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Management of Thrips and Whiteflies with Insect-Killing Fungi: Impact of Spray Technology

Michael Brownbridge, Margaret Skinner & Bruce L. Parker
Entomology Research Laboratory, University of Vermont, Burlington VT 05405

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Phone: 618/692-0045
Fax: 618/692-4045
E-mail: afe@endowment.org
Website: **www.endowment.org**

BACKGROUND

Methods of plant protection in the floral industry are undergoing major changes as many of the "standard" pesticides are withdrawn from the market. Insect-killing fungi are an important new weapon in the IPM arsenal, but information describing their effective use is needed. In these studies, we tested two "off the shelf" sprayers for application of the fungus *Beauveria bassiana* for control of western flower thrips on chrysanthemum and silverleaf whitefly on poinsettia.

MATERIALS AND METHODS

Spray equipment. The sprayers tested were a high-volume hydraulic sprayer (Dramm Corp.) and an electrostatic sprayer (ESS).

Michael Brownbridge
mbrownbr@zoo.uvm.edu
802-655-5440

Application. Plants were artificially infested with thrips or whiteflies and sprayed with BotaniGard® WP at the recommended rate. ***Chrysanthemums.*** Plants were sprayed every 5-days (total 4 treatments) using a standard spray gun at 200 psi or the ESS sprayer. Efficacy was evaluated by sampling thrips from flowers. ***Poinsettia.*** Plants were sprayed using a 5-nozzle extension lance, spraying up into the leaf canopy. Four sprays were applied at 7-day intervals. Whitefly populations were sampled every 7-days. Spore deposition and persistence were determined using a leaf press technique.

RESULTS

Chrysanthemums were in flower at the start of the trial, a time when thrips populations can dramatically increase. Even so, compared to the untreated "checks", both sprayers suppressed the increase in thrips populations. The high volume spray provided better levels of control (Fig. 1) but high levels of thrips infection were obtained with both sprayers (Fig. 2).

Spraying poinsettias

Interestingly, infected thrips were also recovered from the untreated check plants, indicating movement of infected insects from sprayed to non-sprayed areas. This natural "spread" may be an important benefit when using fungi in a control program.

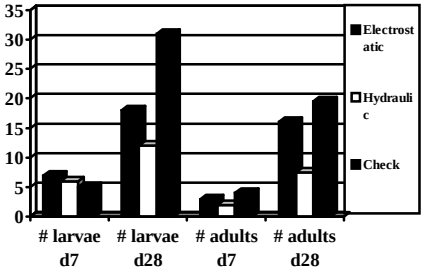

Figure 2. *Mean no. thrips per flower 7 and 28 days after*

On poinsettia, high volume sprays successfully suppressed the whitefly population (Fig. 3). Greater efficacy may have resulted from better targeting of spores to the underside of the lower leaves where the highest whitefly populations are found. Spore counts taken directly from the leaf surface confirmed this. Spores remained viable throughout the spray process and remained viable on the leaves for >6-days.

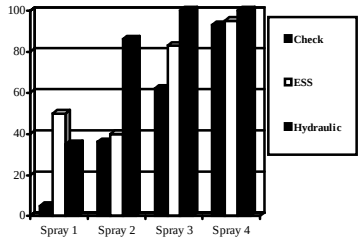

Figure 3*. Per cent infection in thirps sampled from flowers after spaying with fungi.*

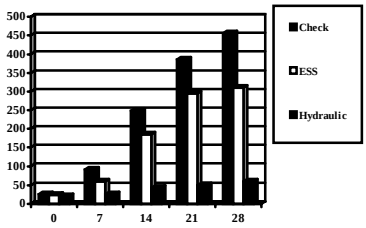

Figure 4. *Mean no. healthy whitefly nymphs per plant after spaying with fungi.*

CONCLUSIONS

Under grower conditions, control measures would be applied before pest populations reached the levels used in these trials. Thus, fungi are best used as preventatives. Increased levels of thrips and whitefly control were obtained with the hydraulic sprayer, probably because of better targeting of the pests. Also, the higher spray volume may have provided better leaf coverage and movement of the spores to infestation sites in flowers and infection sites on the insects. Current research is addressing additional factors to optimize spray coverage. This includes the effects of spray nozzles, pressure, angle and speed of spray. Ultimately, we will be able to define practices that allow growers to obtain the best results from their sprayers

IMPACT TO THE INDUSTRY

(1) Plants must be scouted regularly so that fungal sprays can be initiated before pest populations reach outbreak levels. (2) Growers can use fungi within an IPM strategy to regulate thrips and whiteflies. Their unique mode of action makes them ideal for use in resistance management. (3) Targeted spray applications using a high-volume sprayer appear to provide the best levels of control. (4) When fungi are used within an IPM program, pesticide residues on plants handled by retailers and wholesalers will be significantly reduced.