Let's Get... Bio-Rational!

Dan Gilrein
IPM Specialist
Cornell Cooperative Extension

Last fall, I became concerned about reports from some growers who felt the current Orthene + pyrethroid insecticide treatments didn't seem to be working quite as well as previously against sweet potato whitefly (SPWF) on poinsettias. There were also a lot of questions about how the newer neem-based materials Margosan-O and Azatin would measure up against the old standbys. Unlike many of our older insecticides, these materials are generally considered compatible with biological control and have shorter reentry intervals, an increasingly important consideration under the new Worker Protection Standard.

For the test, we created an impressive infestation of SPWF on our 'V-14 Glory' poinsettias. Each leaf had several hundred whiteflies in a "worst case" disaster situation that no grower should ever see. Plants were caged, and the treatments were repeated randomly on five benches. All insecticide treatments were applied with a high-volume sprayer using labeled rates of the insecticides (listed in **Table 1**), taking care to cover leaf undersides thoroughly. Starting October 15, all plants had four weekly sprays. Dead and live whitefly stages were counted one day prior to each spray on the same prepinch and postpinch leaves each time. A final count (11/11) was made one week after the last application. In the Orthene + Tame treatment, Orthene was included in only the first and third sprays. A yellow sticky card was placed in each cage to monitor adult whitefly levels over the course of the experiment.

The bar graph in **Figure 1** shows that whitefly counts before spraying (10/14) were about the same in all treatments. After two sprays (10/28), there were significantly fewer whiteflies on the treated plants compared with those sprayed with only water. By the end of the trial (11/11), all

plants sprayed four times with insecticide were much "cleaner" than plants sprayed with only water. Based on final infestation levels, all insecticides performed equally well.

The bars in **Figure 2** show counts of whiteflies on yellow sticky cards in all treatments. Adult whitefly counts stayed low for the Azatin, Margosan-O and Enstar II treated plants during the entire trial. Although counts in the Orthene + Tame treatment were lower than in the water-only controls by October 21, numbers of adults trapped on sticky cards remained significantly higher than in the neem treatments for another one to two weeks. Some SPWF pupae hatched after spraying with Orthene + Tame, but in the Azatin, Margosan-O and Enstar II treatments many whiteflies were unable to emerge from the pupal cases. This effect became more apparent around October 28 to November 4.

Although the last two sprays were applied during bract formation (starting at 5% color), no severe phytotoxic effects were observed from any treatment. Plants treated with Enstar II, however, did show some mild chlorotic mottling and a few small necrotic spots on foliage with no injury to bracts. Effects became somewhat noticeable only around November 4, after three sprays had been applied.

The estimated cost for each treatment regime (four sprays) is listed in **Table 1**. Although this is useful for comparison, the real question concerns the best long-term whitefly control strategy. You first want to use all preventive means (throw out or isolate infested plants, buy from cleanest sources available, etc.). Enstar II, Margosan-O and Azatin represent useful alternatives when rotating materials to avoid development of insecticide resistance.

To optimize whitefly control in 1994, the following suggestions might be helpful:

- Practice prevention and sanitation as much as possible. I have seen several greenhouses this spring with leftover poinsettias and undoubtedly leftover whiteflies!
- Check new cuttings for infestations. Treat plants promptly if WF are found, since good coverage is easiest to achieve at this stage.
- Include materials like insecticidal soap and horticultural oil for whitefly control, since their nonspecific action helps deter insecticide resistance.

- Use materials such as Azatin, Margosan-O and/or Enstar II in the insecticide rotation, especially if many whitefly pupae are present. Two or more applications should be used, spaced five to seven days apart. Don't expect instant mortality. Although numbers of adult whiteflies should drop quickly, the pupae take longer to show effects of the spray.
- Other insecticides, such as Pentac or mixes of Orthene TTO + a pyrethroid (Tame, Talstar, Mavrik or Tempo) can still be used if effective.
- Monitor the crop with yellow sticky cards and with foliar inspections to detect and track problems (whiteflies, powdery mildew, *Botrytis*, etc.). Your "action threshold" on stock is probably lower than for the finished crop.
- If you want to try biological control, start early and avoid using residual pesticides for two or more months before releasing beneficials (you can still use insecticidal soap, *Bacillus thuringiensis*, Mycostop, Gliogard, nematodes, Avid, horticultural oil, Enstar II, Margosan-O and Azatin). Begin releasing the beneficials as soon as an infestation is detected.

Table 1. List of treatments and rates applied

Number	*Material and Formulation per 100 gal*	*Rate 40 gal. each*	*Cost (4 applications)*
1	Azatin 3EC + Triton B-98	16 oz. 5.6 oz.	$148.16
2	Margosan-O 0.3EC	80 oz.	180.70
3	Enstar II 0.63E	10 oz	222.21
4	Orthene TTO 75S + Tame 2.4EC	5.3 oz. 10.7 oz.	64.70
5	Water		

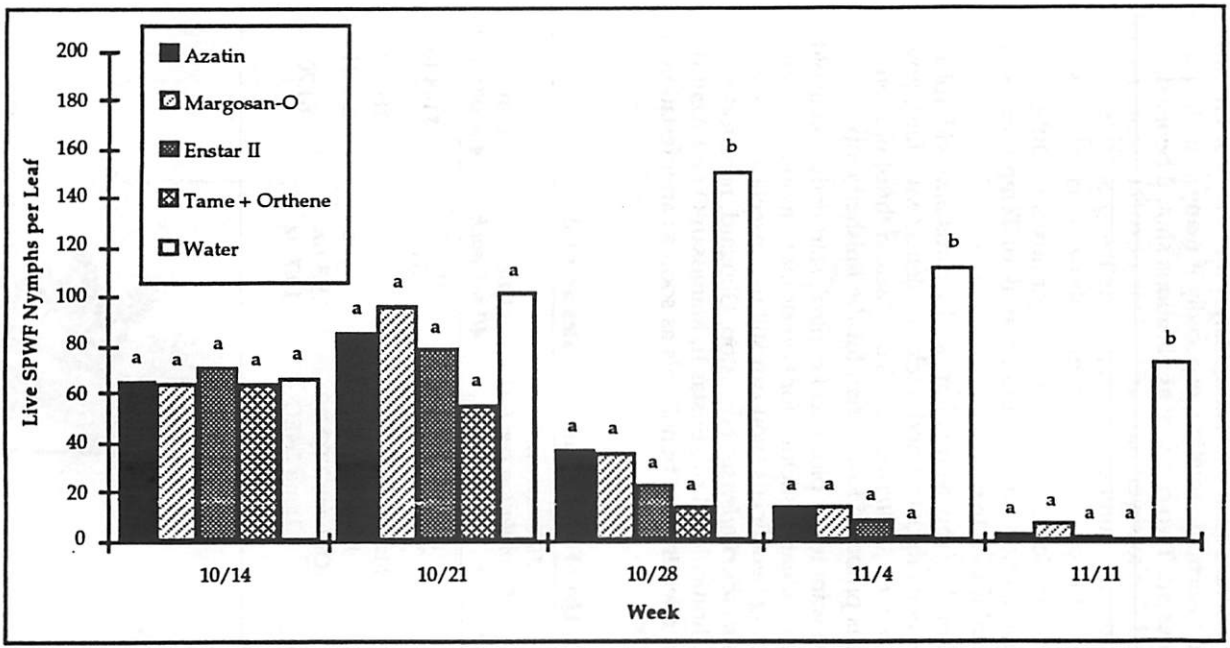

Figure 1. Mean number of live SPWF (*Bemisia tabaci*) nymphs per leaf for each treatment. First pre-treatment counts were made on 10/14, followed by four weekly sprays starting on 10/15. Bars with the same letter are not significantly different at p=0.05 (Fisher's LSD).

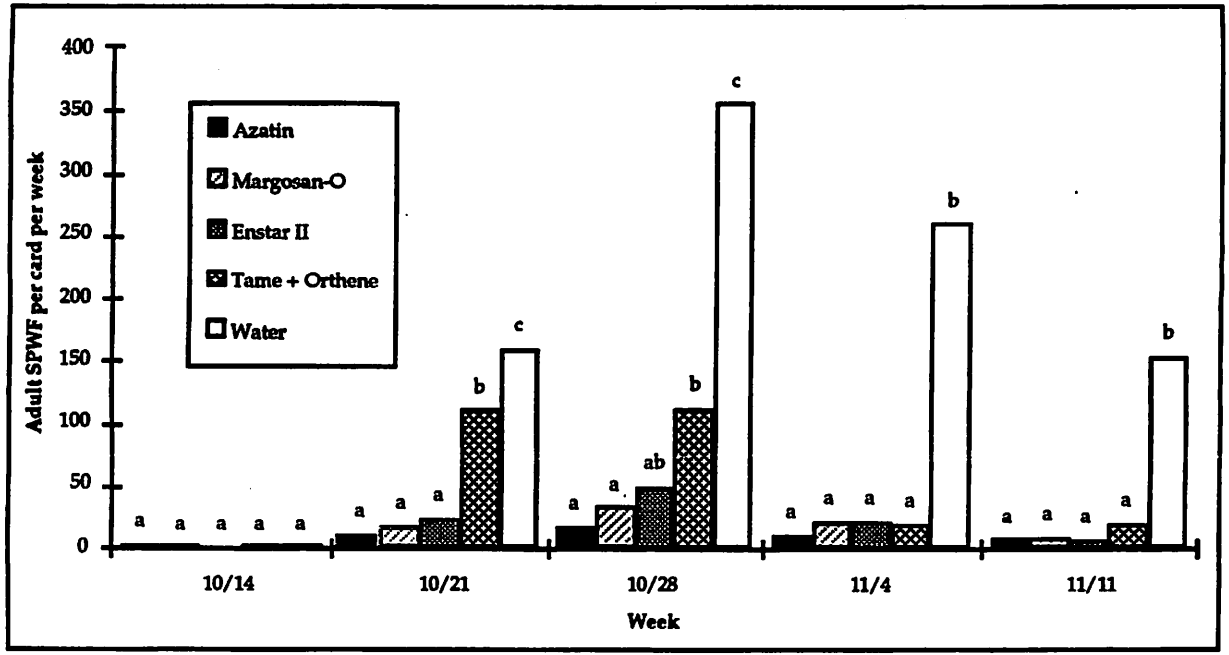

Figure 2. Mean number of adult SPWF (*Bemisia tabaci*) trapped per yellow sticky card per week for each treatment. First pre-treatment counts were made on 10/14, followed by four weekly sprays starting on 10/15. Bars with the same letter are not significantly different at p=0.05 (Fisher's LSD).

Management Tips for the 1995 Easter Lily Crop

Richard J. McAvoy
Associate Professor and Extension Specialist
Greenhouse Crops

Easter 1995 falls on April 16. This is considered a late Easter. Compared to last year, when Easter fell on April 3, in 1995 you will have two extra weeks from the time the bulbs are dug until the flowers are sold. Growers may find they have to slow the crop so that it does not come in too early.

Last year, many Lily growers were reminded just how dominant an effect weather can have on the Easter crop. Following a cool, wet summer, bulbs for the 1994 crop were in limited supply (especially the larger sized grades) and quality was generally below standard. In the east, the weather was horrible for forcing. Record cold prevented growers from maintaining desirable temperatures early in the crop and snow clouds darkened the skies for much of the season. Growers had to really push the crop with high temperatures in the final weeks to finish on time. By Easter, good quality lilies were hard to find.

It's too early to predict what will happen in 1995. Bulb quality from the northwest production fields will not be assessed for several weeks, and no one can predict what the winter will bring. However, we do know that a late Easter gives growers the opportunity to really work on increasing bud count and still bring the crop in on time.

Use the Extra Time to Increase Bud Count

Bulbs dug in late-September to mid-October will be shipped to bulb growers 25 to 26 weeks before Easter. (See the 1995 Easter Lily Schedule in this issue.) This is early. Growers must begin programming bulbs as soon as they arrive. Normally, bulb programming (vernalization) starts about 23 weeks before Easter to provide adequate time for