GROWERTALKS

Features

4/30/2025

The Evolution of Poinsettia IPM

Jeremy Webber

First off, I'm sorry. A poinsettia article falling in the busiest month of the year … well, I'm sure you all have bigger priorities for the time being. Hopefully, my efforts here at least get an earmark for later. That said, it's important to get IPM planning started before the crop even hits the FedEx tracking system, so alas, here we are. I'll try to keep it brief, but the evolution of biocontrols in points over the last pair of decades is an interesting story, assuming you're into that sort of thing. Bug nerds, plant nerds, nerds in general, please read on. This is a safe space.

Left: Here you can see a crop several weeks into the biological approach and the number of introduction sites present. Each week, a strip of cards is placed on each site. Parasitic wasps hatch out of the cards and distribute themselves into the nearby area, searching for whitefly larvae to kill and feed on directly or to parasitize them.

Right: A recently spaced-out crop shows the results of many weeks of beneficial introductions. One benefit of this method is how transparent the releases are. You should be able to analyze any one of the release points and see the week numbers roll back in ascending order. More than one program has been derailed by improper application techniques and this keeps the system in full view.

Back in the day

I started focusing on biocontrols in ornamentals for Koppert in 2011. While this isn't a terribly long amount of time measured geologically, it feels like eons with biocontrols. No better crop than poinsettia demonstrates this. BCAs gained their initial foothold in edible greenhouse crops like tomatoes back in the 1980s. When progressive ornamental growers needed an alternative solution for whitefly in poinsettia, it was an easy reach across the aisle to their CEA relatives for recommendations on where to start.

As is frequently the case when adapting strategies from edible fruit crops or cut flowers, however, results were less than stellar initially. Why? Lots of reasons to pick from there, but the largest was simply that the input rates of the parasitic wasps were far too low. At the time, tomato IPM managers were basically using the tomato crop as a massive banker plant for whitefly parasitoids to develop on the pest and the balance of the good vs. bad guys was a delicate game that the best IPM managers played for a living. You never actually see the tomato plant, right? So as

long as the plants are producing properly and no one's washing honeydew off the fruit at harvest, everyone was (generally) happy.

These intro rates for the wasps would be referred to as "propagative." You're growing your own good guys, while keeping the whitefly suppressed below thresholds. This isn't something you want to do on a large scale in a potted ornamental crop, however, as your customers see the entire thing, not just the fruit. For potted crops, the goal is to crush the entire pest developmental cycle from the beginning since even a ton of parasitized and controlled whitefly on the leaves would still get orders rejected. This is what set the stage for releases with "inundative" rates.

Let's replace neonics

Koppert Canada did the heavy lifting here, just prior to my arrival for Koppert U.S. in the northeast. David Neal, now the leader of the subsidiary to the north, figured out what was required from a numbers standpoint to make the parasitic wasps work in the crop. It took several seasons and lots of pesticide residue testing to rule out some variables, but he was eventually able to dial in a cumulative introduction rate for a combination of both *Encarsia formosa* and *Eretmocerus eremicus* (sold by Koppert as Enermix). The cumulative rate was and still is a relatively unique concept, but it ultimately was nearly three to five times that of what we were using in tomatoes at the time. I think this initial approach can still best be described as bringing a shotgun to a knife fight. It was aggressive, but we now had an approach that had similar efficacy to a full rate drench of the leading neonic product at the time.

Eventually we added in *Amblyseius swirskii* predatory mites for a few weeks early in the crop and got comfortable recommending applications of *Phytoseiulus persimilis* for Lewis mite, too. It wasn't cheap by any means, but it was far cheaper than the problem, and it was in the ballpark with what growers were spending already. There was far less PPE and REIs as well, which was a major win for the bigger guys.

Were it so easy

If you've produced this crop before, you're aware of the curveballs that get thrown your way. The biggest thing to keep in mind though, is that we're buying in the pest problem on the cuttings and we're putting them into our greenhouses when they're nearly as hot as they're going to get. For whitefly (with bios, there's no need to get specific on which one), this is a recipe for disaster. A few uncontrolled eggs or larvae on the foliage of the cuttings can exponentially turn into millions of adults by midsummer.

I like to use a freight train analogy here. The amount of energy required to keep said train in the station and at a standstill in orders of magnitude less than the amount required to stop it from a full on charge a few miles down the track. Regardless of methodology, when executed properly, both conventional and biocontrol plans all keep this concept at the front of mind; go heavy and go hard early and keep them from ever establishing in the crop, especially earlier when conditions are at their hottest.

To complicate matters a bit, you can't simply dump a ton of parasitoids into the crop and expect it to work. This works with the parasitic wasps that go against aphids, as they're strong fliers and have relatively advanced homing mechanisms. I wouldn't advise dropping your entire order in the corner by the headhouse, but you could and you'd still see them working in the opposite corner of the house within a day or so. The wasps used for whitefly are considerably "dumber" however. They have a short working range in the crop, so where they're released each week is paramount for success.

Our general recommendations are to make sure that there's a release point every 100 sq. ft. in the crop, so that the

wasps have good overlapping fields of fire so to speak. Not the easiest sell to a grower with 40 acres on finished spacing, but this is the best way to ensure there's always a good guy in the vicinity of a whitefly trying to set up camp.

Initial efforts were also complicated by the lack of a product named Rycar. (Yes, a "Bug Guy" is about to sell you on a pesticide that I have zero financial stake in.) While good IPM programs focus on keeping the train in the station, whitefly adults can also fly in from outside of the greenhouse. This can happen nearly year-round in the south, but is especially pronounced in the cooler months up north. Prior to the release of Rycar, we didn't have a strong adulticide for whitefly that was compatible with the bios. We had plenty of larvacides and ovicides, but this was a major missing piece, and things got significantly easier once it was an option to deal with the transients that would come in later.

The puzzle piece we didn't know we needed: Isaria

The hybrid approach with Bios + Rycar was state of the art through a few years ago, but then we were introduced to Isaria fumosorosea (Isarid). It was initially discovered killing whitefly in the wild and we were eager to see the effect in points, too. After corroborating results from around the U.S. over two seasons, we were able to do something that may surprise you—we, a company that makes money by selling bugs, cut our recommended poinsettia introduction rate of parasitic wasps into the crop by half. While weekly apps of the mycoinsecticide are required to pull this off, we now work with growers who aren't even applying wasps after spacing anymore and are still seeing comparable results to when they were with far less labor cost. As an added benefit, you get good control of poinsettia, western flower and even pepper thrips, plus mealybug, adult fungus gnats, and some suppression on pest mites, as well.

Isaria fumosorosea is available in a number of trade names and formulations. Koppert has Isarid, however, Nofly is available and Ancora is out there as well. While I can't speak for the others, Isarid has zero residue issues when mixed according to the label and can be applied as late into bract formation as you'd like, though it's far more important to get it in earlier than later and apps during flowering shouldn't be required if the train stays safely in the station. Make sure to add in an IGR of your choice with each weekly application as well. They work synergistically with the mycoinsecticide, allowing for better germination and penetration of the hyphae through the weakened exoskeleton.

Rycar is still a great product to keep on hand for blow-ins, as it responds faster than the mycoinsecticide. As with all pesticides new to your operation, test on a small batch first to make sure there isn't something unique to your setup that causes unforeseen issues.

Right: Isaria is absolutely lethal on whiteflies. It's also been reclassified into the genus of Cordyceps. Fun fact: The video game/HBO series "The Last of Us" is about Cordyceps doing something similarly horrific to humans. I've reached out to Pedro Pascal for ad work on Isarid, but so far, no response.

We keep improving

It's extremely satisfying to see things progress over time like this. While we had a bead on things 15 or so years back, it was complicated and had a steep learning curve to get the intro sites and rates dialed in for each grower. Now we have some truly helpful chemistry and a sprayable fungus

that takes most of that complication out of your equation. The fun part of mycoinsecticides like Isaria? There's zero resistance risk. Yes, it can take years to dial in that magic rotation schedule with a conventional approach, and that's hard to let go of, but products like Isarid can and should be used repeatedly, over and over.

They work best when the spores are layered into the crop. Figuring out when to pull the trigger on the occasional chemical correction for whatever makes it through is the next task at hand and that's where you'll likely need some backup. It's always good to partner with an IPM consultant that knows you, your crop and the bugs as well. This isn't necessarily a pitch for Koppert, though we'd love to hear from you. Unlike back in the day when there were maybe five people in the U.S. that you could hopefully connect with that knows what to do, there are likely north of 50 of us running around the U.S. today spread across the major bio suppliers and distributors. Connect with someone you trust and we'll help you get past Thanksgiving with the best crop yet. **GT**

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