Poinsettia Crop Recommendation

By Evergreen Growers Supply, LLC

OVERVIEW:

Whiteflies can be a challenge in any greenhouse, but they are particularly fond of Poinsettias. Beneficial insects and other methods of biological controls have become increasingly popular for treating whitefly infestations. Over the years, Bemisia whiteflies (bio-types B and Q) have surpassed greenhouse whiteflies and are the most significant and prevalent pest for Poinsettia growers. This trend has greatly affected the strategy for pest management of the crop. Bemisia, especially bio-type Q, is largely resistant to all legal and illegal pesticides. This means pesticide applications on poinsettias are becoming ineffective.

Due to the high levels of chemical residue on most cuttings, it can be tough to effectively use biological control during the summer months. This recommendation is based on the assumption that any Bemisia present on cuttings will have at least one month of freedom from any biological controls. This effectively gives the pest a significant head start. The primary control for Bemisia is the beetle *Delphastus catalinae*. *Delphastus* directly targets Bemisia colonies, focusing on the eggs first and then moving up the development stages until even the adults are consumed. Growers should think critically about when to introduce *Delphastus*. If they are introduced too early, residual chemicals on the cutting will kill the beneficial beetles. When introduced too late, the Bemisia get too much of a head start which delays the conquest of the Bemisia into the later parts of October.

PRIOR TO PLANTING

During this early stage, growers should allow any pesticide residue to dissipate. Because most propagation utilizes misting or humidity tents to facilitate rooting, growers can take advantage of the physical conditions and use fungal and bacterial biopesticides. We urge aggressive application of this class of product, as they can help in three ways. First, they can act directly on the adult and nymph stages of whitefly; second, their application helps rinse off some chemical residue; and third, the physical spray damages whitefly adults. The regular misting of the cuttings also disturbs the adult whitefly, causing movement. We believe that trapping eggplants will provide some of the whitefly a slightly more favorable host, and be able to pull some of the pest from the crop. Some *Encarsia formosa* should also be present at all times so that there will be some killing of the whitefly by host feeding or parasitism attempts.

Young seedlings, cuttings, or tissue culture plants should be inoculated with *Stratiolaelaps scimitus* as soon as they are planted. *Stratiolaelaps* can be applied overhead using a hand spreader, shaken onto the flats, or premixed right into the soil mix, provided it is used up the same day.

One week after introduction of *Stratiolaelaps*, if the crop is being grown wet and significant fungus gnat pressure is evident, growers can apply Steinernema feltiae. Steinernema feltiae utilizes microscopic worms (*Steinernema feltiae*) that attack and kill targeted insects without affecting any other organisms. When applied to the soil, Steinernema feltiae will provide prolonged protection against pest re-infestation. The nematodes ensure an effective attack on the fungus gnats and also feed and help disperse the soil mites. We can consult about application rates and timing according to your pest pressure and budget.

Growers should closely inspect their cuttings for whitefly eggs. It should be assumed that the propagator treated the cuttings for whiteflies. This assumption precludes the use of beneficial insects

against whitefly during the first month of propagation due to insecticide residue. Weekly or bi-weekly applications biological insecticides such as PFR 97, Met52 EC, or BotaniGard should be maintained for as long as the humidity remains high. (More information on these products can be found in the Lewis Mite and Spider Mite sections below.) Check with the supplier of these products to ensure that you are manipulating the climate effectively to ensure efficacy. Usually, high humidity is required for at least 6 hours to ensure adequate fungal penetration of the whiteflies. The rooting period is an ideal time to apply biological insecticides because humidity is high, which is optimal for biological insecticides.

After 2 weeks, or when the covers for propagation have been removed, release *Encarsia* at a rate of 1 to 4 per 10 square feet, depending on the whitefly population. It should be noted that most *Encarsia* applied during this period are not expected to survive the chemical residue on the plants. The goal of this strategy is to kill a significant amount of whiteflies with host feeding and parasitism wounds. This is a preventative approach; one Bemisia killed at this time could mean preventing one thousand in September.

During propagation, we recommend that eggplant implemented as a trapping crop. Bemisia slightly prefers eggplant. By moving or jostling of the plants, growers can make adult Bemisia take flight and some could then move over to the eggplant. If any greenhouse whiteflies are present, the eggplant will definitely be attractive to them, so it will also help with scouting. If a significant whitefly population occurs on the eggplants, then growers will be prompted to introduce *Delphastus* earlier that if lower levels of whitefly were detected on Poinsettia.

Growers can also install a version of a “flying aphid trap” to help reduce the number of flying pests in the greenhouse. The trap is a modified, electric bug zapper with the bottom removed. A downward flowing fan is duct tapped to the bottom and is generated with power from the bug zapper circuit. A paint strainer bag is then placed on the bottom. Make sure this is put away before *Delphastus* is released, as it will also impact them.

COMMON POINSETTIA PESTS

WHITEFLY

Poinsettias are highly attractive to the Bemisia whitefly. *Delphastus* is the key predator of Bemisia. *Delphastus* prefer Bemisia, especially their eggs, over other whitefly species. Because they target the eggs, *Delphastus* are very effective for getting rid of Bemisia.

Though effective, *Delphastus* does not provide quick or obvious results during the month of September. Growers should remember this and be patient. *Delphastus* is applied in a staggered way to ensure that any lingering chemical effects are minimized. The good news is that during this stage the Poinsettia pest pressure decreases as temperatures begin to drop.

During the colder months, Bemisia hunker down into hot spots in preferred varieties. Based on the initial Bemisia totals and the September weather, the ultimate end release rate of *Delphastus* will range from 1 to 3 beetles per 10 square feet. Encarsia should be continuously released from the day the misting tents come off to the end of any detectable whitefly at a rate of 1 to 4 wasps per 10 square feet, weekly.

Whitefly prevention is a multipronged attack. Bemisia is not easily scouted or monitored. A good way to detect and monitor Bemisia is walking through the crop, gently kicking or banging the pots together. Unlike the greenhouse whitefly, Bemisia tend to be mobile only at temperatures above 77° F and prefer higher density clusters. These clusters are a defensive strategy against the parasitoids, as the sticky honeydew is repellent to the predatory wasps Unless you are prepared to pick up every plant, it is best to assume that Bemisia eggs survived the propagator’s treatment, and begin introductions of *Delphastus* after a suitable waiting period to ensure that the residuals of the propagator’s treatment are gone (at least 4 weeks after sticking the cuttings).

We suggest three staggered introductions, two weeks apart of 0.1 to 0.3 beetles per 10 square feet. If significant levels of Bemisia are present, the rate of *Delphastus* release should be doubled or

even tripled. Some beetles should be placed near known infestations, but most should be neutrally released, ensuring aggressive searching. *Delphastus* find Bemisia and all other whiteflies by smell, greatly preferring Bemisia. Once *Delphastus* has eliminated the Bemisia they will turn to other whitefly species. Lower levels of Bemisia are typically discovered in Poinsettia crops about mid-October. This is because Bemisia do not act the same way the greenhouse whitefly does. Bemisia tend to clump in hot spots, and if undisturbed, tend to not be attracted to yellow sticky traps.

We discourage using conventional insecticides to control a Bemisia infestation. Bemisia is resistant to all conventional insecticides and a treatment will only kill the adults and render the site unhospitable for beneficial insects. Severe hot spots should have *Aphidoletes aphidimyza* applied at a rate of one tray for every hot spot, but only during September. Earlier application of beneficial insects may be effected by the chemical residue. Late season applications of *Aphidoletes* are pushing the *Aphidoletes* into the lower light levels and lower temperatures of fall. *Aphidoletes* will readily go after Bemisia if no aphids are present. Also, release *Delphastus* at and near the hot spot at a rate of 10 per 10 square feet (hot spot dimensions). Repeat 2 weeks later.

Bemisia really don't like the coloring up growing conditions, and can't survive cooler temperatures during the final month of a Poinsettia crop. As long as there are *Delphastus* present during the last month, control will be achieved. If you can reduce the temperature, by all means do so. The *Delphastus* will slow down, but they will still be much faster than the remaining Bemisia.

To fight the greenhouse whitefly, growers should rely on *Encarsia and Delphastus*. *Eretmocerus eremicus* is in the same family as *Encarsia* and can also help against the greenhouse whitefly. *Eretmocerus* females search out silverleaf and greenhouse whitefly larvae. Sprinkle the product directly onto the leaves in areas where whitefly occurs. Spread evenly in the crop, with as many release points as possible.

The greenhouse whitefly can also be attracted away from the Poinsettia by using an eggplant. We recommend having at least one eggplant in each production house as greenhouse whitefly is still a significant Poinsettia pest, and Bemisia have a slight affinity for eggplant as well. The eggplant should be placed in the greenhouse before Poinsettias because this will make it easier for the Bemisia to find the eggplant.

FUNGUS GNATS

Growers should reapply *Stratiolaelaps* at the transplanting stage at the same rate (100 per 10 square feet). Fungus gnats should be monitored using yellow sticky traps. The larvae should be regularly monitored by applying a slice of raw potato to the surface of the soil. Leave it there for 24 hours, then remove and inspect it. The larvae are attracted to the potato. Increasing numbers suggest a developing problem, while decreasing numbers show control. Fungus gnats should not be tolerated as they reduce the root development of the young plants and the flying adults are capable of transporting pest mites, such as Lewis mite.

Atheta coriaria or rove beetles, can also be used to control fungus gnats in the soil or planting media. Rove beetles are most effective when applications are started before fungus gnat population becomes well established or while numbers are still low (less than one seen in a trap, per week). One application of *Atheta* per crop cycle is usually sufficient if started early in the season. Because rove beetles have a longer life cycle and takes longer to establish than *Stratiolaelaps* predatory mites, they should be used along with *Stratiolaelaps* for best results.

Nemasys® beneficial nematodes also provide biological control of fungus gnats. (More information on Nemasys® in Prior to Planting section above.)

LEWIS MITES

Lewis mites are difficult to detect until it is too late. As the mite feeds, it causes very faint flecking in foliage, leaving the plants with a chlorotic appearance in advanced stages. As the Lewis mite population increases, the upper foliage will begin to turn brown.

If the greenhouse has a history of Lewis mites, or if there is reason to suspect that Lewis mite has come in on the cuttings, apply fallacis at a rate of 20 mites per 10 square feet just once, after the plants are transplanted, but before they are finally spaced.

Another option is to help control the Lewis mite is Met52. This contact bioinsecticide utilizes a pathogenic fungus for the effective control many pests, including Lewis mite. For best results, Met52 should be applied in early stages of population development. Met52 product efficacy in impacted by coverage and the application frequency is influenced by the environment, the manner of application (foliar or drench), the population of the target pest.

THRIPS

Thrips usually don't cause economic damage to Poinsettias but they are becoming an emerging pest. Releasing *Stratiolaelaps* in the soil will prevent thrips from occurring because the soil mites consume the pupating thrips larvae. Trap plants, such as Yellow Hero Marigold, are very effective for Poinsettia. The predatory mite *Amblyseius cucumeris* ("cucumeris") is the best biological control to combat thrips. If thrips damage is detected, apply cucumeris at a rate of 50 to 500 per 10 square feet, every 3 to 4 weeks. These mites attack the first and second instar larvae. If enough cucumeris are present they are extremely effective. Cucumeris sense the thrips emerging from the leaf, wait for them to stick their heads out, and then bite them off.

Atheta and Steinernema feltiae will also go after thrips, so if a grower is already using these biological controls, they can keep the under control. Another option is to help control thrips populations is Met52. (For more information, see previous section on Lewis Mite.)

SPIDER MITES

In a dry environment, spider mites can become a serious pest. Spider mites hate high humidity. *Stratiolaelaps* can be used to prevent a spider mites problem from developing. This pest goes after spider mites in the soil.

Fallacis can also be used to take preventative action against spider mites. Apply fallacis at a rate of 2 mites per square foot. This predatory mite evenly establishes itself throughout the crop, preventing spider mites under normal conditions.

Hot spot outbreaks should be treated with *Phytoseiulus persimilis* ("persimilis"). Fallacis and persimilis are compatible and do not interfere with each other, however fallacis does not do well on spider mite webbing while persimilis thrives on it.

Mesosiulus longipes ("longipes") is similar to persimilis, but can tolerate lower humidity. The optimum conditions for. These predators require higher humidity as the temperature increases. Longipes are most effective in warm greenhouses or interiorscapes with artificial lighting. Release longipes at a rate of 3 per square foot, once a week, 1 to 2 times.

Another predatory mite that works best when used preventatively against spider mites is *Neoseiulus californicus* ("californicus"). Growers will see best results when californicus is allowed to build up before the spider mite populations are able to establish themselves. Californicus is tolerant of various temperatures and low humidity, but works best under warm to hot conditions. It tolerates higher temperatures and lower humidity than persimilis. When pest populations are low, californicus will feed on pollen which keeps predatory populations around the crop. While some predators will actively seek out new prey in the absence of food, most will stay on the crop and wait for the arrival of new pests.

Amblyseius andersoni ("andersoni") is another predatory mite that can be used to control spider mites and a range of other mite pests. For best results, growers should apply andersoni when pest mite numbers are low. The predatory mites will then be able to feed on small colonies of mites and prevent them from growing and causing major damage.

When growers have an established spider mite problem, *Galendromus occidentalis* ("occidentalis") might be their best option as they feed primarily on

spider mite nymphs and adults, but not eggs. Occidentalis is a very versatile predatory mite and tolerates high temperatures and low humidity well. This biological control is recommended for greenhouses with a relative humidity of 40% or less. Adults eat 1 to 3 pest adults or up to 6 pest eggs per day. Apply occidentalis upon arrival, at a rate of 2 to 3 per square foot, bi-weekly, 1-2 applications. Occidentalis needs at least 11 hours of daylight.

Stethorus punctillum is a small black beetle that also thrives in low humidity situations. If growers are unable to manage the climate effectively and the spider mite conditions are extreme, *Stethorus* could save the crop. It should be applied at a rate of 0.1 per square foot in extreme cases, or in moderate cases, at a rate of 0.01 per square foot. These beetles find spider mites by smell and quickly move to new infestations, leaving behind their eggs and larvae to finish the job. One advantage of *Stethorus* is that that can fly plant to plat. They are sensitive to insecticides. The stickiness of the flower head will not deter these beetles.

Another option to prevent these pests is Met52 EC or PFR 97. PFR 97 Microbial Insecticide can also be used to combat spider mites. PFR 97 is a naturally-occurring fungus that infects both foliage and soil dwelling insects such as whiteflies, aphids, thrips, spider mites, and other pests. The best results can be obtained by using PFR 97 in an Integrated Pest Management Program, which includes scouting, monitoring (e.g. yellow sticky cards) and early detection and identification of target insects. Monitoring of pest pressure is critical to the effective use of PFR 97. Efficacy results from germination and growth of the beneficial fungus over several days, so applications should start before pest numbers have reached crisis levels. PFR 97 is most effective when application is initiated just before or at the first signs that target pests are present.

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