae, which tunnel and feed under the tree's bark, that eventually kill the tree. Because the larvae are often hidden, it is sometimes difficult to tell whether a tree is infested. In fact, the primary cause of the beetle's spread in North America has been people unknowingly moving infested ash products—firewood, nursery stock, green lumber, branches, logs, and chips—to other areas.

Several natural enemies have been discovered attacking emerald ash bore larvae in North America, including woodpeckers and at least two species of parasitic insects. Unfortunately, those predators have not effectively prevented trees from dying, nor have the predators substantially slowed the spread of the beetle. State and federal agencies have initiated quarantines to prevent the movement of infested ash wood and wood products.

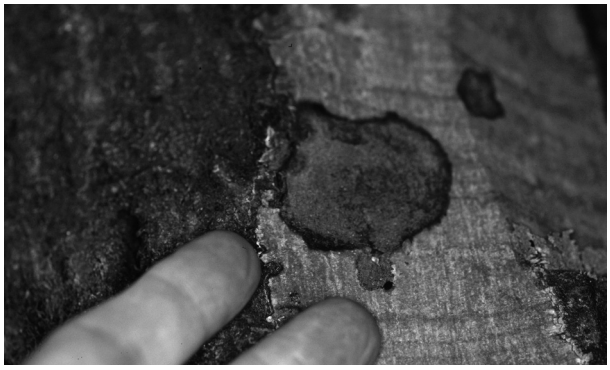
Norway Rats first came to North America from Europe as ship stowaways in about 1775. Although they are commonly called Norway rats, scientists believe that the rats originally came from China and had spread all through Europe before invading North America. Norway rats are now found in all 50 U.S. states, Canada, Mexico, and on every continent except Antarctica—making them the most successful mammal on the planet after humans.

Of all invasive species around the world, Norway rats are among the most harmful. They are secretive, are intelligent, and can reproduce at very high rates. Females can bear four to six litters of 6–12 young per year, producing up to 80 pups in a 2-year lifespan.

Norway rats often live in close association with people, where the rats can ruin food stores and spread harmful diseases. In forests and other natural ecosystems, the rats are ravenous predators that eat the eggs, young, and even adults of birds, reptiles, and other small mammals. The diseases carried by Norway rats can also adversely affect wildlife. Worldwide, the rats have caused a large numbers of species to go extinct—especially on islands—in as little as a few years.

Invasive Species in North American Forests (cont.)

European starlings. Photo by Lee Karney, US Fish and Wildlife Service.



Sudden oak death zone lines on a live oak. Photo by Joseph O'Brien, USDA Forest Service.

European Starlings came to the United States in 1890 when a drug manufacturer, Eugene Scheiflin, released 40 pairs of them in New York's Central Park. He said he wanted to bring to America all the birds mentioned in the writings of William Shakespeare. The birds quickly established themselves in the wild and, by 1930, had spread all the way to the western states. Two hundred million starlings are now found over most of North America, Mexico, and parts of the Caribbean.

The starling is an intelligent and interesting bird, but it is bad news in forests for the native bird species, such as bluebirds, swallows, and woodpeckers. Starlings compete with those birds for nest cavities in trees, often destroying eggs and young birds in the process. Also, because starlings have a habit of forming large wintering flocks, they are an unwelcome pest to people.

Sudden Oak Death is a disease that is caused by a fungus-like water mold closely related to the mold that triggered the European potato famine in the 1800s. More than a million trees in California and Oregon have died from the disease since it was first reported in 1995.

Certain types of oaks seem to be most susceptible to the disease—hence its name—but it attacks more than 45 different kinds of trees and shrubs. As its name suggests, the disease can progress rather quickly, beginning with seeping cankers on the trunk, then with leaves dying, and finally ending in death, often within a year.

Although scientists do not know for certain, they believe that sudden oak death was introduced from Asia and proliferated in plant nurseries. The disease appears to spread through spores that are produced by infected plants and dispersed by wind and rain splash. People hiking and biking in infected forest areas may also play a role in spreading the disease.

Invasive Species in North American Forests (cont.)

White pine blister rust aecia on the bark of eastern white pine. Photo by Frantisek Soukup.

Tamarisk tree, also known as saltcedar. Photo by John M. Randall, The Nature Conservancy.

White Pine Blister Rust is a disease caused by the fungus *Cronartium ribicola*. It infects white pines all over the United States, causing them to lose their branches and die.

The fungus is native to Asia and first came to the United States from Europe in 1898. By that time, the United States had extensively logged its forests for lumber and was looking for ways to replant. Germany and France began supplying young seedlings to the United States for reforestation. Unfortunately, some of these seedlings carried white pine blister rust. Because white pines native to the United States are not naturally resistant to the disease, the disease has spread.

The fungus causes a canker or blister on the branches of the pine tree. When the canker goes completely around the branch, it causes the branch to die off. Trees that lose too many branches weaken and eventually die.

White pine blister rust does not spread from pine tree to pine tree, but it requires a currant plant, blackberry plant, or gooseberry plant to complete its reproduction cycle. To prevent the spread of the disease, people have removed those other plants from the affected area and have used genetic engineering to develop trees that are more resistant to the fungus.

Tamarisk trees guzzle so much water each year in the dry southwestern United States, that the total amount of water absorbed could cover 5 million acres with a foot of water. The tamarisk roots grow deep into the earth, sucking springs dry. When rain falls, tamarisk trees cause flooding by blocking natural flows of water with their dense growth. And as its alternate name—saltcedar—suggests, the tamarisk secretes salt from its leaves, making the soil around it unsuitable to native plants.

Originally from Eurasia, the tamarisk tree was first brought to the region by western settlers in the 1800s as a source of wood and shade. The tamarisk has now spread to more than 1 million acres, primarily in the southwest. The numbers and variety of birds, small mammals, and other animals greatly decrease when tamarisk trees replace native woodland species.

The tamarisk has been successful largely because there are no natural predators or disease to keep the tamarisk in check. It is also very quick to multiply—each plant produces up to a half million seeds per year and can grow as much as 10 feet per year. Cattle raising also seems to give the tamarisk an edge over native plants. Because cattle prefer the leaves of native cottonwood and willow trees to tamarisk leaves, the uneaten plant is able to outcompete the native plants.

Invasive Species in North American Forests (cont.)

Entomologist Robert Pemberton observes invasive old world climbing fern overtaking cypress trees in southern Florida. Photo by Peggy Greb, USDA Agricultural Research Service.

Old World Climbing Fern is a vine native to Africa, Asia, and Australia that is spreading through southern and eastern Florida at an alarming rate. In 1958, a Florida nursery started selling it as an ornamental garden plant. By the year 2005, it had spread to more than 127,000 acres, completely engulfing the Everglades tree islands, pinelands, and cypress swamps.

What looks like a stem is actually a leaf that can grow up to 100 feet long. Old world climbing fern devastates forest and other plant communities by smothering and killing mature trees and shrubs, by creating thick mats of plant material on the ground, and by preventing native plants from regenerating.

As it grows up and over large stands of trees, old world climbing fern creates a "fire ladder" into the trees. This fire ladder causes beneficial ground fires to reach the tree tops and become destructive, tree-killing, crown fires. The ladder also creates an avenue for fire to spread where swamp waters would usually provide a natural barrier.

Old world climbing fern can resprout from almost anywhere along each climbing leaf. The fern also reproduces by wind-dispersed spores, thus enabling new populations to grow far from existing populations. A single leaflet can produce 28,600 spores, with each spore potentially capable of starting a new population at a distant location.

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