RESEARCH REPORT

It takes one to grow one

Producing Pasteuria *by the pound to be a pesticide doesn't look too feasible yet*

BY DARCY MEEKER

Soil samples from golf courses in Broward, Collier and Palm Beach counties turn up many pest nematodes with bacterial infections. That's the report from Robin Giblin-Davis, an IFAS researcher at the Fort Lauderdale Research and Education Center.

Giblin-Davis is studying the sting nematode.

With funding from the FTGA and the O.J. Noer Research Foundation, he's looking at *Pasteuria*, a bacteria which appears to be one nature's ways of keeping nematodes and other pests in line.

In the first six months in the laboratory, the bacteria built up to the levels researchers had seen in the soils. After one year, *Pasteuria* seemed to depress sting nematode populations, a revelation which will not depress golf course superintendent populations at all.

Even though it takes a year for the microbe to slow the nematodes down, with a perennial system like grass that you expect to have in place for 15 to 20 years, one year isn't such a bad deal.

"It's encouraging," said Giblin-Davis. "There are no panaceas, of course. It's one of the many potential biological control candidates."

But producing *Pasteuria* by the pound to be a pesticide doesn't look too feasible yet.

So far, scientists haven't found a way to grow it except on the sting nematodes themselves. That means producing the microbe calls for scientists to produce sting nematodes.

As the IFAS researcher wryly puts it, "Sting nematodes are not easy to grow unless you're trying to grow grass."

There are some real advantages in the

Want to get involved?

How can you get involved in research? It's easy. Researchers are always looking for people in the field who are willing to cooperate with their projects. Call Bob Yount at the Florida Turfgrass Association in Orlando at 407-898-6721. Contact the University of Florida in Gainesville at 904-392-7231 and speak to Dr. Ed Freeman. In Fort Lauderdale, you should contact Dr. Monica Elliott at 305-475-8990.

Pasteuria approach, he added. *Pasteuria* is very persistent. Its spores are resistant to heat and to most of the pesticides available.

"Once you get them (Pasteuria) in your soil, they're going to be around for a long time like little land mines that the nematodes can trip over. There's evidence that use of some nematicides may actually encourage the microorganisms."

Also in favor of the *Pasteuria* and other biological control approaches: some nematicides are fairly toxic. Some are losing their efficacy as soils built up populations of microbes that can digest the pesticides.

The Fort Lauderdale scientist said that it looks like almost all phytoparasitic nematodes have a type of *Pasteuria* afflicting them. He said USDA scientists and other IFAS researchers are studying the germ's potential to control other pests. IFAS researcher Don Dickson in Gainesville studies *Pasteuria* with a smaller spore that infects sting nematodes and another *Pasteuria* that attacks lance nematode. He's looking at a fungus on lance nematodes, also.

What can golf course superintendents do while science marches on its own sweet time? Giblin-Davis recommends you do the same thing that the researchers are doing: Take samples of soil in areas that used to have nematode problems and don't seem to anymore. Then sprinkle the soil over problem areas and check back next year.

It's a pretty small investment with a big potential payback.

St. Augustine shows some promise around banks, bunker faces

St. Augustine can add a new texture and color to South Florida roughs without taking over the fairways, says Steve Ehrbar, who tested the system with architect Pete Dye at Cypress Links GC in Jupiter. Now at Lost Tree in Palm Beach, Ehrbar had previously tested centipede, bahaia and carpet grass at Old Marsh in Palm Beach Gardens with "not very good luck."

But the St. Augustine grass worked out really well around bunker faces and lake banks to give a contrast appearance, like golf courses up north. Against all that bermudagrass, the St. Augustine provided a different color and texture.

They feared the disadvantages. St. Augustine is very aggressive. Would they be able to keep it from creeping into fairways?

"Over a year's time we found we could get the control we wanted. The St. Augustine did especially well on the steep, two-to-one slopes Dye likes to use. These are trouble spots requiring hand-mowing and it's hard to get any fertilizer on them."

They used a chinch bug-resistant cultivar of Floratam.

"You can only sod it," said Ehrbar. "On a new golf course, it's nice to sod. It healed in very quickly without too much washout problem, whereas when you sprig grass, you can find it washed away during rainy summer months."

Phil Busey, IFAS researcher at Fort Lauderdale, is studying what makes St. Augustine grasses more or less susceptible to chinch bugs.

'Good' nematodes well established at seven golf courses

Year One of the FTGA-sponsored "good nematode" research project has come to a close with good news. The microscopic worms that burrow into mole crickets, eat their innards and reproduce have gained a foothold. Seven of the 21 Florida golf courses participating in the experiment have captured and returned mole crickets infected with the nematode to IFAS researchers, meaning that the nematode is living at large on those courses.

The parasitic nematodes attack southern, tawny and short-winged mole crickets which cause $47 million worth of damage to Florida turfgrass annually. Some golf courses pay over $20,000 a year to fight this browner of green space.

Says Howard Frank, the IFAS entomologist who coordinates UF mole cricket biocontrol work: "The methods used to release these agents were basically the same on all courses. There is reason for optimism that the agents will be detected on most courses during 1991."

Courses where the parasitic nematodes are established are Cypress Creek, Orlando;

Northdale, Tampa; Pineview, Macclenny; Riviera and Royal Poinciana, Naples; Sun City South; and TPC/Sawgrass, Ponte Vedra Beach.

Other courses participating in the project are Banyan, West Palm Beach; Bay Hill, Orlando; Citrus Hills, Hernando; Countryside, Clearwater; Cypress Run, Tarpon Springs; Delaire, Delray Beach; Fiddlesticks, Fort Myers; Foxfire, Sarasota; Golden Hills, Ocala; Interlachen, Winter Park; Quail Ridge, Spring Hill; Riviera, Ormond Beach; Waterford, Venice; and Woodfield, Boca Raton.

Red-eyed flies doing their part in war against mole crickets

Steve Kuhn, superintendent at Doral CC in Dade County, ran sound traps in December to see if there were any red-eyed-flies around and caught 22, a record number.

This natural enemy of the mole cricket, imported from Brazil, comes to the mole cricket mating call and lays its living larvae on or near the singer.

The fly has been released at the 21 courses participating in the nematode experiment. No one has looked directly for red-eyed flies in these locations, but a mole cricket sent to Howard Frank from Foxfire in December was infected with a fly larvae. Definitely a good sign.

Frank's research team will monitor for the fly at the 21 courses next fall when populations will have had a chance to build up.

Meanwhile, there is a move afoot to enlist more courses in the project.

Pine tree decline treatment project extended two years

The Florida Turfgrass Association has agreed to fund Dr. Roger Webb's pine tree decline research in 1991 and 1992.

Webb, a University of Florida scientist, has prepared a research protocol for this expanded program which includes 14 treatment and control categories. He needs data from at least 100 different treatment sites around the state.

Any Florida golf course wanting to participate in the program should select at least 140 trees to be injected (10 trees for each of the treatment and control categories). More trees can be treated at each site in multiples of 140.

Variables include injection methods, rates, product packaging, product formulations and fungicide chemistry.

Each participating site must contribute $5,000 to the Florida Turfgrass Research Foundation Pine Tree Research Program. The money pays for training seminars and materials, the treatment products and expenses. Cost for each additional 140 trees is $3,080 or $22.50 per tree.

Participation (sign-up) information will be mailed from the FTGA office to all interested superintendents in the next few days. Seminars will begin in January and February with tree injections beginning in the spring of 1991.

All contributions to the Florida Turfgrass Research Foundation, a 501-C-3 organization, are tax deductible. For more information, contact Bob Yount at the FTGA office, 407-898-6721.

Cisar/Snyder study aimed at protection of groundwater

The first major research to be conducted at the FGCSA Research Green at the University of Florida's Fort Lauderdale Research and Education Center will be a three-year study of mobility and persistence of turfgrass pesticides by Drs. John Cisar and George Snyder. Below is a summary of the proposal which landed a $135,000 grant from the USGA *(see page 8)*:

Rationale

Many different pesticides are required for maintaining high quality turfgrass in golf course greens.

The sand-based USGA green specifications are being used increasingly because they perform well under heavy traffic in unfavorable weather conditions. The USGA green drains well, while at the same time it provides an acceptable measure of water-holding capacity and a favorable root zone environment.

But the green does not contain a high level of organic matter and, in a humid climate, considerable percolation can occur.

These two factors may lead to unacceptable mobility of pesticides used for turfgrass maintenance, which may impact groundwater quality.

We are requesting funds to evaluate the mobility and persistence of selected turfgrass pesticides in a USGA green in a humid, sub-tropical environment, and to devise strategies for minimizing groundwater contamination.

We also intend to determine the efficacy of certain soil amendments for absorbing pesticides and the suitability of the amendments for use in a green.

Specific Objectives

Determine the persistence of turfgrass pesticides in a USGA green, evaluate pesticide mobility through the soil profile, measure pesticide concentration in percolate waters, and evaluate existing computer models for describing the persistence and mobility of pesticides under field conditions. Investigate selected soil amendments for mitigating pesticide mobility.

Methodology

Lysimeters for collecting percolate waters will be installed in an existing USGA green at the Fort Lauderdale Research and Education Center. Selected pesticides (e.g. organophosphates, carbamates, phenoxy compounds) will be applied to the green, including the lysimeter area.

Cultural practices and environmental conditions following pesticide application will be recorded.

Analyses of turfgrass thatch, soil, and percolate waters for the applied pesticide, and in some cases for important degradation products, will be made at various time intervals to determine the mobility, persistence, and degradation of the pesticides.

Existing computer models will be evaluated to determine the degree to which they describe observed phenomena in a USGA green.

In laboratory column studies, soil amendments will be evaluated for reducing pesticide mobility. Promising amendments will be field tested to evaluate their compatibility with turfgrass maintenance.

Don't under-water rye during transition to bermuda

Greens and fairways overseeded with rye for the winter should not be underwatered in transition back to bermudagrass, says Dr. James Beard of Texas A&M University at College Station. Withholding water can enhance death of bermudagrass, especially if spring root decline occurs. Instead, before the soil reaches 64 degrees F 4 inches down, he recommends close mowing, high nitrogen and weekly verticutting. These practices allow the sun to reach the bermudagrass and gets it greened up.