

SCIENCE & EDUCATION Impact

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The Aliens Are Here

Emerging diseases and invasive pests pose a significant challenge.

Since the first ships crossed mysterious oceans, trade has brought bounty from foreign lands. Along with their treasures, those ships also carried animals, insects and diseases that could devastate crops, animals and people in previously unexposed territories. Today, globalization has dramatically increased international trade as well as the influx of pests and diseases. The USDA and Land-Grant university partnership is wellpositioned to find cost-effective ways to manage emerging diseases and invasive plants and animals that threaten the health and well-being of people, animals, natural resources and economies.

Payoff

- **Trouble for cattle and white-tailed deer alike.** Heartwater, one of the most feared animal diseases, has made its way from Africa to the Caribbean and threatens to move into the United States. Heartwater, which is carried by ticks, affects livestock and wildlife and kills up to 90 percent of infected animals. **Florida** scientists recently developed two safe and affordable vaccines that protect livestock from the disease. They also devised measures to protect wildlife and test the health of imported animals.
- **A bite worse than the bark.** Several encephalitis strains including West Nile, St. Louis and La Cross recently emerged or reemerged as U.S. health threats. In New York City alone, 62 human cases of West Nile encephalitis, including seven deaths, were confirmed in 1999. Researchers at **Cornell, Penn State, Connecticut, Virginia Tech, Kentucky, Tennessee** and elsewhere successfully identified mosquitoes as the carrier, although species vary from place to place. Land-Grant universities rapidly developed programs to educate the public about the disease, its carrier and effective methods to protect human and animal health. **Florida** scientists have developed a pill that kills mosquito larvae. It can be put into any body of water and is now being tested to ensure environmental safety. This pill holds great promise to control mosquitoes worldwide.

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- **Have boat will travel.** Zebra mussels are notorious for their ability to form huge colonies that block water flow and seriously damage power plants, public water supplies and industrial facilities. They also threaten native freshwater species. Because zebra mussels attach themselves to boats of all types, Land-Grant universities have developed broad public education programs that are key to control. For example, specialists at **Langston** are teaching Oklahoma aquaculturalists to minimize contamination risks, and **New Hampshire** has created a Mussel Watch Program for its lakes. With zebra mussels now reported in more than 20 states, public education is essential to slow the spread of this evasive species.
- **A pox on your peaches.** In 1999, the plum pox virus was discovered in North America. The virus devastates stone fruit such as peaches, plums, nectarines and cherries. Making its first appearance in Pennsylvania, plum pox endangered the state's \$25 million-per-year industry and potentially threatened stone-fruit production nationwide. **Penn State** teamed with state and federal agencies, growers, legislators and citizens to develop a rapid-response team to stop the spread of the virus. Infected trees were identified and burned, and funds were secured to help affected farmers stay in business. Prospects are very strong that Pennsylvania's plum pox virus has been stopped in its tracks.
- **It's pretty but ...** Purple loosestrife, a beautiful, exotic weed unintentionally imported from Europe, is a severe threat to North American wetlands and native plants. Scientists and extension specialists at **Minnesota, Cornell, South Dakota State, Virginia, Tennessee** and elsewhere have teamed with U.S. and European agencies to turn purple loosestrife into insect fodder. They have found several insects that decimate loose-strife without harming native plants. These insects have been released to control loosestrife at sites throughout the country.
- **These bugs will eat your house.** The Formosan subterranean termite is Louisiana's most destructive insect, causing as much as \$500 million in economic losses in the state and \$1 billion nationwide per year. **Louisiana State** scientists and extension specialists are attacking on several fronts. Buildings in New Orleans'

French Quarter are being treated with bait traps and insecticides to determine their effectiveness. Researchers also are evaluating whether the state's tree spraying program is working. They also are recommending building code changes. These termite control programs could save billions of dollars annually.

- **No smut here.** Controlling invasive species works both ways. For years, the Chinese feared that smut, a plant disease, might be imported with U.S. wheat and threaten China's crop. Researchers from **Montana State, Utah State, Oregon State, Wyoming** and **Idaho** convinced the Chinese that smut was not a threat to their wheat. As a result, the Chinese began accepting wheat from the Pacific Northwest. In Montana alone, wheat exports to China have ranged from 1.8 million to 11 million tons per year.
- **Endangered trees.** Researchers in **California** found that a fungus is the culprit in "sudden oak death," a mysterious disease killing thousands of California's oak trees. The disease kills three oak varieties just eight weeks after symptoms appear. Up to 80 percent of trees die off, leaving behind an ugly fire hazard. Scientists discovered that the fungus also attacks rhododendrons. To control its spread, extension specialists developed an education program that teaches people to recognize disease symptoms and understand the dangers of moving plants from one location to another.



**Cooperative State Research, Education,
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