

Greenhouse Poinsettias: Guidelines for Biological Control

The major pests of poinsettias are greenhouse whitefly (*Trialeuroides vaporariorum*), the sweet potato whitefly (*Bemesia tabaci*) and fungus gnats. Flower thrips may also infest production plants particularly if they are planted out following or near a previously infested crop.

Propagation Stages and Cuttings

The key to a successful biological control program in poinsettias is starting with clean stock cuttings. For a cost effective biological control program, very few whitefly must be present at the start of the crop and the cuttings must be free of persistent chemical residues that are harmful to biological control (see sheet 180, Effect of Chemicals). Examine the underside of the leaves of a good sample (1%) of the cuttings before planting using a 5-10X head-band magnifier or hand lens. Treatments of 0.5% spray of refined horticultural summer oil (Sunspray) or insect growth regulator (Enstar) are one of the most effective treatments for whitefly immature stages. Caution is necessary in the use of oil to avoid phytotoxicity. Plants under water stress may be damaged as will unrooted or poorly rooted cuttings. Agitate solutions when dipping the foliage and apply overhead misting after treatment. An oil concentration of 0.5% will kill 90-95% of the whitefly immature stages and the residue also has an inhibiting effect on whitefly adults.

General Monitoring

Do not attempt to use biological control on poinsettia without weekly monitoring using yellow sticky cards. Place cards just above or just within the top of the plant canopy. Use one 3X 5 inch sticky card per 400 plants or one card per 100 m². Identify the whitefly species in order to use the appropriate release of biological control. Sweet potato whitefly also tends to be aggregated within the crop so it is a good idea in the early crop to also inspect the underside of the leaves of about 1% of the plants. Use the leaf or trap counts to determine rates of introduction of Encarsia. At 10 traps per 1000 m² a count of 1 whitefly per 10 traps is approximately equivalent to 0.1 individual whitefly per plant or 10 whitefly per every 100plants. **Starting levels of whitefly above 0.1 per plant can lead to hot spots and control problems.**

Action Thresholds

The action thresholds for treatment (adding more biological control agents, spot spraying) are:

- 5 whitefly per trap per week or higher**
- 50 fungus gnats per trap per week or higher**
- 30 thrips per trap per week or higher**

WHITEFLY CONTROL

Both species of whiteflies can be controlled on poinsettia by the parasitic wasp, 'Encarsia', by following steps described below. A whitefly biocontrol program with poinsettias differs from that of some longer term cut flower crops where the aim is to

SHEET 455- POINSETTIAS

establish a breeding population. The biological control of whitefly in poinsettias depends on starting with a very low level of whitefly and always maintaining a high enough population of beneficials to suppress any increase in whitefly numbers.

Monitoring Tips

- Begin as soon as cuttings are planted out.
- Check traps weekly for adult whiteflies.
- Early in the season under low light levels whitefly may remain on the plant and not be detected on traps. Examine the underside of leaves on about 1% of the plants.
- Encarsia tend to remain in regions where the whitefly are concentrated, therefore it is important to distribute them well throughout the greenhouse.
- Catching some Encarsia adults but few whitefly (less than 1 whitefly per 10 traps) on yellow traps is a good sign and means that the whitefly levels are very low.

Identify Whiteflies

Correct identification is important because treatment recommendations differ for each species. It is difficult to identify whiteflies trapped on sticky cards, therefore it is advisable to examine adults and immature whiteflies on leaves (for descriptions, see Sheet 310).

Release Biological Controls

'Encarsia': *Encarsia formosa* is a tiny, 1 mm (1/20 inch) long, wasp that parasitizes immature stages of whitefly. It is sold as parasitized scales glued to cards, from which the adult wasps emerge. As the wasp develops inside, greenhouse whitefly scales gradually turn black; parasitized sweet potato whitefly scales turn a tan colour. Best results are achieved when Encarsia are introduced at low rates before whiteflies are found on monitoring traps. For more on Encarsia, see Sheet 210).

RATES:

Poinsettia stock and production plants

No whitefly on traps- apply 2 Encarsia/ m²/week

1-5 whitefly/ week-apply 3 Encarsia/ m²/week

6-10 whitefly/week-apply 6 Encarsia/ m²/week

'Delphastus': *Delphastus catalinae* is a small, black, 1.4 mm (1/15 inch) long, lady beetle. Both adults and larvae feed on whitefly eggs and immature stages. Delphastus is sold as adults and should be applied preventively or as soon as whitefly are detected.

Delphastus works well with Encarsia because it feeds on all stages of whitefly including eggs and avoids feeding on parasitized whitefly scale (for more on Delphastus, see Sheet 244).

RATES: Poinsettia stock and production plants

At first sign of whitefly-apply 1 Delphastus/ m² every 2 weeks

FUNGUS GNATS

In poinsettia most fungus gnat damage is caused by the larvae feeding on tender roots. As root area is lost, plants become more susceptible to drought stress and less tolerant of

SHEET 455- POINSETTIAS

root infections. Adult fungus gnats can transmit root rot and other diseases (for more on fungus gnats, see Sheet 320).

Monitoring Tips

Yellow sticky traps used for monitoring whitefly above can be used for fungus gnats as well. Record weekly counts.

Release Biological Controls

The following three species of biological controls are compatible and may be used together. If the monitoring trap counts are 50 fungus gnats per week or higher use nematodes or Bti.

'Hypoaspis'. This soil-dwelling predatory mite feeds on fungus gnat larvae. The best way to use *Hypoaspis* is to establish it in the greenhouse before large numbers of fungus gnats appear. Apply to stock and production plants at the start of the growing season. By feeding on other soil organisms, *Hypoaspis* populations can build up to high numbers that are effective in keep fungus gnat populations low (for more on *Hypoaspis*, see Sheet 230). Supplement *Hypoaspis* with other biocontrols (below) if fungus gnat populations are high (above 50/trap/week).

RATES:

Poinsettia stock and production plants

As soon as planted out- apply 150 *Hypoaspis* m²

Insect Parasitic Nematodes. *Steinernema carpocapsae*, *S. feltiae*, and *Heterorhabditis* spp. are beneficial nematodes sold to control fungus gnats and other insects. They can be applied to the soil through conventional sprayers or through the irrigation system. They are effective against high populations of fungus gnats.

- Apply nematodes when yellow sticky traps average over 50 fungus gnat adults per trap, weekly, or while fungus gnat populations are increasing.
- If root diseases are a problem in the crop, apply nematodes sooner to reduce the risk of disease transmission by fungus gnat larvae.
- Three applications, 7-10 days apart, are usually required. Nematode products vary, so always follow product recommendations for rates.

***Bacillus thuringiensis israelensis (Bti)*:** A strain of this bacteria that infects fungus gnat larvae is available (Vectobac®). It is applied in water to the soil or growing media after fungus gnats are established (follow instructions on the product label).

Other Measures

- It is essential to eliminate wet spots in the greenhouse where fungus gnats can breed by improving drainage, repairing leaks, adjusting automatic irrigation equipment, etc.
- Control is usually better in greenhouses with concrete or covered floors because fewer breeding sites are available for fungus gnats.
- Control fungus gnats in other crops in adjacent greenhouses.

SHEET 455- POINSETTIAS

Summary of IPM Guidelines Poinsettias

Between crops:

- Remove all weeds inside and around greenhouse perimeter.
- Spray benches, floor and walls with insecticidal soap if traps indicate the presence of greenhouse whitefly.

At start of crop:

- Whitefly: Release Encarsia at low rates.
- Fungus gnats: Introduce Hypoaspis at the start of the crop.

When pests are detected:

- Fungus gnats: Apply insect parasitic nematodes, Bti.
- Whitefly: Increase Encarsia as per monitoring counts above.

If pest levels are too high:

- Use the appropriate increased rates as per above.
- Treat affected area with pesticides that will cause minimum harm to biocontrol agents (i.e.) refined horticultural summer oil (Sunspray) or insect growth regulator (Enstar).

Summary of Biocontrol Rates

Whitefly:

- No whitefly on traps- apply 2 Encarsia/ m²/week
- At first sign of whitefly adults -apply 1 Delphastus/ m² every 2 weeks
- 1-5 whitefly/ week-apply 3 Encarsia/ m²/week
- 6-10 whitefly/week-apply 6 Encarsia/ m²/week

Fungus gnats:

- As soon as planted out- apply 100 Hypoaspis m²
- 50 fungus gnat adults/week or more - apply nematodes or Bti.