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Section G: Ornamentals & Turf

SALVIA: *Salvia nemorosa* (L.), 'New Dimension Blue'

# Effect of Dinotefuran on *Bemisia tabaci* and *Amblyseius swirskii*, 2016

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With the overall goal to integrate predatory mite *Amblyseius swirskii* in the management program of MED whitefly, the specific objective of this study was to evaluate dinotefuran, a neonicotinoid insecticide considered as a grower standard for whitefly control, and assess its compatibility with swirskii mite. The trial was conducted on an ornamental host, salvia under greenhouse condition at U.S. Horticultural Research Laboratory. Salvia plants were grown from seed in Premier Pro-mix General Purpose Growing Medium in seedling trays, and placed into a plexiglass screened cage ($61 \times 91 \times 61$ cm) for ~8 wks to prevent contamination prior to experimentation. Plants in seedling trays were then transplanted into one gallon plastic pots and placed in mesh screened cage ($61 \times 61 \times 61$ cm). Potted plants were irrigated as needed and fertilized with 50 ml/pot of Peters Professional® 20-10-20 (325 ppm) (Scotts Co., Marysville, OH). Four treatments were arranged in a randomized complete block design with six replicates, where each replicate consisted of four plants per cage. Salvia plants in each cage (replicate) were infested with 100 MED whitefly (3×) at weekly intervals (25 whitefly/plant), and treatment cages with swirskii mite were inoculated with 20 mites/plant (3×) starting 1 wk after whitefly infestations and prior to the first insecticide application. Pretreat sampling to determine an initial count of arthropods and whitefly biotype confirmation was made prior to the drench application of dinotefuran. Treatment evaluation was made at weekly intervals for a period of 7 wk by randomly sampling five leaves per replicate and recording the number of *A. swirskii* eggs and motiles (nymph + adult) per leaf. For MED whitefly, eggs, early immature, and late immature stages were recorded by taking two discs (~1 $cm^2$) per leaf. Count data were subjected to square root transformation prior to conducting the ANOVA and mean separation procedure. The data presented are the untransformed means. Means separations was performed using the least significant difference (LSD) mean separation test $p < 0.05$.

Weekly samplings showed overlapping generations of *A. swirskii* on host plants throughout the study period indicating drench application of dinotefuran at the applied rate was compatible with *A. swirskii*. In mite only treated plots, a significantly higher mean number of *A. swirskii* eggs on weeks 4–6 (Table 1) and motiles on weeks 3–6 (Table 1) were found compared to rest of the three treatments. No significant difference in *A. swirskii* eggs and motiles between mite treated and combination plots (*A. swirskii* + dinotefuran) were reported on weeks 1, 2, 3, and 7 and 1, 2, and 7, respectively. Dinotefuran was effective in suppressing MED whitefly life-stages throughout the study period. A significantly lower whitefly eggs, early immatures, and late immatures were recorded on all the sampling dates (except for wk 1 for late immatures) in two insecticide-treated plots (dinotefuran alone and in combination with swirskii) compared to the untreated control (Table 2). *A. swirskii* was effective in reducing whitefly eggs until the end of the study, whereas it significantly suppressed immature stages only until the sixth sampling week. Suppression of various stages of whitefly in plots treated with mites (only) was comparable with plots treated with dinotefuran except for whitefly eggs in week 2, 5, and 7 and, early immatures in week 7. Overall whitefly mortality in different treatments ranged between 14.4 and 84.1% for *A. swirskii*, 92.4–99.9% for dinotefuran, and 90.8–100% for combination treatments. No phytotoxicity symptoms were observed following any of the insecticide treatments. This research was supported by the Floriculture and Nursery Research Initiative & USDA Farm Bill.

**Table 1**

| Treatments | Rate/100 gallon | Wk 0 | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 |
|---|---|---|---|---|---|---|---|---|---|
| Eggs | | | | | | | | | |
| Control | – | 0.0 | 0.0a | 0.0b | 0.0b | 0.0b | 0.0b | 0.0b | 0.0a |
| Dinotefuran | 12 oz | 0.0 | 0.0a | 0.0b | 0.0b | 0.0b | 0.0b | 0.0b | 0.0a |
| *A. swirskii* | – | 0.4 | 0.26a | 1.33a | 1.26a | 0.26a | 0.56a | 0.2a | 0.1a |
| Dinotefuran + *A. swirskii* | 12 oz | 0.3 | 0.03a | 0.2a | 0.3ab | 0.0b | 0.03b | 0.0b | 0.16a |
| Motiles | | | | | | | | | |
| Control | – | 0.0c | 0.0b | 0.0b | 0.03b | 0.0b | 0.0b | 0.0b | 0.0b |
| Dinotefuran | 12 oz | 0.0c | 0.1b | 0.03b | 0.0b | 0.0b | 0.0b | 0.0b | 0.0b |
| *A. swirskii* | – | 0.46 | 0.56a | 0.76a | 1.73a | 0.8a | 1.13a | 0.53a | 0.7a |
| Dinotefuran + *A. swirskii* | 12 oz | 0.9 | 0.5a | 0.53a | 0.1b | 0.13b | 0.16b | 0.06b | 0.3a |

Means within a column followed by the same letter are not significantly different ($p > 0.05$, LSD test).

**Table 2**

| Treatments | Rate/100 gallon | Wk 0 | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 |
|---|---|---|---|---|---|---|---|---|---|
| Eggs | | | | | | | | | |
| Control | – | 3.93 | 16.9a | 16.4a | 27.4a | 38.63a | 28.2a | 59.23a | 45.86a |
| Dinotefuran | 12 oz | 3.43 | 0.73bc | 0.13c | 0.46b | 0.0b | 0.06c | 0.0b | 0.0c |
| *A. swirskii* | – | 3.2 | 5.3b | 4.13b | 6.4b | 3.5b | 11.3b | 13.03b | 15.2b |
| Dinotefuran + *A. swirskii* | 12 oz | 2.96 | 0.4c | 0.0c | 0.03b | 0.0b | 0.0c | 0.0b | 0.0c |
| Early immatures | | | | | | | | | |
| Control | – | 3.6 | 4.06a | 10a | 18.8a | 23.13a | 18.1a | 28.8a | 23.46a |
| Dinotefuran | 12 oz | 2.46 | 0.16b | 0.9b | 0.5b | 0.8b | 0.1b | 0.06b | 0.13b |
| *A. swirskii* | – | 1.13 | 0.86b | 1.63b | 5.5b | 1.73b | 5.06 | 3.9b | 16.4a |
| Dinotefuran + *A. swirskii* | 12 oz | 1.33 | 0.66b | 0.1b | 0.0b | 0.0b | 0.0b | 0.0b | 0.0b |
| Late immatures | | | | | | | | | |
| Control | – | 0.5 | 0.33a | 1.43a | 4.7a | 6.36a | 4.2a | 7.9a | 7.46a |
| Dinotefuran | 12 oz | 0.33 | 0.0a | 0.6b | 0.06b | 0.1b | 0.16b | 0.0b | 0.0b |
| *A. swirskii* | – | 0.1 | 0.0a | 0.13b | 1.03b | 0.73b | 0.26b | 1.66b | 4.7ab |
| Dinotefuran + *A. swirskii* | 12 oz | 0.5 | 0.1a | 0.1b | 0.03b | 0.16b | 0.0b | 0.06b | 0.0b |