Keeping Young Plants Clean

Maintaining clean cuttings and plugs is a must for any solid pest management program

- Ronald Valentin

Clean cuttings, young plants or plugs — this has been a discussion point for many years in our industry. It also has been a topic of tension between customers and suppliers. In this article, the idea is to try getting some positive thoughts and hopefully as a result, some positive dialog going about this topic between growers, propagators, breeders and industry technical support people.

Learning From the Past

The greenhouse vegetable industry went through this same situation more than two decades ago. I grew up in the greenhouse vegetable industry in The Netherlands and my parents owned and operated a 6-acre hydroponic tomato production greenhouse. When my father took over from my grandfather in 1966, the meaning of a “clean” plant was very different from what it is today. A clean plant was a plant that had NO bugs (what is still called zero tolerance today).

My father implemented biological control for the first time in 1971 to control whitefly in his tomato crop. The reason for this switch was the pesticide resistance that hit the vegetable industry at the time. In those early years, implementing bio-control in vegetables wasn’t always easy and it was often hard to find reasons why things didn’t work out as planned. But by trial and error, the keys to success were found. A few keys to mention are commitment, start early in the crop cycle, monitoring, management from beginning to end of the crop, and not to forget patience.

One particular outcome of this list was an early start of releasing biological control agents (BCAs), in this case Encarsia formosa for whitefly, early on in the crop. This was more or less done on a preventive basis, even if whitefly was not seen yet. Greenhouse vegetable growers in The Netherlands were getting their young plants started by specialized propagators and plants would arrive at the greenhouse at about six weeks of age.

Of course these plants needed to be clean. However, it became evident quickly that clean wasn’t always clean. Plants would still come in with pests present, but that wasn’t all. The plants also had been sprayed with pesticides that were not compatible and had residual effects of BCAs. In those years products such as oxamyl (vydate), methomyl (lannate), endosulfan (thiodan) and acephate (orthene) were still registered for use in vegetable crops in The Netherlands. Needless to say, this was in many cases a difficult start to a biological pest management program.

Within years, an understanding between the propagators and their customers developed about pest management and what a clean young plant would or should be. The words “zero tolerance” disappeared as it became clear that low levels of pests and no long residual pesticides was a better option than still low levels of pests and long residual pesticides, which basically meant that the grower has a hard time getting their biological pest management program started. It was basically determined that zero tolerance is extremely difficult to achieve.

Today most vegetable propagators are working with an IPM program using BCAs as a first line of defense. That doesn’t mean that they never use a pesticide, but if they do, it is a BCA compatible or it does not have a long residual effect. With this technique, they are not only leaving the customer (grower) with plants on which BCAs will start successfully, but also do their part of pesticide resistance management as they use fewer pesticides.

An Ornamental Industry Translation

The use of biological control is increasing in the ornamental industry on a worldwide basis. There are many growers who are very successful, but just like the vegetable growers had to go through a learning curve, so do we in the ornamental greenhouse industry over the last several years — and probably several years to come. There is however one similar issue in the ornamental industry that the vegetable growers faced more than 20 years ago — clean propagation material and cuttings, rooted or unrooted.

At a recent study done at the University in Guelph, Ontario, Canada, five main varieties of chrysanthemums were checked for the presence of thrips at arrival from the breeder. This study went on for eight months and every two weeks samples were taken. Not one single sample came in as clean, and in all samples thrips (adults and immature) were found. In some samples, one adult thrips were present every two cuttings. This is obviously a difficult start. Due to the different pesticides that had been applied, it is very likely that these thrips could be resistant to some of them.

The growers involved in this project all work with BCAs as part of their pest management. In The Netherlands, there is a three-year project that started in 2010 to address the issue of clean cuttings. In this project, the objective is to determine pesticide residues on cuttings of different crops coming in from different parts of the world as well as from within the country. This project has been initiated as these residues are a suspect of the reason why BCAs have trouble getting to work after arriving at the growers' greenhouse.

This research project is still taking place and I am sure we will learn a lot more about the project's results in the next two years.

Where Do We Go From Here?

Some breeders and propagators (rooting stations) have already implemented more BCA-friendly pest management programs. However, in an ideal world, it would be great if the ornamental industry could skip the mistakes that were made by our vegetable counterparts and implement a more BCA-friendly pest management strategy at the level of all propagator and breeders.

However, sometimes as an industry, we are our own worst enemy. A grower asking for a credit as he did not receive zero tolerance on his cuttings or plugs does not solve anything in the long run. The bigger question is how can we minimize initial pest levels and long residual pesticides on propagative material? The use of a pest management program at the level of breeders and propagators that includes BCAs, not excluding some short residual and compatible pesticides will benefit the industry.

This will not only benefit growers that are working with BCAs in their pest management program, but also growers who are working with traditional pesticides and are not ready yet to implement BCAs, as these techniques are an excellent pesticide resistance management tool. The key here is that propagative material coming out of a pest management program that excludes the long residual pesticides leaves the option open for the grower to implement BCAs or a traditional pesticide program.

Making 'Clean' Possible

Of course it is always important to inspect any incoming propagative materials for the presence of a pest, but it is unrealistic to think and expect that there is zero tolerance. What would be excellent is if growers could get some information on what pest management tools and products were used during the propagation process as this will provide important information on what to expect from BCAs if released early on. This would also help growers using traditional pest management programs to choose their pesticides.

The question that remains is what is acceptable and not acceptable as far as pest levels go? For example, unrooted poinsettia cuttings will have some whitefly, period. But if every cutting has as many as six adult whiteflies as I have seen this last July, then there is obviously a problem. To reduce the level and risk of pests coming in through the door, many growers have started to treat rooted and/or unrooted cuttings with products such as Botanigard, biological fungicides such as Rootshield and nematode Steinernema. Treating cuttings before they enter the greenhouse will not eliminate pest problems, but can reduce the number and the risk.

For example, the study at the University of Guelph has shown excellent results on thrips (adults and immature), but it does very little on the eggs of thrips as they are protected in the plant tissue. But if you eliminate most adults and immature, it will lower the total number of thrips, and it also buys the grower (and the BCAs) some time if pesticide residues are an issue. Products like nematodes and Botanigard work only by contact so dipping is the best way of getting optimal coverage. However, there is some risk of dipping cuttings as most plant pathologists will tell that disease problems could be an issue. It is up to each individual grower to assess that risk and see

which is a greater risk. Sprenching the products mentioned above will definitely have some effect as well, but dipping makes an escape of getting in contact with the solution very difficult.

In the study at the University of Guelph, hot water treatments have been successful on thrips. Thirty minutes at 102.2° F or 15 minutes at 104° F gave excellent results on chrysanthemum cuttings without any phyto toxicity or plant damage. This, however, is not a guarantee or been tested on other plant species. Also horticultural oil was very good in reducing both thrips and whitefly, but currently does not have a registration to be used as a dip treatment.

The above treatments have no residual effect on BCAs but are not exclusive to growers that are using BCAs as part of their pest management program, but can be implemented in any pest management program.

Ronald Valentin is biological control and IPM specialist with Biobest Biological Systems. He can be reached at rvalentin@biobest.ca.

Source: *Greenhouse Product News* February 2011 Volume: 21 Number: 2