

Residual Control of Spider Mites on Cotton with Zephyr

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Abstract:

An experiment was conducted to determine residual spider mite control on cotton in the San Joaquin Valley.

Four treatments were imposed using Zephyr @0.005 lbs.ai/acre, Zephyr @0.005 lbs.ai/acre with Penetrator Plus, Dicofol (Kethane) @ 1 lb.ai/acre, and an untreated check as a control. One pre-treatment evaluation and six post-treatment evaluations were used to determine residual control of mites. It was found that there was a significantly lower number of infested leaves relative to the control population during all six post-treatment evaluation dates. The number of mites per leaf was significantly lower than the control population on only two of the six post-treatment evaluation dates.

Introduction

The Pacific spider mite, strawberry spider mite, and the two-spotted spider mite are common pests of cotton in the San Joaquin Valley. These mites prefer dry and dusty conditions which are common during the long, hot summers. The mites feed on the cotton leaves, thereby reducing the plants' ability to produce photosynthates necessary for plant growth processes. The resulting damage is responsible for an overall reduction in plant biomass as well as square retention, thus making mite control and sampling an important part of the early-season management of cotton.

Materials and Methods

The study was conducted at Vacquero Farms, located near Tranquillity, California. The cotton was planted April 20, 1994, on 40" furrow irrigated beds with a field length of one-half mile. The field was prepared and maintained using standard cultural practices prior to and during the trial. A randomized complete block design was used on 12-row plots with a length of 300 feet. Four treatment levels were used and replicated three times. The treatments were as follows: (1) untreated check, (2) Zephyr @0.005 lbs.ai/acre (4 oz.), (3) Zephyr @0.005 lbs.ai/acre plus Penetrator Plus, and (4) Dicofol (Kethane) @1 lb.ai/acre.

A pre-treatment mite evaluation was conducted on June 14, 1994, by sampling 25 leaves per plot, six to eight nodes down from the terminal. Presence or absence of spider mites was determined at this time. The leaf samples were then bagged,

cooled, and transported to a freezer for storage. Treatment materials were applied on the morning of June 15, using a ground application rig set up with drop nozzles. A spray volume of ten gallons per acre was used for this single application.

Six post-treatment evaluations were conducted on a weekly basis beginning June 17 and ending July 19. Sampling procedures were the same as used for the pre-treatment evaluation. A motorized rotating mite brush was used to brush the mites from the leaf surface onto a counting grid. The grids were then carefully inspected under a microscope to determine the number of mites per leaf based on a 25-leaf sample.

Results and Discussion

The data from the study was analyzed to compare significant differences between the Zephyr treatments and the control treatment. It was found that the Zephyr treatments, as well as the Dicofol treatment, had a significantly lower number of infested leaves than the control treatment (Table 1). The number of mites per leaf, however, were only significantly lower than the control treatment 14 and 42 days after the application date.

The mean and standard error of infested leaves (Table 2) shows that spider mites were suppressed throughout the duration of the study. It is of interest to note that, at 21 days after application, there is a resurgence of the number of infested leaves in all treatments. The non-treated check is significantly higher than the other treatments thus demonstrating the residual control of spider mites using Zephyr, Zephyr with Penetrator Plus, and Dicofol. Spider mite resurgence 21 days after application is also shown on the mites per leaf evaluation (Table 3).

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Table 1. ANOVA Results. One way analysis of infested leaves or mites per leaf relative to control populations.

Catagory	Before	Days after treatment					
	Treatment	7	14	21	28	35	42
Zephyr							
Infested Leaves	A	L	L	L	L	L	L
Mites/Leaf	A	A	L	A	A	A	L
Zephyr+Adj.							
Infested Leaves	A	L	L	L	L	L	L
Mites/Leaf	A	A	L	A	A	A	L
Dicofol							
Infested Leaves	A	L	L	L	L	L	L
Mites/Leaf	A	A	L	A	A	A	L

A, not significantly different to equivalent control population.

L, significantly lower than equivalent control population.

Duncans Multiple Range Test. alpha level=0.05

Table 2. Mean and standard error of number of infested leaves for the four treatments imposed.

Catagory		Days after treatment					
		7	14	21	28	35	42
Control	mean	6.333	7.333	11.67	3.333	4.333	3.333
	std. error	1.528	0.4408	1.175	0.6873	0.9953	0.4408
Zephyr	mean	1.000	1.000	2.000	0.3333	1.000	0.3333
	std. error	1.528	0.4408	1.175	0.6873	0.9953	0.4408
Zephyr+Adj.	mean	0.333	1.333	4.333	0.3333	0.3333	1.333
	std. error	1.528	0.4408	1.175	0.6873	0.9953	0.4408
Dicofol	mean	1.333	0.3333	5.000	0.000	0.6667	1.333
	std. error	1.528	0.4408	1.175	0.6873	0.9953	0.4408

Means generated from 3 independent plot measurements.

Table 3. Mean and standard error of mites per leaf for the four treatments imposed.

Catagory		Days after treatment					
		7	14	21	28	35	42
Control	mean	0.0800	1.4330	4.2000	0.1000	0.1333	0.2000
	std. error	0.1992	0.3619	1.7700	0.0365	0.0447	0.0516
Zephyr	mean	0.0400	0.1000	0.1667	0.0333	0.0333	0.0000
	std. error	0.1992	0.3619	1.7700	0.0365	0.0447	0.0516
Zephyr+Adj.	mean	0.1000	0.0667	2.3670	0.0333	0.0333	0.0667
	std. error	0.1992	0.3619	1.7700	0.0365	0.0447	0.0516
Dicofol	mean	0.6886	0.0333	0.1333	0.0000	0.0333	0.0667
	std. error	0.1992	0.3619	1.7700	0.0365	0.0447	0.0516

Means generated from 3 independent plot measurements.