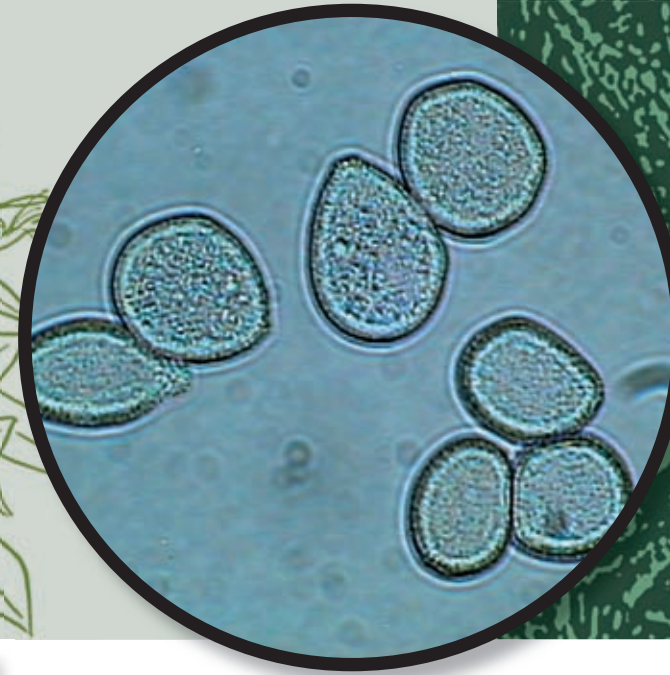


INVASIVE SPECIES: They Don't Belong Here

by Terri Darr McLean

OVER THE PAST 200 YEARS, 50,000 species of **foreign plants, pests, and pathogens** have found their way into the United States, some intentionally and some by accident. While many have proven to be beneficial, others—perhaps one in seven—are considered invasive.

Kentucky is no exception when it comes to invasive species. Hundreds have already ventured into the state and several new and potentially devastating species are quickly closing in.



The problem with invasive species is that they crowd out or kill native species and, in the process, wreak havoc across the landscape.

It's believed, for example, that about 400 of the 958 species listed under the Endangered Species Act are at risk because of invasive species. Controlling such species is compounded by the fact that they are highly adaptive and lack natural enemies to keep them in check.

"It seems like, right now, Kentucky is facing threats from a number of invasive species affecting our forests, urban landscapes, and agricultural crops," said John Obrycki, chair of the Department of Entomology.

At the same time, however, Kentucky is in a position to play a key role in stopping or slowing the invasion. For one thing, Obrycki said, some of the most harmful species have already demonstrated what they can do in other states. "We're not going to be caught off guard," he said.

In addition, a number of agencies and institutions, including UK, are actively involved in monitoring, modeling, preventing, mitigating, and eradicating the destructive plants, pests, and pathogens.

"Controlling invasive species is a complicated process that requires collaboration," said Forestry professor Songlin Fei, who initiated an invasive species working group aimed at fostering collaboration of UK with institutions across the state. "They (invasive species) are already affecting daily lives of average citizens. ... We have to get our arms around this."



INVASIVE

Following is a look at three invasive species that either have made inroads into Kentucky or are threatening to create problems in the near future.

BUSH HONEYSUCKLE

With its bright red berries, fragrant flowers, and ability to stay green longer than most native species, exotic bush honeysuckle might seem like the perfect addition to any landscape. Yet this native of Asia is anything but, said Department of Forestry professor Mary A. Arthur.

"It is very invasive," she said, "and it's spreading very rapidly."

Bush honeysuckle is problematic because it forms dense thickets that block sunlight and prevent anything from growing beneath it. It can also be difficult to get rid of. And, despite the fact that birds are drawn to its red berries, those berries do not provide them a nutritious food source.

While a lot of resources are devoted to removal of the aggressive plant, Arthur and the students in her lab are focusing on its effects on forest ecosystems.

One of the things they are studying is how bush honeysuckle changes the way nutrients cycle

in the soil—an important ecosystem function. Another project, which includes looking at forest systems within the Inner Bluegrass region, focuses on the degree of bush honeysuckle invasion and the forest attributes that contribute to that invasion.

"There's no way we're going to remove all the honeysuckle, so one of the things that we really need to figure out is what should be our priority sites for removal," she said. "I think we can contribute to that dialogue by having a better sense about which systems it's not proliferating in yet and maybe understanding something about what makes a forest susceptible to invasion."

In the meantime, Arthur believes it's important to communicate to people that bush honeysuckle is a serious environmental threat.

"You can still buy it and plant it in your backyard," she said. "So, there's a lot of education we need to do."

HEMLOCK WOOLLY ADELGID

Although difficult to see with the naked eye, the tiny hemlock woolly adelgid packs a big punch. This aphid-like insect, which wraps itself in a white, fuzzy covering, feeds on the sap of the hemlock's needles and eventually kills the tree. Large stands of hemlock trees in the Northeast have already fallen victim.

"I view the hemlock woolly adelgid as probably the greatest threat to forest health in Kentucky," said Lynne Rieske-Kinney, a forest entomologist in the Department of Entomology.

It's not so much that the large, long-lived hemlock tree is important to Kentucky economically. Rather, it is important ecologically, particularly in watersheds, where it influences light penetration, soil and vegetation characteristics, and stream temperatures.

"The dynamics of an entire watershed could be affected by the loss of its hemlock trees," Rieske-Kinney said.

The hemlock woolly adelgid, like bush honeysuckle, is a native of Asia. It was discovered in Kentucky in Harlan County in March 2006 by J.D. Loan, an exotic pest surveyor in the Department of Entomology. While the initial infestation was considered light, the adelgid is spreading rapidly. Susceptible hemlocks throughout southeastern Kentucky are expected to become generally infested within three to four years, Rieske-Kinney said.

"We knew it was coming. Eastern Tennessee is heavily infested. Virginia is heavily infested. It came in where we thought it would, and it's progressing pretty much as one would expect," she said.

Kentucky, however, has two things going for it in efforts to manage the pest, she added. "First of all, we discovered the infestation very, very early, and secondly, we do not have large tracts of

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—MARY ARTHUR

Mary A. Arthur



Lynne Rieske-Kinney



INVASIVE



SOYBEAN RUST

contiguous hemlock (at risk)."

Kentucky also stands to benefit from Rieske-Kinney's work. She is assessing the vegetative and structural changes within a forest before, during, and after the adelgid moves through and is analyzing the effectiveness of varying management techniques.

Along with John Obrycki and James Harwood in Entomology, Rieske-Kinney is working toward enhancing the natural enemy complex that could potentially regulate adelgid populations, providing some relief to stricken trees.

She and Obrycki are also working with colleague Songlin Fei in Forestry to locate hemlocks and detect infestations through remote sensing technology.

"There are people who have been working on this for some years," Rieske-Kinney said. "We should, very quickly, start to learn more, and as our research progresses, we'll be able to learn more about Kentucky-specific things."

When Hurricane Ivan roared into the United States in September 2004, it was one of the most intense and costly hurricanes to make landfall. But to extension plant pathologist Don Hershman, the hurricane is notorious for a much different reason: It brought Asian soybean rust to this country.

"I don't know of any diseases that can do the damage that soybean rust can do," he said.

The discovery of the highly invasive fungal disease in Louisiana shortly after Hurricane Ivan hit marked the first time it was found in the United States.

"It ended up being found in numerous sites that fall, but it came in too late to do any damage," Hershman said.

Nevertheless, Hershman quickly became involved in a national sentinel network to monitor soybean fields for the disease. Several sentinel plots were designated in Kentucky, and numerous extension agents, farmers, and others began regularly collecting soybean leaves to send to Hershman's lab at the UK Research and Education Center in Princeton.

"We need to find it when the incidence and

severity is so low that you pretty much can't see it when you look at a field. You have to find it with a microscope and look at it in controlled conditions," Hershman said.

As a sort of "gatekeeper," Hershman shares his findings not only with Kentucky farmers but also with farmers in states to the north, where the bulk of the nation's soybeans are grown.

"There's about 60 million acres (of soybeans) north of Kentucky. People look to us as the gateway," he said, "so if soybean rust moves into Kentucky, that sends shockwaves into the rest of the country."

Through the soybean rust sentinel network, Hershman's goal is to provide the ammunition farmers need to make good management decisions regarding soybean rust, especially those pertaining to fungicides. "Should they spray or not? That's the bottom line," he said.

By avoiding unnecessary fungicide applications, Kentucky soybean growers are saving \$9 million a year, Hershman added.

"They are really dependent upon this network and information that I and others like me can provide," he said. ♦

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Last year Don Hershman (above and at right) and other scientists won a national award for their efforts to alert farmers about soybean rust.



Top 14 Invasive Species in Kentucky

Bush honeysuckle
(*Lonicera maackii*)

Japanese honeysuckle
(*Lonicera japonica*)

Wintercreeper
(*Euonymus fortunei*)

Tree-of-heaven
(*Ailanthus altissima*)

Multiflora rose
(*Rosa multiflora*)

Kudzu
(*Peararia lobata*)

Musk-thistle
(*Carduus nutans*)

Poison hemlock
(*Conium maculatum*)

Sudden oak death
(*Pytophthora ramorum*)

Hemlock wooly adelgid
(*Adelges tsugae*)

Johnsongrass
(*Sorghum halepense*)

Gypsy moth
(*Lymantria dispar L.*)

Fire ant
(*Solenopsis invicta*)

Emerald ash borer
(*Agrilus planipennis*)

—COMPILED BY MEMBERS OF UK'S INVASIVE SPECIES WORKING GROUP



Note: While soybean rust (featured in the main story) did not make the list, it is considered an important invasive species in Kentucky and the entire United States.