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WORK LIFE PROFILE

On the attack

Kelly Smith of Pasteuria Bioscience leads scientists trying to wipe out harmful bacteria

Kelly Smith, CEO of Pasteuria Bioscience in Alachua, wants to help backyard gardeners and professional farmers alike raise a thriving crop. And she plans to do it by growing massive numbers of bacteria that kill plant-damaging microscopic worms.

The tiny worms, called nematodes, attack plant roots. They cause an estimated \$100 billion in worldwide crop damage annually.

Locally, they destroy tomato, peanut, cotton, squash, zucchini, eggplant and other vegetable crops, said Smith, who has lived in Gainesville for three years.

But home gardeners may not even know nematodes are to blame for their sickened plants. Symptoms include knots on plant roots and wilting of the visible part of the plant.

Nematodes also make a plant vulnerable to disease, said Smith, 37.

Currently, chemicals such as methyl bromide are used to curb the destructive worms. But chemicals can cause environmental problems, can be dangerous to its users, and can destroy beneficial organisms in the soil.

Scientists have known for more than 50 years that some bacteria could kill nematodes. But they were never able to grow the bacteria in a lab - until a few years ago when a University of Florida professor figured out how to keep the worms alive long enough to do research with them.

With the technology in hand, scientists at a company called Entomos figured out how to grow the bacteria, called *Pasteuria penetrans*, in fermentation tanks. Smith was one of the scientists at Entomos.

When the Alachua-based company went under a couple years ago,

neither the scientists nor the investors wanted to give up.

The investors funded continued research into the bacteria, allowing Smith and two other scientists to continue their work. Pasteuria Bioscience was formed in May 2003.

Smith and her co-workers are now scaling up production of the bacteria and are looking for a manufacturer to create the mass quantities of the bacteria needed.

That's important because each quart of the worm killer contains 10 trillion of the bacteria. A quart covers one acre of land and will be available in a liquid or powder form.

Smith hopes to get the product on the shelves in 2006.

In the meantime, they grow tomatoes and coleus to test the bacteria on. Housed in the Sid Martin Biotechnology Development Incubator, Smith and her co-workers have access to labs, a greenhouse and machinery that would be hard to afford if they had to buy it as a new business, Smith said.

In the fermentation tanks, which look like large, clear vials, the bacteria grow in a swirling yellow liquid. And while Smith comes across as generally reserved, she lights up when talking about the nutrients she and the other scientists feed the bacteria that allow them to grow.

In the nearby greenhouse, Smith points out plants purposely infected with nematodes, their yellowing leaves drooping.

Next to the infected plants grow healthy ones that have been pre-treated with *Pasteuria penetrans*.

"That's the best way to do it, to prevent the damage," Smith said.

After the *Pasteuria penetrans* is marketed, Smith plans to work on bacteria that will target other types of nematodes, which destroy golf course grass, banana and citrus trees.

Biological solutions are the wave of the future, she said. They're less toxic than chemicals and give growers more options, Smith added.

Smith's own future was clear to her when she was a child.

Even as young as 8 years old, she told everyone she was going to be a paleontologist or an entomologist- and yes, she did know what those words meant, even back then.

As it turned out, her predictions weren't that far off. Even though she's not working with insects, the bacteria and worms are still small, living, wiggly creatures.

Born in Arvada, Colo., she received a bachelor of science degree in chemical engineering from Michigan State University. From there, she went on to receive her master's degree and Ph.D. in environmental engineering science from the California Institute of Technology.

Smith's hobbies also revolve around nature. She enjoys gardening, bird-watching, sea kayaking and backpacking. Bird watching is really a scientific hobby because it involves identifying and classifying birds by their sounds and appearances, she said.

"I do tend to look at the natural world with a scientific eye," Smith said. "But it doesn't lessen my enjoyment or wonder."

Smith approaches life in general from a scientific perspective, said Debra Neill-Mareci, who has known Smith for four years as a friend and business associate.

"She researches information before making decisions," said Neill-Mareci, owner and illustrator for Neill BioMedical Art in Gainesville. "She's thorough, objective and non-judgmental."

Smith does a good job of keeping the big picture in mind while maintaining a sense of humor, said Neill-Mareci.

Smith keeps that sense of humor when referring to her own problem plants at home. She said she can't wait for *Pasteuria penetrans* to be commercially available because she wants to try it out on her own garden.

"I've experienced first-hand the tragedy of plants that don't produce tomatoes," Smith joked.

Kathy Ciotola can be reached at (352) 338-3102 or ciotolk@gvillesun.com.
