Efficacy of Foliar Applied Insecticides for Control of Silverleaf Whitefly in Cucumbers

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Introduction

The silverleaf whitefly, *Bemisia tabaci*, is a key pest of cucurbit crops grown in the Fall in South Georgia. Severity of this pest problem in some areas requires use of multiple insecticides for management. This test was conducted at the University of Georgia’s Tifton Vegetable Park in Tifton, Georgia, to evaluate the efficacy of foliar applied insecticides against the silverleaf whitefly in cucumbers.

Materials and Methods

Cucumbers for the test were grown on white plastic mulch (6 foot row spacing) with a one foot in-row spacing. Plots were a single row by 22 feet, with four replications of each treatment in a randomized complete block design. Treatments evaluated were:

- Brigadier at 5 oz/ac
- Movento at 4 and 5 oz/ac + MSO at 0.5% v/v
- Venom at 4 oz/ac
- HGW 86 10SE at 13.5 and 20.5 oz/ac + MSO at 0.5% v/v (also buffered below pH 7 with 1ml/3000ml)
- Coragen at 5 oz/ac + MSO at 0.5% v/v
- Requiem 25EC at 2 qts/ac
- Non-treated Check

Foliar applications were made with a CO2 pressurized backpack sprayer (60 psi), in 40 GPA of water, with 3 hollow-cone nozzles per bed (broadcast arrangement, 18 inch nozzle spacing). Application dates were 22 and 29 September and 8 October, 2009. The more detailed evaluations were conducted prior to the third application.

Direct whitefly nymph counts were conducted on 2 October. Five plants were randomly selected in each plot. The third true leaf was removed from each plant and taken to the laboratory for insect counts. The third leaf was selected based on presence of older nymphs. Each leaf was placed under a dissecting scope and the nymphs in a single field (10X ocular, 20X magnification, circle of 15/32 inch diameter) on each leaf were counted. Nymphs were classified as small (assumed 1st and 2nd instar) or large (assumed 3rd and 4th instar).
Whitefly adult emergence from treated leaves was determined following the second application. Leaves were collected from each plot and held in a paper bag to allow for late instar nymphs to complete development and for adults to emerge and die. All adults in the bag were then counted. If the number of adults was relatively small (< 150), the adults were directly counted. The adults were numerous, the number was estimated based on volume (9445 adults per milliliter based on research by Sparks). Five leaves were sampled on Oct. 2 (the same leaves used for nymphs counts). On 7 Oct., the five leaves used in the efficacy ratings were used.

A visual efficacy rating was conducted on 7 October. Five plants were visually examined in each plot. Runners were picked up and the 3rd to 6th leaves from the crown were examined to determine the leaf with the most late instar nymphs (ended up as 4th or 5th leaf). This leaf was also picked for adult emergence. Based on the relatively populations of nymphs on these leaves, plots were rated as follows:

0 = no control
1 = suppression of whitefly
2 = fair control (obvious suppression, but not adequate)
3 = good control
4 = excellent control

Following the third application, sooty mold ratings were conducted. On 23 October, it was obvious that differences existed in sooty mold deposits on the white plastic beneath the plots. All plants were cut and removed to make observations easier. Plots were rated as follows:

1 = very little sooty old, primarily around crown of plants (good to fair control)
2 = light and spotty distribution (also good to fair control)
3 = even distribution but much less sooty mold than 5 (obvious suppression, but inadequate)
4 = even distribution with slightly less sooty mold than a 5
5 = heavy and even (worst plots)
0.05).

All data were analyzed with the PROC ANOVA procedure of PC-SAS. Where significant differences were detected (P<0.05), means were separated with LSD (P=0.05).

Results and Discussion

Pest pressure was heavy in this test. Brigadier and Requiem did not provide significant suppression of silverleaf whitefly. The lack of control with Brigadier is likely a result of pyrethroid resistance in the whitefly. Coragen, Venom, Movento and HGW86 generally provided good to excellent control with few significant differences in whitefly nymph counts, adult emergence or sooty mold ratings. The efficacy ratings did indicate better control with Movento, which is supported by numerical trends in the other data.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of nymphs per 5 fields, 2 Oct.</th>
<th>Efficacy rating, 7 Oct.</th>
<th>Adults emerged per sample</th>
<th>Sooty mold rating, 23 Oct.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small nymphs</td>
<td>Large nymphs</td>
<td>Total nymphs</td>
<td>2 Oct.</td>
</tr>
<tr>
<td>Check</td>
<td>64.50 a</td>
<td>163.25 a</td>
<td>227.75 ab</td>
<td>0.25 c</td>
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<td>Brigadier</td>
<td>93.25 a</td>
<td>148.25 a</td>
<td>241.50 a</td>
<td>0.00 c</td>
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<td>Requiem</td>
<td>63.00 a</td>
<td>123.75 a</td>
<td>186.75 ab</td>
<td>0.13 c</td>
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<td>Coragen</td>
<td>77.75 a</td>
<td>21.50 bc</td>
<td>99.25 cd</td>
<td>3.25 b</td>
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<td>Venom</td>
<td>133.25 a</td>
<td>20.00 bc</td>
<td>153.25 bc</td>
<td>3.38 ab</td>
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<td>Movento 4oz</td>
<td>57.75 a</td>
<td>53.75 b</td>
<td>111.50 cd</td>
<td>3.00 b</td>
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<td>Movento 5oz</td>
<td>78.25 a</td>
<td>24.25 bc</td>
<td>102.50 cd</td>
<td>3.25 b</td>
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<td>HGW86 13.5oz</td>
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<td>28.00 bc</td>
<td>83.00 cd</td>
<td>4.00 a</td>
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<td>HGW86 20.5oz</td>
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<td>6.25 c</td>
<td>67.25 d</td>
<td>4.00 a</td>
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<tr>
<td>Days after second application</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Days after third application</td>
<td></td>
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