

# Exotic diseases and pests:

## How is UF preparing to protect Florida from the next citrus greening?

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The Florida citrus industry is perhaps more keenly aware of the damage that exotic pests and diseases can cause than any of Florida's other industries. Florida's diverse agriculture, a result of our climatic and ecological diversity, is particularly vulnerable to new pathogens and pests that thrive in our climate. Recent hurricanes have allowed disease agents to appear and reappear from the Caribbean and Latin America simply by being wind-borne. In addition, nearly 100 million tourists each year and commercial agricultural imports from around the world have the potential to unwittingly carry pathogens to our state from other countries.

The purpose of this article is to summarize the research efforts being made by the University of Florida-IFAS to learn about and be prepared for exotic pest and disease introductions before they arrive in our state.

### THE EMERGING PATHOGENS INSTITUTE

Recently, as part of its Florida Tomorrow campaign, the University of Florida has developed the Emerging Pathogens Institute (EPI) to fuse key disciplines to develop outreach, education and research capabilities designed to preserve Florida's health and economy, and to prevent or contain new and re-emerging diseases. Though still in its infancy, the EPI at UF is strategically developing tools to help protect Florida's agricultural commodities, including citrus. Predicting where new diseases may appear, and what their threat or impact may be, is one of the toughest problems facing science today. To this end, the EPI has three primary objectives:

1. Develop the research capability to be prepared to prevent and contain outbreaks of new diseases that threaten Florida.
2. Develop the teaching capability to train the next generation of scientists who will keep these exotic

pathogens at bay in the future.

3. Develop the outreach capability to educate the people of Florida on steps they can take to avoid human diseases as well as help our private sector avoid diseases that affect plants and animals.

Supporters of the Florida Tomorrow campaign believe that the rapid development of new scientific knowledge, achieved through the use of the latest scientific tools and techniques, holds the power to predict and control disease outbreaks. However, beyond having the tools and techniques lies the need for communication among the diverse scientists that work on finding solutions to today's problems. That is the EPI's strength. The EPI capitalizes on the existing resources and strengths within UF to bring together a diverse group of researchers in the fight against a variety of diseases. Currently, faculty with appointments in the EPI come from disciplines as diverse as geography, entomology, environmental and global health, veterinary medicine and plant pathology, to name a few.

### INTERNATIONAL TALENT

In addition to assembling a core group of faculty from within UF's ranks, the EPI is reaching around the world to bring in new talent and further develop international research collaborations. One of the EPI members tackling this challenge is Ariena van Bruggen, who has a joint appointment between the EPI and the plant pathology department. Prior to coming to UF, van Bruggen was the chair of the Biological Farming Systems Group at Wageningen University in the Netherlands, where she coordinated the research and teaching activities of the scientific staff from 1999 to 2008.

Van Bruggen is working to devise an international network of plant pathologists who would meet virtually on a regular basis using video conferencing to share the latest surveillance and monitoring news from their countries, and assess which diseases may pose a threat to other countries. This network

would also be a university course and would have participants on every continent. This virtual network would facilitate real-time information sharing on a global scale, and it would outpace the time lag in receiving information from the scientific literature alone. Such a network is hugely beneficial to researchers, since in order to contain new pathogens, we must first be aware of them.

One of van Bruggen's first steps involves looking beyond Florida's shores to the state of plant diseases in other countries. Van Bruggen says that not many pathogens are worse for citrus than greening, with the exception of one little known bacterium from Africa, *Phaeoramularia*, which causes spots to appear on fruit and leaves. It has been devastating citrus in several African countries. It could threaten Florida's citrus industry too, if it jumps across the Atlantic on imported fruit or trees. Van Bruggen is currently seeking funding for one of her graduate students to study the disease. The symptoms are more severe than those of citrus canker.

In addition to scouting for pathogens that may affect citrus, she will also be keeping an eye on pathogens that can affect other Florida agricultural commodities and ecosystems.

These are a lot of threats for one person to look out for, which is why the common denominator in all of van Bruggen's strategies, and the fundamental tenet behind the EPI, is collaboration. "To be on the lookout for potential problems, one needs to be part of an international network of plant pathologists," she says. "It is very important to be a member of international networks in order to be able to foresee potential threats of emerging pathogens."

### INSECT PESTS AND INSECT-VECTORED DISEASES

Insect-vectored disease study is another area in which the EPI will build on UF's existing strengths. The idyllic climate that attracts so many people to Florida is also welcoming to

new insect pests and the diseases they may carry. Citrus greening is just one example of many such insect-vectored diseases that can devastate our state's agriculture, economy or health. The EPI has global research initiatives to identify the most threatening of these vector/disease systems and study them in their current environments to learn about their biology and epidemiology

so that we are better prepared to deal with them should they accidentally be introduced. Even if the specific vector/disease complexes being studied are never introduced to Florida, the knowledge gained by studying them is invaluable in helping to fight those that are introduced.

The EPI will be the foundation of the University of Florida's research

and outreach efforts to protect Florida's agriculture, health and economy from new and re-emerging diseases as we continue to move into the 21st century.

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