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Nature's efficient ways to protect crops

A division of the state Department of Agriculture is running biocontrol projects in an attempt to protect the state's crops, animals and people from pests and diseases.

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George Schneider and his 10 co-workers can count on being stung by imported fire ants just about every single workday.

But the welt-spotted crew of state researchers gets its revenge in due time.

Each week, several thousand of the stinging, biting ants are sent to a building where they will be decapitated.

Slowly.

If the recent E. coli infestation of California spinach marked an attack by an enemy people can't see, the Division of Plant Industry is standing guard against many that we can.

"The goal of biological control is using the natural enemies of pests to reduce populations of pests below an economic threshold," said Reed "Ed" Burns Jr., who heads DPI's Bureau of Methods Development and Biological Control. "That is the level at which you can produce a crop or grow a crop effectively without undue expenditures of funds."

DPI, a division of the state Department of Agriculture, is running nine biocontrol projects in an attempt to protect the state's crops, ornamental plants, animals and people from plant-related pests and diseases.

One of those projects is the rearing of phorid flies, tiny gnat-like insects that attack the heads of fire ants to use them as hosts for their own young. The fly lays its egg in the ant's thorax, and the larva that hatches migrates to its head, releasing an enzyme that gradually separates the head from the ant's body.

Soon, the young fly emerges from the disembodied head. It's gruesome, but effective.

"As we get these flies out there and they spread around, they will put continual pressure on the fire ant population, not just with the numbers of ants they kill, but also because of their effect on the ants' foraging behavior," Schneider said.

The DPI reared 2.3 million of the flies last year, and it's the only place in the nation growing them on a mass scale. The phorids were released in Florida, 13 other Southern states and Puerto Rico, devouring the ants that do about \$6 billion in damage to crops annually.

SHARED ECOSYSTEM

Invasive plant and insect pests cause \$138 billion in annual major environmental and economic damage nationwide, according to the U.S. Department of Agriculture. Because Florida and the Caribbean share a common ecosystem, whatever thrives in the Caribbean's balmy climes will thrive in Florida.

There's also a pattern of pests coming from Asia to the Caribbean or Central America, then to Florida, with Florida receiving more invasives than any other state.

Elise Ryan, owner of Color Garden Farms in Loxahatchee, credits the work being done at the state Department of Agriculture and the University of Florida with keeping some of the pests at bay.

"They do an amazing job. They do it quickly and get in front of these things," Ryan said.

Her nursery has not had a problem with pink hibiscus mealybug, a pest that arrived in Florida in 2002 and for which the state was ready. She's talked to Homestead growers whose nurseries had the mealybug destroy plants as the bugs covered plants with colonies that resembled a "waxy goop."

'RESEARCH READY'

"It's a very bad bug. They had their research ready. They knew it was in the Caribbean, and they were prepared," Ryan said.

With its many seaports and airports bringing in foreign agricultural commodities and international travelers and its warm, hospitable climate, Florida also is a breeding ground for many new arrivals from the insect world.

The DPI's staff finds a new exotic insect that is a potential pest every couple of weeks, entomologist Paul Skelley said.

When an insect is intercepted, whether it's in an arriving visitor's handbag or later at a commercial plant nursery or a homeowner's back yard, the next step is to identify it.

INSECT COLLECTION

It helps that The Museum of Entomology, which houses the Florida State Collection of Arthropods, the sixth-largest insect collection in North America, is on DPI's premises. It includes 8.3 million pinned and preserved specimens from mites to spiders and flies, which are housed in more than 18,000 insect drawers.

So far this year the DPI's eight entomologists have had the task of identifying close to 8,000 species of insects that come in from its field inspectors and other sources.

The 130 DPI employees in Gainesville work in a campus-like setting west of UF. Across the state, DPI employs 875 people, with a budget of \$86 million.

The most recent crisis was the arrival of the pea leaf miner, detected in lettuce shipments from California.

Inspectors found the tiny black insect at Wal-Mart and Publix distribution centers in late August. DPI's entomologists quickly pegged it as the miner that destroys lettuce, celery and other vegetables. Three weeks later, the pest -- which is harmless to humans -- still was coming in on lettuce by the truckload.

"This is a big infestation," said Gary Steck, a systematic entomologist. "The lettuce is quarantined. They can't sell it in Florida. They could send it to another state. I don't know why they keep sending it here."

The pea leaf miner and another unwanted creature, the lettuce aphid, also are turning up on cauliflower, also from California, he said.

"It's a little ironic. The spinach with E. coli is coming out of the same area, the Salinas Valley," Steck said.

Mark Sodders, president of Lakeview Farms in Pahokee, which grows sugar cane and sweet corn, said farmers need all the help they can get fighting plant pests.

"Keeping them out is a real concern," he said. "There are indications that Mediterranean fruit flies came in through plants. They are pretty sure citrus canker came in the same way."

With sugar cane, a crop that is a four- to five-year investment, keeping pests out is particularly important, Sodders said.

Biocontrol usually does not eradicate a pest, but rather suppresses its population and can weaken it so that fungal diseases or other factors can reduce it, Burns said.

One of the division's success stories is the initiative against the citrus blackfly that plagued the state in the 1970s, Burns said.

"We introduced a couple of parasitic wasps. Those have been dramatically successful," Burns said. And so far, the interceptions of the pea leaf miner have worked.

The miner has not made it to Florida's agricultural fields, and the goal is to keep it out, said Michael Thomas, who heads DPI's entomology section.

In the halls of DPI, the entomologists sometimes refer to the latest arthropodan arrival as the "pest du jour."

They know the influx of pests is apparently endless. For example: The red palm mite, now infesting palms in the Caribbean, is expected to turn up in Florida any day now.

"We have a whole list of insects our inspectors are looking for every day. It's a constant battle," Thomas said.