GROWERTALKS

Paul's Pointers

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Biological Progression

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As time passes, I find myself using more and more biologicals (biological control agents, biosolutions products and biological additives) to control pests and diseases on greenhouse crops. Before I share some of the ways I currently use biologicals, please allow me to walk you through how bios have progressed throughout my horticultural career.

My progression on biologicals

When I first got into gardening as a kid, one of my main sources of horticultural knowledge came from my subscription to Organic Gardening magazine. I was an avid organic gardener who constantly worked at improving the soil by incorporating tons of organic materials such as leaves and using Dipel (*Bacillus thuringiensis*), and other homemade organic concoctions to manage garden pests.

Unfortunately, biologicals weren't really prevalent outside my own gardens. As a teenager, I worked on agricultural farms where conventional non-organic approaches were used. Biologicals were covered for about a hot minute in college. In the early years of my career after graduation, I soon learned that biologicals weren't a viable option for controlling pests in wholesale greenhouses. In the early years of my career, biologicals were around, but weren't as widely used are they are these days. Also, controlling pests using biologicals back then usually carried a much higher price tag than controlling pests using traditional chemistries.

Commercially, my first foray with using biologicals was using weekly applications of Gnatrol (*Bacillus thuringiensis subsp. israelensis*) to reduce the occurrence of fungus gnats in poinsettia propagation. A few years later, I discovered and began using routine applications of beneficial nematodes (Nemasys, *Steinernema feltiae*) in propagation houses to manage fungus gnat larvae. Over time I began to use biological control agents and biosolutions products more frequently.

Fast forward to today and I can honestly say that biologicals play an integral role in my pest management programs. But I have to be fully honest with you that I don't rely on them exclusively and frequently use traditional chemistries, "softer chemicals" or a combination of these products independently or in combination with biologicals.

This reminds me about the special inaugural Biosolutions Guide published with the June 2023 issue of *GrowerTalks* I worked with Ball Publishing to create. This guide not only discusses bioinsecticides, biofungicides and BCAs, but helps demonstrate how they can be used in conjunction with traditional chemistries. (You can view and even download your digital copy HERE.)

How I use biologicals

First and foremost, the mention of specific brand names below does not imply other trade names are less effective—these are simply the products or BCAs that I've used or am currently using. There are often multiple similar products on the market that are also effective at what they're designed to manage. Secondly, I mention below how I use or have used specific biosolutions products; this doesn't imply that these are the only strategies for using these products or that they cannot be used either more or less intensely than how I've used them.

Now that the disclaimers are done, here's how I've used or am currently using various biosolutions products:

Trichoderma: I view trichoderma, such as RootShield, as a cost-effective insurance policy. When everything is being managed properly (good irrigation and fertility practices), I find it hard to gauge their true benefits. However, when things begin to drift sideways or backwards culturally, the results with trichoderma become more apparent and their benefits can more easily be seen. I like to apply trichoderma to difficult crops, slow crops and to many crops planted from bareroot starting materials.

Biological soil additives: There are numerous good biological soil additives available that can help improve nutrient uptake, decrease stress and improve growth. I've been using Terra Trove SP-1 Classic from DPH. It contains five different types of Bacillus, humus and other natural components. I originally applied SP-1 to difficult crops, but am rapidly expanding the use throughout propagation and other high-value programs.

Beneficial nematodes: Perhaps my favorite biological control agents are beneficial nematodes. When starting with a clean propagation area or greenhouse, I can generally keep the fungus gnat populations down when making weekly applications. The times I've tried stretching out the application interval (for example, increasing the application interval from seven days to 14 days), I've found the fungus gnat populations would increase. Moral of the story—stick with your program as it was designed and apply beneficial nematodes regularly. Beneficial nematodes also work well when sprayed weekly for controlling western flower thrips.

Bioinsecticides: These are certainly not new products, but I've recently found a new interest in using bioinsecticides such as Botanigard (*Beauveria bassiana*), NoFly (*Isaria fumosorosea*) and LalGard M52 (*Metarhizium brunneum*) for controlling several pests, including aphids, fungus gnats, spider mites, thrips and whiteflies to name a few.

BCAs: *Amblyseius cucumeris* are highly effective and affordable predatory mites used to protect crops from numerous enemies. I use them for controlling western flower thrips and spider mites on a range of herbaceous perennials. One really cool observation I see year after year is weekly releases of *A. cucumeris* to asclepias crops has prevented aphids from attacking them. I believe the presence of *A. cucumeris* has deterred aphids from entering the crop.

Additional BCAs: Besides *A. cucumeris*, I often use the predatory mites *Amblyseius californicus*, *Amblyseius swirskii* and *Phytoseiulus persimilis* to control spider mites and other insect pests. *Dalotia coriaria*, aka rove beetles, are in my toolbox for controlling fungus gnats and thrips.

In conclusion

Rather than a conclusion, I like to think that I'm near the beginning of my biosolutions journey. There are certainly other effective biosolutions and biological additive options than those mentioned above. Many of them are quite compatible and can be used in conjunction with more conventional strategies. Similar to being successful with more traditional chemistries, using BCAs and biosolutions products does require a basic understanding of what they are, how they work and what they're compatible with. When used properly, biosolutions approaches can be effective at controlling numerous pests and diseases, as well as for improving overall plant health and appearance. Give them a

try. **GT**

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