GROWERTALKS

Culture Notes

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Successful Biocontrol in Poinsettias

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Biological control in poinsettias has been used for many years—as far back as the mid to late 1980s. Back then, I was still working in the Netherlands and many poinsettia crops were actually grown by growers who grew a tomato crop from mid-December to July followed by a poinsettia crop. For many of these growers, it was "natural" to use biocontrols in their poinsettias, as they were doing this also in their tomato crop.

Pictured: Eretmocerus eremicus is a tiny wasp that's released as pupa into the crop using blister packs.

Many things have changed over the years and it's had its up and downs as far as growers using biological controls. First of all, 30 years ago, the primary whitefly species was Greenhouse Whitefly (*Trialeurodes vaporariorum*), a whitefly species that was best controlled using a tiny wasp called *Encarsia formosa*. About 10 years later, the introduction of imidacloprid, and later other neonicotinoids, which were highly effective (even one application would protect the crop entirely) and lowered cost, resulted in many growers abandoning biological control during the mid-1990s. However, when more cutting production started to come from off-shore locations, Sweet Potato Whitefly (*Bemisia tabaci*) became more prevalent.

For our neighbors to the north in Canada, biological control started to become the "standard" approach for many growers about 10 years ago, mainly because they don't have similar availability of "tools in the pesticide toolbox." The introduction of 'Q' type Sweet Potato Whitefly has made it more difficult worldwide to control this species with traditional products, as it's resistant to many active ingredients of traditional pesticides.

The interest for biological control has increased in the U.S. and globally. What are important basic steps to make a pest management program that's based on using BCAs successful in poinsettia?

Starting "clean!"

In any biological control program, starting "clean" is a very important first step. However, the meaning of

“clean” has two sides. Obviously, it’s expected that cuttings aren’t coming in from producers with unacceptable levels of pest problems—in this case, whitefly. However, trying to reach for “zero” tolerance has probably also increased the development of resistance, as traditional pesticides are used exclusively and extensively.

The other side is that certain groups of pesticides can have very long residual effects on BCAs. For example, the A.I. acephate can have long residual effects on the wasps that are used for whitefly control (>8 weeks). So if this product has been used on the stock plants producing the cuttings, it wouldn’t work in favor of starting early with BCAs. If the whitefly on these same stock plants is resistant to this same A.I. (which ‘Q’ type Bemisia most likely would be), you end up with double the trouble—bad residues, but still having possibly unacceptable levels of whitefly on the cuttings.

Communication with producers and suppliers of cuttings is highly recommended to let them know your intentions of using BCAs. Many of the cutting producers have become much more active with producing BCA -ready cuttings, minimizing the use of “older style” chemistry and even using BCAs on the stock plant farms. In addition, if you’re still using a traditional approach in your spring crop prior to your poinsettia crop, you’ll also need to be mindful of what type of traditional products you use in the last few months of your spring program.

A technique that has picked up in recent years to help with a cleaner start with any young plant material has been dipping of unrooted or rooted cuttings into solutions to limit the level of whitefly being introduced. This has been supported with research in Canada that dipping cuttings into either an oil-based product (for example Suffoil X) or a solution with Botanigard WP will lower numbers of potential hitch hikers. (Editor’s note: See the April issue of *GrowerTalks* to read the article from Rose Buitenhuis.)

Often Botanigard WP is done in combination with nematodes (*Steinernema feltiea*) and RootShield to also target fungus gnats and fungal disease problems such as Pythium. Keep in mind that these products only work on contact with their target organism. So a whitefly adult or larva not getting in contact with spores of Botanigard WP will most definitely not get affected. Same with the oil products. Key note here is to watch for phytotoxicity. We know that Botanigard ES isn’t the best choice for this application, so for sure use the WP formulation, which has been shown to be safe for poinsettia cuttings.

Releasing BCAs

Nowadays, it’s very rare to see a poinsettia crop where the main whitefly species found isn’t Sweet Potato Whitefly. This species can be in two bio types, named ‘B’ biotype and ‘Q’ biotype. The ‘B’ biotype is still relatively susceptible to traditional pesticides, whereas the ‘Q’ type is the one that has given some growers sleepless nights, especially when a population has been well established later in the crop.

Here’s the tricky part: you can’t tell the difference between the two biotypes unless you get them DNA tested. The other method for identifying which biotype you have isn’t recommended: the presence of ‘Q’ biotype is sometimes only discovered when certain traditional pesticides don’t seem to work as they “used to.” However, this typically means it’s too late and there’s a battle that’s already started.

The BCA that’s used for whitefly control in many different crops, including poinsettia, is Eretmocerus eremicus. This tiny wasp is completely yellow and is released as pupa into the crop using either blister packs

(loose pupa in a small container) or little cards (pupa glued on the card). These blisters or cards are clipped on the side of the pot with the blister or card facing the pot. It's important to keep these pupa out of intense sunlight, especially during the summer months. Releases should start as early as possible, as soon as mist starts for the cuttings or, for the growers receiving rooted cuttings, as soon as possible after transplanting (don't forget to dip the liner).

The pupas of these wasps are hatching in the blister or from the card. Typically, hatch rates are better with loose pupa, as *Eretmocerus eremicus* can only hatch from one side of the pupa. So blister packs maximize hatch rates because pupa glued upside down on the card are unable to hatch.

Once hatched, these little wasps can fly and start their search for whitefly larva. They have two modes of action. The first one is host feeding, which is primarily done on younger larva. One wasp can kill 20 to 30 first instar larva per day. The second mode of action is parasitism of the older larva by depositing an egg underneath the whitefly larva, which in the end results in producing another wasp. Here's the good news: these wasps do not discriminate between 'B' or 'Q' type and they'll also control Greenhouse Whitefly as well.

In stock plant production, often *Amblyseius swirskii* is added as a third BCA, mostly in small-release sachets. This predatory mite feeds on whitefly eggs and is highly effective at high temperatures, consuming approximately 10 eggs per day, which is approximately 10% of what a whitefly female produces in her lifetime.

On a higher-value crop, such as stock plants, it can be cost effective to use this predatory mite. Some growers also release these mites in the finishing crop, mostly as a broadcast application.

The timing of these applications is critical, at points where you have the highest leaf surface density, i.e. in plug trays JUST before transplanting and just before spacing in September. The reasoning is that these are predatory mites that don't have the ability to fly, which makes it difficult for them to distribute throughout the crop. This is the advantage of the wasps—they can fly.

Conclusion

Biological control has been an option for poinsettia crops for many years and, as it's typically a mono-crop with limited pest problems in the form of whitefly and fungus gnats, it's one of the earliest success stories with biocontrols in ornamental crops (1980s). For many growers, it's a stepping stone to biocontrol in their spring crop
settings.

In a more recent study in Canada, biocontrol has also been shown to be an excellent resistance management tool. It was shown with six greenhouse growers, three applying a traditional program and three growers applying biological control. For those using biocontrols, whitefly populations almost completely reverted back to 'B' type by September/October. For the traditional growers, the 'Q' type remained the majority of the population until the end of the crop.

This information also suggests that IF a clean-up application would be necessary at the end of the crop cycle, growers with primarily 'B' type will have much more success with this application. There are a few compatible

tools in the toolbox that can be used, for example Kontos and Mainspring as a systemic application. If we use them wisely, we can avoid building resistance.

Last, but not least, another key to a successful program is starting early. Every generation of whitefly that's missed means typically a 100 times increase in population, and during the warmer summer months, this happens in just over three weeks.

When considering biocontrols, start discussions with your supplier/consultant as soon as you can and prepare a plan that goes hand-in-hand with your production planning. Have a terrific poinsettia season! **GT**

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