Evaluation of Insecticide Termination Decisions in Southeast Arkansas

Jeremy K. Greene and Chuck D. Capps1

RESEARCH PROBLEM

Cotton growers face the difficult decision every year of determining when to stop spraying for insect pests. Late-season pests such as the Heliothine complex, comprised of the cotton bollworm, Helicoverpa zea (Boddie); and the tobacco budworm, Heliothis virescens (F.); along with the stink bug complex comprised of the brown stink bug, Euschistus servus (Say), the green stink bug, Acrosternum hilare (Say), and the southern green stink bug, Nezara viridula (L), make late-season insecticide applications necessary for viable cotton production in southeast Arkansas. If farmers fail to treat when pests reach threshold levels before the crop reaches cutout, they can suffer severe losses in yield and fiber quality, but if they treat long after fields have passed cutout, they protect fruit that does not contribute significantly to yields.

BACKGROUND INFORMATION

An important decision made by Arkansas cotton growers every year is when to stop treating for insect pests. For years, this decision consisted of “judgment calls” made by the grower or consultant with no practical application model on which to base this decision. While no system can provide absolute answers for every situation, recent research based on the COTMAN (COTton MANagement Model) can provide a system to help growers make these crucial management decisions (Kharboutli and Allen, 2001; Greene and Capps, 2002). 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 (Bagwell, 1995; Oosterhuis et al., 1996; Kharboutli and Allen, 2001; Kim et al., 1997).

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

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1 Extension entomologist and pest management technical support specialist, respectively, Southeast Research and Extension Center, Monticello.
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 last effective boll (Oosterhuis et al., 1996) and is considered to be at physiological cutout (Oosterhuis et al., 1999).

**RESEARCH DESCRIPTION**

Two fields of cotton (*Gossypium hirsutum* L.) were planted to Fibermax 958 variety - Y-19 on 15 April 2002 and Y-16 on 16 April 2002. The fields were located at Yancopin, AR, on the Steve Stevens Farm. Plots were 20 rows wide, the width of one plane pass, by approximately 1000 ft in length and replicated four times. Both tests were designed to have insecticide treatments terminated on the following: NAWF=5 to NAWF=5 + 350 heat units (HU), NAWF=5 + 350 HU, NAWF=5 + 450 HU, NAWF=5 + 550 HU, and NAWF=5 + 650 HU. Neither Test 1 nor Test 2 followed these termination treatments exactly because of variability in insect pressure and application dates of insecticides. Test 1 termination of insecticides resulted in the following treatments: NAWF=5 + 258 HU, NAWF=5 + 465 HU, and NAWF=5 + 568 HU. Treatments after cutout were Baythroid at 2.1 oz/acre and Tracer at 1.6 oz/acre applied on 5 August, Baythroid at 2.1 oz/acre and Tracer 1.6 oz/acre on 15 August, and Baythroid at 2.1 oz/acre and Tracer at oz/acre applied on 20 August. Test 2 termination of insecticides resulted in the following treatments: 5 days prior to NAWF=5, NAWF=5 + 286 HU, and NAWF=5 + 359 HU. Treatments after cutout were Baythroid at 2.1 oz/acre and Tracer at 1.6 oz/acre applied on 5 August, Karate at 1.8 oz/acre and Tracer at 1.8 oz/acre applied on 7 August, Baythroid at 2.1 oz/acre and Tracer at 1.6 oz/acre on 15 August, and Baythroid at 2.1 oz/acre and Tracer at 1.6 oz/acre applied on 20 August. Net returns were calculated using the cost of insecticides applied after cutout (all treatments received same insecticide treatments prior to cutout), 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. Net returns were highest for the NAWF=5 + 465 HU treatment in Test 1 and the NAWF=5 + 0 HU in Test 2. Similar results have been seen in previous tests (Kharboutli and Allen, 2001; Greene and Capps, 2002).

**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.

LITERATURE CITED

### Table 1. Insecticide termination data from field Y-19, cultivar Fibermax 958, planted on 15 April 2002 (Test 1).

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>DAP</th>
<th>Days after NAWF=5</th>
<th>DD60° after NAWF=5</th>
<th>Lint yield</th>
<th>Insecticide cost</th>
<th>Net return</th>
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<tbody>
<tr>
<td>Last trt</td>
<td>5 Aug</td>
<td>101</td>
<td>11</td>
<td>258</td>
<td>1242.7</td>
<td>14.45</td>
<td>631.75</td>
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<td>111</td>
<td>21</td>
<td>465</td>
<td>1280.0</td>
<td>28.90</td>
<td>636.70</td>
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<td>Last trt</td>
<td>20 Aug</td>
<td>116</td>
<td>26</td>
<td>568</td>
<td>1279.3</td>
<td>43.35</td>
<td>621.89</td>
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</table>

* DAP = days after planting.
* NAWF = nodes above white flower.
* DD60° = degree days (threshold 60° F).

### Table 2. Insecticide termination data from field Y-16, cultivar Fibermax 958, planted on 16 April 2002 (Test 2).

<table>
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<th>Event</th>
<th>Date</th>
<th>DAP</th>
<th>Days after NAWF=5</th>
<th>DD60° after NAWF=5</th>
<th>Lint yield</th>
<th>Insecticide cost</th>
<th>Net return</th>
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<tr>
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</table>

* DAP = days after planting.
* NAWF = nodes above white flower.
* DD60° = degree days (threshold 60° F).