GROWERTALKS

Features

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Details Matter

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There's something about broadcasting mites and their carrier material over a crop that seems to click for many growers. It's possible that it's analogous to spraying a pesticide. You can physically see the blanket of protection that you're applying to your crop and therefore sleep a little better. For me, I'd been a chemistry/pesticide nerd for years, but when I finally made the jump to bios, it was a bit nerve-wracking. I'm guessing there was something with the bulk apps that tapped into my very early days as a turf guy, spreading granular products in the landscape.

Regardless of what subconscious thing struck the chord for me, lessons learned from designing irrigation systems and granular herbicide apps all quickly came back within the first few years to help dial in the approach to the Nth degree. The main takeaway? Distribution Uniformity (DU) is key if you want consistent, predictable results. The underlying truth that we've realized over the years is that predatory mites always work if they're always present throughout the canopy of your crop. Koppert's initial bio-applicator efforts with the Mini-Airbug, full-sized Airbug and Airobug were, and still are, some of the best ways to make this happen at scale. Now that the Airobreez is just starting to hit facilities in the U.S., we're in an even better position to get that even coverage in the canopy, with less labor and greater efficiency. First, let's start with a few ground rules as to how predatory mites actually work.

Know thyself

The team gives me a hard time about this phrase, but I'm a fan of saying "predatory mites are dumb and blind" on a regular basis. You'll find few people more enthusiastic about what predatory mites can achieve, but let's not get carried away with their abilities. They don't have eyes and their prey homing mechanisms aren't that strong, either. Knowing and understanding these limitations is key for success, but fortunately, they're fairly easy to account for.

Don't assume they can move from plant to plant without contact because they don't even know that other plant is there. If your crop isn't touching, then every plant needs predators applied evenly or this isn't going to work. As an example, pretend you have a crop of 1,000 1-gallon salvia that are spaced out and you get solid coverage on 98% of the crop with your weekly application of Spidex (*Phytoseiulus persimilis*). I'll bet you very good money that the spider mite hot spot you find three weeks from now doesn't come from one of the plants that got coverage. The predators always work. If they didn't it's because they weren't there when they needed to be.

If you apply a targeted number of predators on every leaf, with every application, you'll never have substantial development of the pest that you're concerned with. This really emphasizes how important the early applications are, before we get good-sized canopies that start to touch. It's at this point later in the crop that the mites will begin to redistribute themselves and make up for less than flawless DU. The pests have likely started developing much earlier, though, when the plants were small and the application didn't cover everything evenly. Koppert has solved this problem with our lineup of application technology, and it continues to evolve and improve with Airobreez.

Figure 1. Airobreez has two separate ducts. One small one for close in coverage right in front of the applicator and a larger one for a ranged attack. Easy and even dispersal of predators was imperative in the design process, and fan speed is controlled from an easy-to-reach dial on the top.

The journey

I like to think of my early days of applying by hand with the "chicken-scratch method" as analogous to watering a crop by hand without a watering wand and Dramm redheaded water breaker. I was essentially just going at it with my thumb over the end of the hose and doing my best. Sure, you can get water in the pots that way, but there's no chance that it would be even and some plants would dry out considerably sooner than others.

In both situations, if you want each plant to get enough mites or enough water, you've got to go after it heavily, over-applying to much of the crop so that everyone at least gets the minimum. In my case, it worked. I was applying Thripex (*Neoseiulus cucumeris*) mites to echinacea at an average of around 1,000/m2 when 300-ish per m2 would have worked. Some got 3,000/m2, others got 100/m2. At least the thrips population we brought in had a terrible spring, but it was grossly inefficient. To get the most bang for your bio-buck, you need to apply the product to as much area as you can as evenly as possible.

Shortly after my first season with the aforementioned chicken-scratch method, I was introduced to Koppert and our Mini-Airbug blower. I was really impressed that a bug company went to that level and then didn't even charge for it. If you were a customer, then you got what you needed to apply the products loaned to you free of charge.

This was a huge development for me and it immediately kicked the gears in motion, thinking about how we used to measure the DU of granular herbicide apps in my previous nursery position. Poorly applied apps meant weed germination and ridiculous labor burn pulling the weeds. You had to apply them with as much precision as possible with a belly-pack spreader or you were literally paying for it a month or two later. It quickly dawned on me that it was the same concept. Apply quality product as robotically evenly as possible and the results speak for themselves.

Figure 3. The rotating dispenser pot on the Airbug and Airobug line of blower units is critical to their success. This ensures that a uniform blend of mites and carrier fall into the airstream for dispersal at all times.

Think of a cement mixer

While I was mentally comparing a predatory mite intro to an application of granular herbicide or turf fertilizer, I was missing a key component in the analogy. If we're only applying inert carrier material with each app, then, yeah, it's

almost literally the same thing. But we're applying living, moving and breathing things with that carrier material, and their incessant movement adds a wrinkle to the equation. Depending on your mite's activity level during the introduction, they're typically trying to move vertically through the carrier material.

This makes blower units with static hoppers less than ideal. You start with an even blend of mites and carrier, but this changes over the introduction, as the mites migrate northward through the hopper. This is a design issue that Koppert has solved with all of our blower units. The original models all have a rotating drum that sits at a 45-degree angle, keeping the mites and the carrier evenly blended as they fall into the air stream. Airobreez goes a step further, though, as it's able to do this while remaining completely sealed. The drum spins at a variable speed, which keeps things mixed evenly, but also controls the speed at which the mites are fed into the blower unit.

Figure 4. Airobreez has a sealed compartment that holds up to 3 liters of material. The entire drum rotates at various speeds based on an easy-to-adjust dial on the top. This keeps the mites evenly blended, as well as controls the dosage of the application.

Paratroopers ready for combat, not bugs on a windshield

Similar to the previous situation, we're not just applying carrier material, we're applying living mites that need to land on the crop with all their faculties about them. Blasting them in over 25 to 30 feet is ideal from a labor standpoint, but not if half of them hit the crop like a fly on your windshield while driving down the interstate.

Again, this only works if you have even coverage on every plant and Koppert put in the time to figure out what the maximum velocity can be before we start to see mortality creeping up. All of our blowers operate below 2% mortality on application and that's absolute worst case. In most tests, we see 0.0%. Our smallest unit, the Mini-Airbug, can do this over about 6 ft., the Airobreez and full-sized Airbug can do this out to about 15 ft., and the Airobug can go out to about 20 ft. (in two directions at once, so about 40 ft. in total).

Attention to detail pays for itself

Koppert U.S. has a team in the field of over 35 consultants. Most of us are crop focused, so that we have deep knowledge of not just the bugs, but the plants, the environment and all the other variables that come into play when working with you to put the IPM puzzle together. We are the IPM and BioSolutions experts and we're here to help you get the most out of your budget. Go to koppertus.com when you're ready to dial in your bio program to the Nth degree. **GT**

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