EFFICACY OF SELECTED ACARICIDES AGAINST SPIDER MITES ON COTTON IN SOUTHEAST ARKANSAS

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RESEARCH PROBLEM

Spider mites occur each year in a few cotton fields in Southeast Arkansas, and miticides are occasionally needed to protect cotton from spider mite damage. The efficacy of traditional miticides should be monitored in light of reported development of resistance in spider mites. Also, new compounds have been introduced for spider mite control, and farmers need information about their efficacy. Limited information is available on the effectiveness on the various miticides currently used for mite control.

BACKGROUND INFORMATION

The two-spotted spider mite, *Tetranychus urticae* Koch, infests cotton fields nearly every year in Southeast Arkansas and can be an important cause of lost revenue to cotton producers. Because of their high reproductive potential and the short generation time, spider mite population outbreaks can develop rapidly when conditions are hot and dry. The feeding damage of spider mites, concentrated primarily on the lower surface of the leaves, is caused by both nymphs and adults. They remove plant sap and devour the content of epidermal cells of leaves. This causes leaf discoloration that initially appears as tiny white spots, giving the foliage a speckled look. Under heavy infestation, severe defoliation occurs and leaves become entirely gray, curl, turn brown, and drop off. This decreases the photosynthetic capacity of plants. Loss of leaves causes shedding of small bolls and may prevent the lint from developing properly in large bolls (Davidson and Lyon, 1979). In 1998, about 350 bales were lost in Arkansas due to spider mite damage (Williams, 1999). Although spider mites rarely develop to the point that yields are threatened, this could change with initiation of the boll weevil eradication program in Arkansas. Spider mite outbreaks could become more common in cotton in light of the reported increased infestation following insecticide applications (Gonzales *et al.*, 1982). Because spider mites are rarely treated, most growers, county agents, and consultants have little information on which miticides are effective against them. This study was conducted to provide efficacy information on selected acaricides to help producers deal with mites when control is needed.

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MATERIALS AND METHODS

This study was conducted in 1999 on the Randy Eagle Farm near Grady in Lincoln County. A field of spider mite-infested Stoneville BXN 47 cotton that was planted on 25 April 1999 was used. The test was conducted using a randomized block design with four replications of each treatment. Plots were 25 ft long by 2 rows wide with one border row between treated plots. The test was initiated on 28 July. Miticides were applied in 10 gal of water per acre using TX-4 hollow cone nozzles. Mites were counted at 2, 4, 6, and 15 days after application by collecting five main-stem leaves (four nodes below the terminal) per plot. Data from each plot were averaged and the plot means were analyzed using analysis of variance and least significant difference.

RESULTS AND DISCUSSION

Table 1 shows the effect of acaricides on spider mite populations. All the products tested significantly reduced spider mite counts compared with the untreated check at 2, 4, and 6 days after treatment. At 15 days after treatment, mite counts in plots treated with Lorsban or Curacron were significantly higher than those in check plots and other miticide-treated plots, indicating that Lorsban and Curacron had caused spider mite population rebounds. Similar results were reported by Studebaker (1997), who observed a population rebound in spider mites following Lorsban and Curacron treatments. A plausible explanation for this population rebound could be the harsh effects that both compounds (organophosphates) exerted on the beneficials. Curacron had good early knockdown and performed well at 2, 4, and 6 days after treatment. Lorsban provided some level of mite control but was less effective than other acaricides tested. Capture was relatively weak in short-term knockdown and was more effective at 4 and 6 days after treatment, indicating slow action. Pirate, Kelthane, and Zephyr provided strong mite suppression 6 days post-treatment.

PRACTICAL APPLICATION

Several miticides provided good control of spider mites in this test. The strong initial efficacy of Curacron in this test has not been consistently seen in previous tests in Arkansas. Lorsban reduced the mite population, but the level of control was not adequate. Mite populations tended to rebound following treatments with Curacron or Lorsban. Pirate and Kelthane performed well in this test and have shown strong performance in previous tests. We do not have strong databases on either Zephyr or Capture; therefore, more test work will be needed before definitive conclusions can be drawn about the effectiveness of these products.

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LITERATURE CITED

Davidson, R.H. and W.F. Lyon. 1979. Insect Pests of Farm, Garden, and Orchard. Seventh Edition. John Wiley & Sons, New York. 596 pp.

Gonzales, D., B.R. Patterson, T.F. Leigh, and L.T. Wilson. 1982. Mites, a primary food source for two predators in San Joaquin Valley cotton. Calif. Agric. 36:18-20.

Studebaker, G. 1997. Spider mite control on cotton, 1996. Arthropod Management Tests. 22:274.

Williams, M.R. 1999. Cotton insect losses 1998. Proc. Beltwide Cotton Conf., National Cotton Council, Memphis, TN. pp. 785-806.

Table 1. Live spider mites after miticide application. Grady, AR, 1999.

		Spider mite number			
Miticide	Rate	2 DAT[z]	4 DAT	6 DAT	15 DAT
	lb ai/acre	----------	mites/microscope field	----------	
Check	---	17.0 a[y]	17.7 a	20.0 a	0.6 b
Capture 2EC	0.078	7.4 b	5.3 c	4.2 c	0.6 b
Lorsban 4EC	1.0	7.1 b	10.1 b	13.1 b	7.3 a
Pirate 3SC	0.10	4.8 bc	0.06 c	0.5 c	0.1 b
Zephyr 0.15EC	0.0094	4.2 bc	2.9 c	1.8 c	0.3 b
Kelthane MF 4EC	1.0	3.8 bc	0.8 c	1.3 c	1.8 b
Curacron 8EC	1.0	1.5 c	2.2 c	3.4 c	7.0 a

[z] DAT = day(s) after treatment.

[y] Means in columns followed by the same letter are not significantly different (P=0.05).