CROP INFO-SHEET

Poinsettia

General Information

The most important insect pest in poinsettia is the whitefly, with the greenhouse whitefly as the main one and the silverleaf (tobacco or sweet potato) whitefly as an increasing problem. Other insects that can be a problem are fungus gnats and thrips. Traditionally, control of these pests has been done with pesticides. However, it is also possible to successfully control pests in poinsettia production with an integrated pest management (IPM) program based on the use of 'Biological Control Agents' (BCA).

Scouting and Monitoring

For poinsettia, since whitefly is the main pest, yellow sticky cards will be the main scouting and monitoring tool. We suggest using 10 sticky cards per hectare (1 card/4000ft^2), which should be inspected once a week. Identify, count and record number of whiteflies (and any other pests) and BCA's found on cards. All counts and observations can be recorded on the Biobest 'Scout-Sheet' or other scouting and monitoring sheets. Plants should also be inspected weekly. We suggest inspecting about 10-20 plants/house (randomly selected); if any pests are found on plants, identify and record observations. When whitefly larvae are found, try to determine if they have been parasitized. If 'Trap' plants are used, inspect them weekly; identify pests found and record observations.

Pests, Biological Control Agents (BCA) & Control Strategy

Whitefly

The two main whitefly species found on poinsettia are the greenhouse whitefly (*Trialeurodes vaporariorum*) and the silverleaf (tobacco or sweet potato) whitefly (*Bemisia argentifolii* or *B. tabaci*). It is important to identify the whitefly species because BCA's may attack some whitefly species but not others; therefore, whitefly species can impact the choice of the BCA's used.

Since both whitefly species are usually present in a poinsettia crop, we suggest using the Encarsia-System, which contains the BCA *Encarsia formosa* to control greenhouse whitefly, in combination with the Mundus-System, which contains *Eretmocerus mundus* to control silverleaf whitefly, including the Q-biotype. Both BCA's in these products are parasitic wasps that kill whitefly in two ways, by parasitization and by feeding on whitefly larva (host-feeding). In a poinsettia crop, since the tolerance to whitefly is extremely low, the goal is to regularly introduce BCA's in number high enough so that most of the whitefly control is the result of host-feeding. If only one species of whitefly is present, it is possible to use only one BCA; it is then important to double the recommended introduction rate mentioned in Table 1. It is possible to replace either or both products (BCA's) mentioned above by the Eretmocerus-System, which contains *Eretmocerus eremicus*, a parasitic wasp that can attack both whitefly species; If using the Eretmocerus-System instead of the Encarsia-System and/or Mundus-System, introduce at the same rate as replaced product(s). As a complement to parasitic wasps as preventive measure, it is also possible to use the Swirskii-System, which contains the predatory mite *Amblyseius swirskii*. The Swirskii-System can also be a curative measure if whitefly hot spots develop. (Introduction rates: Tables 1 and 2).

Fungus gnat and shore fly

Fungus gnats are especially a problem in poinsettia at the rooting stage of cuttings or at the planting stage of small rooted plants but they can also cause damage to stock plant and older plants. Shore flies can also be a problem; they do not cause damage to plants but their presence decrease the aesthetic value and marketability of plants.

We suggest using the Hypoaspis-System, which contains the predatory mite *Hypoaspis miles*, as preventive measure against fungus gnats. We suggest to also introduce the Atheta-System, which contains the predatory rove beetle *Atheta coriaria*, as a preventive measure; this BCA will complement the work of the Hypoaspis-System in controlling fungus gnats but it will also control shore flies. Usually one application soon after placing cuttings in rooting media or when planting rooted cuttings is enough to obtain control of fungus gnats but they can be re-applied later if necessary. In case fungus gnat hot spots develop, we suggest using the Steinernema-System, which contains the parasitic nematode *Steinernema feltiae*, as curative measure; this product can also be used preventively, either alone or with other BCA's. (Introduction rates: Tables 1 and 2).

Thrips

Usually, thrips are not a major pest in poinsettias but occasional infestation can occur when poinsettias are grown next to thrips-sensitive crops (e.g. Chrysanthemum) or in previously thrips-infested greenhouses.

If a thrips problem develops, we suggest using the Steinernema-System curatively, which contains the parasitic nematode *Steinernema feltiae*. The predatory mite *Hypoaspis miles* contained in the product Hypoaspis-System can also contribute to thrips control by feeding on thrips pupae in the soil, but its actual contribution to thrips control is uncertain and it is therefore not recommended to rely only on *Hypoaspis* to control thrips. (Introduction rate: Table 2)

Trap-Plant and Banker-Plant

'Trap plants' are plants other than the crop grown, which are more attractive to certain pests than the crop itself; trap plants help in the early detection of pests. When BCA's are introduced on trap plants, it creates an "in-house" rearing system of BCA's, hence the term 'Banker plants'. For a poinsettia crop, the ideal trap and banker plant is eggplant, which is very attractive to whitefly. A dwarf variety is ideal because it stays very compact, does not require additional maintenance and do not interfere with the crop. Eggplant is also attractive to other pests and, therefore, can be used as a trap plant for thrips, aphids and spider mites and as a banker plant for the BCA's used against these pests. We strongly recommend introducing BCA's on trap plants in order to control pest population on trap plants and thus prevent that they become an infestation source for the poinsettia crop. (Introduction rates in Table 3)

Additional sources of information

- For detailed information on pests and BCA's mentioned above, consult the corresponding "Pest Info-Sheet" or "Beneficial Info-Sheet", which are all contained on the "Biobest Info-System" CD. To obtain a copy of any info-sheet or of the CD, please contact Biobest directly or a Biobest representative.
- Murphy, G. Biological control of whitefly in poinsettias: Can Trap Plants Help? Greenhouse Canada, March 2007

Miscellaneous

- Introduction rates of BCA's can be influenced by climate, season and location;
- Starting with pest-free greenhouse and plants: remove plant debris and weeds that may harbour pests; clean greenhouse (structure, benches, etc.); quarantine and inspect plants coming from outside sources for presence of pests before moving them into a clean greenhouse or with pest-free plants, treat new plants with pesticides if necessary;
- Always use products as soon as possible after receipt. If storage is unavoidable, keep at recommended temperature (indicated on package) for the shortest amount of time possible;
- Always use products before the expiry date stated on the package;
- Pesticides (insecticides, nematicides, fungicides, etc.) can have short or long-term negative effects on one or more stages of the BCA's. Please, be careful if or when choosing pesticides. Effects of pesticides on BCA's are listed in the Biobest's publication "Side Effects Manual" or can be found on Biobest's website (www.biobest.ca);
- For additional information, please contact a Biobest supplier or technical advisor.

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Table 1: Preventive introduction of BCA's against pests of poinsettia.

Pest	Product (BCA)	Introduction rate	Timing	Application
Whitefly	Use the first two products in combination; use of third product is optional			
	Encarsia-System (Encarsia formosa)	0.3/ft^2	Weekly, start as early as possible	Hang card on pot rim
	Mundus-System (Eretmocerus mundus)	0.4/ft^2	Weekly, start as early as possible	Hang card on pot rim
	Swirskii-System (Amblyseius swirskii)	5/ft^2	Once on rooted cuttings before transplanting and once before first spacing	Sprinkle on plants
Fungus gnats & shore flies	Use following two products in combination			
	Hypoaspis-System (Hypoaspis miles)	If rooted cuttings, 15/ft^2 at planting. If unrooted cuttings, 10/ft^2 when sticking cuttings + 5/ft^2 after transplanting cuttings.		Sprinkle on soil
	Atheta-System (Atheta coriaria)	If rooted cuttings, 0.2/ft^2 at planting. If unrooted cuttings, 0.1/ft^2 when sticking cuttings + 0.1/ft^2 after transplanting cuttings.		Sprinkle on soil

For all products, introduction rates are based on the area occupied at the time of the introduction.

Table 2: Curative introduction of BCA's against pests of poinsettia.

Pest	Product (BCA)	Introduction rate	Timing	Application
Whitefly	Use one of the following two products			
	Swirskii-Breeding-System (Amblyseius swirskii)	1 sachet/10 ft^2 (if plants touching)	As needed	Hang sachet on plants
	Swirskii-System (Amblyseius swirskii)	10/ft^2	As needed	Sprinkle on plants
Fungus gnats	Steinernema-System (Steinernema feltiae)	100000/ft^2 or 10000/pot	As needed	Drip or drench on soil
Thrips	Steinernema-System (Steinernema feltiae)	25000/ft^2	Weekly for at least 3 weeks	Spray foliage

For all products, introduction rates are based on the area occupied at the time of the introduction.

Table 3: Introduction of trap plants and of BCA's on trap plants in poinsettia.

Pest	Product (BCA)	Introduction rate	Timing	Application
All	Trap plant (Eggplant, dwarf variety)	1 trap plant/1000 ft^2	At planting	
Whitefly	Use the following two products in combination			
	Encarsia-System (Encarsia formosa)	1 card/trap plant	Weekly	Hang card on pot rim
	Mundus-System (Eretmocerus mundus)	1 card/ trap plant	Weekly	Hang card on pot rim
Whitefly + Thrips	Swirskii-Breeding-System (Amblyseius swirskii)	1 sachet/trap plant	Monthly	Hang sachet on plants
Spider mites	Phytoseiulus-System (Phytoseilus persimilis)	200/trap plant	As needed	Sprinkle on plants
Aphids	Aphidoletes-System (Aphidoletes aphidimyza)	25/trap plant	As needed	Sprinkle on plants

If started from seeds, eggplants will need to be started about a month before the start of the poinsettia crop. If using the Eretmocerus-System (*Eretmocerus eremicus*) to replace the Encarsia-System (*Encarsia formosa*) and/or the Mundus-System (*E. mundus*), introduce at the same rate as the replaced product(s).