

Biological controls keep Delray pests at bay

This grower's integrated program has greatly helped with insect management

By Suzanne Wainwright-Evans

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Many people in this country have come to a realization that change must occur. Gone are the days of not understanding man's impact on the planet.

This realization is occurring in the nursery industry, too. With concerns about pesticide runoff, worker safety and the negative impact on native beneficial insect populations, progressive growers are looking to more environmentally sustainable pest management.

With these approaches, many find in the long run they're growing better plants and saving money. One nursery that had the vision years ago to head in this direction was Delray Plants.

This company, with two locations in Florida, produces tropicals and supplies retail giants such as Home Depot, Wal-Mart and Target stores. It was founded in 1969 by Jake Koornneef on 14 acres in Delray Beach, Fla.

Over the years Delray Plants expanded and added new growing facilities. Today the majority of crops are grown in Venus, Fla., in Highlands County. There are 250 acres in production at this Central Florida location. It has a total of more than 850 acres, allowing opportunities for expansion.

Delray started experimenting with an integrated pest management program in the 1990s

at its original Delray Beach location. When the majority of production moved to Venus, this program was escalated to a new level.

Brandon Boyd, one of Delray's growers, helps lead the battle of good bugs vs. bad bugs. Before working at Delray Plants, Boyd worked at Epcot's The Land pavilion. This 6-acre exhibition in Orlando, Fla., demonstrates innovations in sustainable agriculture.

During his time at Epcot he had hands-on training working with biological control agents as part of an integrated pest management program. Delray Plants gave him an opportunity to implement this knowledge at a large commercial production operation.

Getting started

When Boyd arrived at Delray Plants, he and production manager Bryan Gilde spearheaded a program at the Venus location. Attempts at biological control had been made in the past at this location, but without great success. This time they were committed to make it work.

Knowing that this was not going to happen overnight, Boyd and Gilde put together a plan and stuck to it. As part of the program, they hired me as an outside independent consultant. The role of an independent consultant was to help educate them on the latest pest management technologies, and to offer unbiased, independent information on suppliers and other options.

One of the first steps was to identify significant pests on key crops. At the typical nursery, many broad assumptions are often made about what pests are present. However, for a



Photo by Johnathan Lonsdale
Grower Brandon Boyd, left, and general manager Lee Theiss have helped Delray Plants develop a successful biological control program.

Delray Plants

Founded: 1969 by Jake Koornneef in Delray Beach, Fla.

Locations: Venus, Fla., and Delray Beach.

Acres: More than 250 in production.

Crops: Tropical container plants.

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**Delray Plants has more than
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biological control program to work, you have to know exactly what you're battling. Accurate identification is absolutely essential or the grower could be wasting time and money applying the wrong predators.

At Delray Plants, the biggest pest was twospotted spider mite — *Tetranychus urticae*. A goal became to develop a program specifically targeting this pest.

Scouting counts

To implement a solid IPM program, several steps were necessary. First, the company took the time to train in-house employees on how to properly scout.

This way Boyd and Gilde could accurately track pest populations. Schedules were set up, and crops were scouted once or twice a week. Knowing where in the nursery the pests were, and learning if the biological control agents were also there working, was a key part of establishing the program.

Next, finding a quality supplier of biological control agents was critical. The company needed suppliers that could provide the correct predator species reliably, in enough volume and at a fair price.

And just like all nursery stock isn't created equal, neither are biological control agents. Delray needed suppliers that would ship quality. A successful biological-control program can only be as good as the quality and viability of the predators supplied.

It took some time, but after trial-ing product from several suppliers, Delray eventually found the right fit.

Are you a candidate for biological control?

Growing operations suited to biological control programs have these traits:

- Growers are committed to continuing education.
- The company is willing to commit to a scouting program.
- Growers should be concerned about pesticide resistance.

Nurseries with spray drift issues are excellent candidates. Biocontrols may also be opportunities for companies looking to capitalize on green/environmental niche marketing.

With some short-term crops, it may not be cost-effective to use a biocontrol program.

The mite fight

For Delray Plants, there were several commercially available options for controlling twospotted spider mites. During the early phases of implementing the program, a number of different predatory mites and insects were looked at from different suppliers.

Beneficials whose biology seemed to fit the conditions at the nursery were tried first. The first three months of releasing beneficials were a learning experience. Once spraying broad-spectrum pesticides was eliminated and biocontrol agents were release on target pests, other minor pests showed up. In the past these were taken out by the pesticides.

But at the same time, native beneficials moved in and worked alongside the released predators. In some cases this was not enough to control these new minor pests.

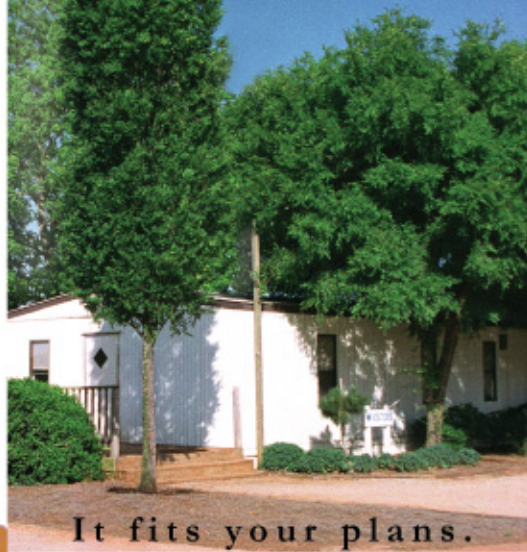
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Once the new minor pests were accurately identified, a pesticide could be selected that would have minimal impact on the beneficials, while still controlling the pest.

A good example of a secondary pest occurred on crotons. Soon after discontinuing regular preventive sprays, thrips appeared and needed to be controlled.

The predatory mites were working wonderfully on twospotted spider mites, so a pesticide had to be selected that would not disrupt the mite program. The wettable powder form (which contains no oil) of BotaniGard was chosen. This product contains the beneficial fungus *Beauveria bassiana*, which attacks insect pests including thrips, whiteflies and aphids.

It's very compatible with a predatory mite program because it does not kill mites. It's also useful from a resistance-development standpoint. It can be used regularly because it's next to impossible to build resistance to this beneficial fungus.

Spikes happen

If the scouts did find high populations of twospotted spider mites, a decision had to be made whether to spray or release more predatory mites. This was a learning curve and varied by crop. Often a targeted knock-down spray was done with a miticide friendly to the predatory mites, and then beneficial mites were reintroduced.

Some of the spider-mite-susceptible crops did not economically justify the cost of the predatory mites. On certain crops twospotted spider mites are rarely an issue.

For example, mite pressure on *Phoenix roebelenii* was so low that no predators were released on this crop. It was far more economical to spray miticides only as needed.

Over time fewer populations of twospotted spider mites were found in the crops managed under the bio-control program. The growers found if a pesticides spray was needed, they had better efficacy with the pesticides than in the past.

And less frequent exposure to pesticides reduces instances of resistance.

Hundreds of acres

The initial recommendations for predators given to the growers were a general starting point. Next the company needed to fine-tune the predatory mite program.

Temperatures were monitored more closely to observe which beneficials performed best under Delray's growing conditions. Of the predators introduced, *Phytoseiulus persimilis* and *Neoseiulus californicus* came out on top. They remain the backbone of Delray's spider mite management program.

Another goal was to make mite management more cost effective. The company learned quickly that treating 100 or more acres with predatory mites consumes a great deal of labor.

The mites were applied by hand with shaker bottles on the foliage of plants. Because this process could take so long all the mites could not be applied in a day, requiring the mites be refrigerated until the next day.

This can be done, but it's not ideal. A solution needed to be found.

Native beneficials move in

A number of native beneficial species move into production areas once spray programs are reduced. These include:

- Lacewing larvae.
- Aphid parasites.
- Lady beetles (adults and larvae).
- *Coenosia* spp. (predatory flies).
- Rove beetles.

The growers, with some outside help, developed a method to apply predatory mites using a blow sprayer. This way the mites are broadcast over the crops, allowing for treatment of an acre in a few minutes.

Higher numbers of mites had to be applied to compensate for the mites that did not survive this application method. But even with using higher rates of predator mites, it was still more cost effective because of the labor savings.

Benefits seen

With years of experience, Boyd can list many benefits of the predator mite program. He likes how the predatory mites can work their way into the plant canopy, reaching nooks and crannies that miticides may not reach.

He also likes knowing that when the plant leaves the nursery, the predatory mites will keep working to protect the plant. He also likes that he doesn't have to spray as often.

He boasts that he hasn't had to spray his crotons with miticide in four months because the predatory mites

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are working so well. There's more thought involved in developing a biological control program than a traditional spray program, but he feels the results are worth it.

Delray Plants has done an excellent job blending biological controls with its traditional spray program. This didn't happen overnight. Small steps

Beans help insect distribution

Most predatory mites come shipped in plastic bottles. They're sprinkled over foliage, like you would salt your food.

This works fine for many crops. But on plants with fine leaves, like chamaedorea palm, the beneficials may fall to the ground.

To solve this problem Delray Plants is purchasing the predatory mite *Neoseiulus californicus* from Sterling Insectary on bean leaves. They come shipped in bags and the leaves are then laid out over the crop. This allows the



Photo by Suzanne Wainwright-Evans

Delray Plants distributes beneficial mites on bean leaves, which prevents predatory mites from falling to the ground.

predatory mites to crawl off the bean leaves and into the plant canopy, eliminating the possibility of them falling to the ground.

An added benefit is that all life stages of the predatory mite are being applied to the crop, including eggs.

were taken on the path to integration.

While the technical aspects require more focus than a traditional spray program, the benefits have outweighed the effort to acquire knowledge. Delray Plants is reducing exposure to its workers, reducing pesticide runoff, preventing insecticide resistance and improving its bottom line.

After having such great success with spider mites Delray Plants is looking to develop biocontrol programs for other pests.

Suzanne Wainwright-Evans is founder of Buglady Consulting, (610) 767-9221; suzanne@bugladyconsulting.com.