Sweetpotato Whitefly (*Bemisia tabaci Gennadius*) Control: Field Studies with Insecticides on Cotton in the Imperial Valley, CA

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Abstract

Insecticides and insecticide mixtures were evaluated for sweetpotato whitefly (Bemisia tabaci Gennadius) control on cotton in the Imperial Valley, CA in 1992. Seasonal average number of large immatures was 1.6/cm^2 leaf disk from plots treated with a mixture of Danitol and Orthene as compared to 4.5/cm^2 on leaf disks from untreated control plots. Lint yield was 1232 lbs/ac compared to other treatments which ranged from 551 to 976 lbs/ac.

Introduction

A new sweetpotato whitefly (SPWF) biotype (Brown, 1992; Perring et al., 1993) has been a major pest since 1991 of almost all dicotyledon crops, including cotton *Gossypium spp.* in the Southwest. Cotton yields were decreased and lint quality was reduced because of honeydew contamination (Akey et al, 1992; Norman et al., 1992). SPWF-related crop losses of over half a billion dollars occurred in the United States in 1991 (Perring et al., 1993). We evaluated a number of insecticides and insecticide mixtures for their effect on SPWF populations on cotton. This report presents the results of our 1992 studies.

Materials and Methods

Cotton (*Gossypium hirsutum L.*) cultivar 'Deltapine 5461' was planted and irrigated for germination on March 20, 1992. The experimental design was a randomized complete block with four replications. Each plot was 4 rows wide and 34 ft long. Rows were 40 inches apart. There were 3 unplanted buffer rows between plots and 20 ft alleys that separated blocks. A total of seventeen chemicals or mixtures of chemicals were evaluated (Table 1). An untreated control was included for comparison.

Foliar applications of the chemicals were initiated on April 16, three days after plant emergence reached about 95%. Additional applications were made every two weeks or a total of nine times. The last of the foliar applications were made on August 5 when over 50% of leaves were defoliated by SPWF. Chemicals were applied with a sprayer described by Akey et al. (1992) designed to improve underleaf coverage. Chemicals were applied in 20 gal of water/ac at 90 psi with three nozzles/row until plants were about one foot high. One nozzle was positioned above the top of plants and one on each side of the plants. From June 24, chemicals were applied in 27 gal of water/ac at 90 psi with five nozzles each row. One nozzle was positioned above tops of plants, one on each side of plants to provide bottom leaf coverage and one on each side of plants to provide coverage of leaves on mid and top portions of plants. Large SPWF immatures were counted on ten 12 cm^2 leaf disks from 5th open leaves on the

main stems sampled from each plot, before and after each chemical application. Seed cotton was sampled on August 17 from two 1/1000 acres of cotton row and ginned for estimated lint yields.

Results and Discussion

Overall average number of large SPWF immatures for 11 sampling dates from 9 June to 21 August were lowest in plots treated with the mixture of Danitol and Orthene (Table 1). Variability was high and results were not significantly different from plants treated with the mixture of Capture and Orthene or thiodan. However, lint yield (1232 lbs/ac) was significantly greater than occurred in plots treated with any of the other chemicals tested. Two other mixtures that resulted in lint yield over 900 lbs/ac were Capture and M-Pede, and Capture and Orthene. Capture, Danitol, Orthene, or M-Pede alone were not as effective as the mixtures described. The results suggest a synergistic effect with the chemical mixtures.

Further studies to develop SPWF chemical control are needed to establish economic thresholds and define rates and frequency of application in relation to cost benefits.

References

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Table 1. Effects of insecticides on SPWF control and cotton lint yields at Brawley, CA, 1992.

Chemical and rate (lb AI/ac)	Large SPWF immatures[b] No./ cm^2	Lint yield (lbs/ac)
Untreated	5.5 ab[c]	551 d-g
Aliette 4.0	4.9 abc	534 d-g
Applaud 0.38	3.6 cd	683 c-g
Azatin 0.044	5.7 a	495 d-g
Capture 0.1	3.9 bcd	710 c-f
Capture 0.1 + M-Pede 0.82	4.8 abc	976 b
Capture 0.1 + Orthene 0.5	2.4 de	904 b-c
Danitol 0.2	5.6 ab	498 d-g
Danitol 0.2 + Orthene 0.5	1.6 e	1232 a
Fenoxycarb 0.25	4.7 abc	696 c-g
Fenoxycarb 0.25 + M-Pede 0.82	4.6 abc	728 bcd
Margosan-O 0.044	5.4 ab	451 g
M-Pede 0.82	4.8 abc	522 d-g
NTN 33893 0.086[a]	4.7 abc	475 efg
Orthene 0.5	3.6 cd	484 d-g
Ovasyn 0.25	4.9 abc	501 d-g
Temik (at early square stage) 2.1	4.0 a-d	726 b-e
Thiodan 1.0	3.3 cde	695 c-g

[a] Seed treated with NTN 33893 at 8 ounces/100 lb seed and foliar application began on 6/24.
[b] Means of 4 replicates over 11 sampling dates from 6/9 to 8/21.
[c] Means of 4 replicates in each column with different letters differ (LSD = $P \leq 0.05$).