EVALUATION OF INSECTICIDE TERMINATION DECISIONS IN SOUTHEAST ARKANSAS

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RESEARCH PROBLEM

Insecticides are needed every year in southeast Arkansas to maintain viable cotton production, but they are very expensive inputs that add to the cost of production. Growers face the difficult decision every year of determining when to stop spraying for insect pests. If producers treat too long into the growing season, they spend money to protect fruit that will not contribute significantly to higher yields, resulting in higher costs of production and reduced profits. If growers terminate insecticide treatments too early, they sacrifice yield potential due to insect damage.

BACKGROUND INFORMATION

The correct time to stop spraying for insect pests is a critical decision that has been made by farmers for the past several years without a reliable model on which to base this decision. Recently, research has been conducted to help farmers make a decision on when to terminate sprays (Kharboutli and Allen, 2001). Much of this research has been based on COTMAN, COTton MANagement Model, which provides a system to help growers make management decisions. This system provides a way to monitor cotton growth and fruit development during the growing season, and research has supported the practical use of this model (Oosterhuis et al., 1996; Kharboutli and Allen, 2001).

COTMAN uses Nodes Above White Flower (NAWF) as the basis to determine crop maturity. Research has shown that fruiting forms produced on main-stem nodes above NAWF=5 did not contribute significantly to total yield (Bourland et al., 1992; Lammers, 1996). The date that the crop reaches NAWF=5 is the flowering date of the

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last effective date boll (Oosterhuis et al., 1996). This study was conducted to investigate insecticide termination rules for southeast Arkansas by comparing standard practices with those associated with the COTMAN model.

RESEARCH DESCRIPTION

Two irrigated fields on a producer's farm in Desha County, Arkansas, were identified for these tests. The first field (Test 1) was planted to DPL 5415 on 2 May 2001, and the second field (Test 2) was planted to BXN 47 on 1 May 2001. Both tests were replicated four times, and each plot was 20 rows wide (the width of one plane pass) and approximately 1000 feet in length. On Test 1, treatments were terminated near NAWF=5 + 250 HU, near NAWF=5 + 450 HU, and near NAWF=5 + 650 HU. On Test 2, treatments were terminated at NAWF=5, near NAWF=5 + 250 HU, and near NAWF=5 + 550 HU. After NAWF=5, Test 1 was treated on 7 August with Baythroid (1 gal per 65 acres or 1.97 oz per acre) and Tracer (1 gal per 85 acres or 1.51 oz per acre); on 17 August with Tracer (1 gal per 70 acres or 1.83 oz per acre); and on 27 August with Tracer (1gal per 70 acres or 1.83 oz. per acre) and Centric (2 oz. per acre). After NAWF=5, Test 2 was treated on 7 August with Baythroid (1 gal per 65 acres or 1.97 oz per acre) and Tracer (1 gal per 85 acres or 1.51 oz per acre); on 17 August with Tracer (1 gal per 70 acres or 1.83 oz per acre); and on 4 September with Baythroid (1 gal per 65 acres or 1.97 oz per acre) and Tracer (1 gal per 85 acres or 1.51 oz per acre). Net returns were calculated using the cost of insecticides applied all season, cost of aerial application ($4.00), and $0.52 per pound for lint yield. Yields were statistically analyzed using ANOVA and LSD.

RESULTS AND DISCUSSION

All insecticide termination systems produced similar yields (Tables 1 and 2), but there was a numerical increase in yield with continued insecticide use. This was likely due to additional insecticide treatments protecting fruit high on the main-stem node that did not contribute significantly to yield. The economic returns for each insecticide termination system were similar, but there were numerical increases in net returns for the NAWF=5 + 250 HU termination system (Tables 1 and 2). No economic benefits were found by prolonging crop protection after NAWF=5 + 250 HU. Similar results were found in an insecticide termination study conducted in 2000 (Kharboutli and Allen, 2001).

PRACTICAL APPLICATION

Because of low yield potential due to inclement environmental conditions, a slight numerical difference in net return favored insecticide termination at NAWF=5 + 250 HU. No economic benefits were seen by making extra insecticide applications after NAWF=5 + 250 HU.

DISCLAIMER

The mention of trade names in this report is for informational purposes only and does not imply an endorsement by the University of Arkansas Cooperative Extension Service.

ACKNOWLEDGMENTS

We thank Cotton Incorporated for their financial support of this project. We especially thank Mr. Steve Stevens for his support and cooperation during this project.

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Table 1. Insecticide termination data from Well Field, DPL 5415 planted on 2 May (Test 1).

Last treatment date	DAP[z]	HUAP[y]	Days after NAWF=5[x]	DD60[w] after NAWF=5	Lint yield	Insecticide costs	Net return
					(lb/acre)	($/acre)	($/acre)
7 August	98	1881	12	250	710	30.23	338.87
17 August	108	2090	22	459	728	44.70	333.96
27 August	118	2311	32	679	741	65.41	319.75

[z] DAP = days after planting.
[y] HUAP = Heat units after planting.
[x] NAWF = Nodes above white flower.
[w] DD60, Degree days (60EF).

Table 2. Insecticide termination data from Center Field, BXN 47 planted on 1 May (Test 2).

Late treatment date	DAP[z]	HUAP[y]	Days after NAWF=5[x]	DD60[w] after NAWF=5	Lint yield	Insecticide costs	Net return
					(lb/acre)	($/acre)	($/acre)
7 August	99	1869	0	0	827	26.54	403.66
17 August	109	2078	10	209	856	41.01	404.27
4 September	127	2411	28	542	868	59.22	391.98

[z] DAP = days after planting.
[y] HUAP = Heat units after planting.
[x] NAWF = Nodes above white flower.
[w] DD60, Degree days (60EF).