

## INVASIVE SPECIES

Currently, Florida's ecosystems support established populations of more than 500 non-native fish and wildlife species, 1,300 non-native plants and thousands of non-native lower life forms including insects, mites, nematodes, fungi and microbes.

A fraction of these organisms flourish under Florida conditions and multiply so prolifically that they disrupt the ecological balance of areas where they occur. Known as invasive species, they pose one of the greatest threats to Florida's farmland, natural areas and urban landscapes.

For example, the bacterium believed to cause citrus greening disease, *Candidatus Liberibacter asiaticus*, cost Florida's citrus industry \$4.54 billion in lost revenues and 8,300 lost jobs over five production seasons. Management efforts increase the costs imposed by invasive species. Agricultural and forestry operations spend an estimated \$265 million each year on invasive plant control; in the fiscal year 2010-2011 the state spent about \$23 million fighting invasive plants infesting public lands and surface waters.

Research programs aimed at the detection, diversion, tracking and control of invasive organisms are one of the top priorities for FAES scientists, and will likely remain so for decades to come.

NATURAL  
RESOURCES



HUMAN  
SYSTEMS



AGRICULTURE



## Ongoing Research



### CRAZY ANTS

Reported in about 20 Florida counties, the tawny crazy ant, *Nylanderia fulva*, is an invasive pest that creates havoc through sheer weight of numbers. Though the species doesn't bite or sting, its colonies may contain multiple queens and millions of workers. In communities where this species is established, workers sometimes invade homes in search of food and accidentally short out electrical systems. UF/IFAS entomologist Faith Oi says professional treatment is usually the only viable solution for homeowners. She leads a team investigating the ant's dietary habits and working to develop effective poison baits that will appeal to the species.



### AVOCADO

Florida is the nation's second-largest producer of avocados, with a crop worth \$30 million annually. But the disease laurel wilt threatens to decimate the industry, centered in Miami-Dade County. The disease is caused by a fungus, *Raffaelea lauricola*, which lives symbiotically with an invasive insect, the redbay ambrosia beetle. UF/IFAS faculty members are pursuing multiple lines of research, hoping to protect the avocado industry from possible invasion. In one study, a UF/IFAS research team led by Randy Ploetz, a plant pathology professor, screened 24 avocado varieties and found significant differences in their susceptibility to the disease. Among the most vulnerable was the Simmonds variety, which accounts for 35 percent of commercial production in Florida.



### BIOFUEL CROPS

Fast growth, drought tolerance and other traits that make a plant attractive as a biofuel feedstock can also make it a potential invasive threat to Florida's agricultural and natural areas. To help analyze the risks more thoroughly, a UF/IFAS research team led by agronomist Lynn Sollenberger recently published a paper proposing a multistep evaluation that involves incremental tests, from small-scale experiments to widespread, controlled introductions. The process begins with testing to determine the growing conditions needed for a candidate biofuel crop, then uses experimental introductions to assess factors important for establishment and performance, and concludes with introductions across the expected geographic range where the plant will be cultivated.

## Research with Impact



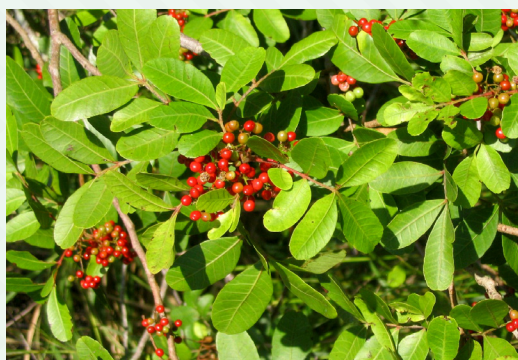
### HYDRILLA

For decades, the aquatic plant *Hydrilla verticillata* was a popular item for aquarium hobbyists, prized for its deep green color and hardiness. But that hardiness proved disastrous when hydrilla was released into Florida waters in the late 1950s. It's now the state's No. 1 aquatic weed, infesting more than 110,000 acres of surface waters. Initially, hydrilla was controlled with the herbicide fluridone but in the past decade a resistant strain of the plant has emerged, so researcher Bill Haller, a professor with the UF/IFAS Department of Agronomy, leads a team investigating new management approaches. The biggest triumph so far: Their research resulted in federal and state approval for two herbicides effective against fluridone-resistant hydrilla.



### LIONFISH

The only non-native marine fish established in Florida waters, lionfish were first detected along the state's southeast coast in 1985 and are now common in the South Atlantic, broader Caribbean region and Gulf of Mexico. Two virtually identical species, *Pterois volitans* and *Pterois miles*, raise significant concerns because they feed on or compete with popular seafood species, including grouper, snapper and shrimp. Coastal communities have responded by catching or spearing lionfish in hopes of driving down local populations. A UF/IFAS study led by Tom Frazer of the Fisheries and Aquatic Sciences Program shows that such efforts can help. Lionfish do not move into vacated areas readily, so consistent removals reduce pressure on ecologically and economically important native species.



### BRAZILIAN PEPPERTREE

A UF/IFAS study found that intraspecific hybridization has enabled Brazilian peppertree, *Schinus terebinthifolia*, to become one of Florida's most widespread terrestrial invasive plants, occupying almost 700,000 acres. Previous research showed that Florida was colonized by two distinct peppertree genotypes from different regions of Brazil, and that the two genotypes hybridized extensively in the state. So UF/IFAS weed biological control specialist Bill Overholt and colleagues analyzed specimens collected in Florida and concluded that intraspecific hybridization led to rapid natural selection of genotypes with greater cold tolerance than the two parental lines. The study also suggests that if additional genotypes are introduced to Florida, Brazilian peppertree might spread further northward, colonizing much of the Southeast.

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