Optimizing Revenue Through Defoliation Timing Using COTMAN

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RESEARCH PROBLEM

Timing of harvest aids continues to be a difficult decision for producers. Validation of the heat unit (HU) concept of timing defoliation beyond the last effective boll population as defined by COTMAN would allow producers to make this decision with greater confidence and allow for an earlier harvest. The objective of this study was to evaluate the heat unit-based concept for defoliation timing with traditional methods.

BACKGROUND INFORMATION

Producers and crop advisors often are tempted to wait as long as possible on young immature bolls in the top of the plant before making the decision to defoliate. These bolls are often insect damaged, small, of low fiber quality, and account for little additional gain but the perception of additional lint gain is difficult to overcome. Any delay in defoliation application is often enhanced as deteriorating weather increased time from defoliation application to harvest. Validation of the heat unit (HU) concept (NAWF5 + 850 HU) for timing defoliation beyond the last effective boll population as defined by COTMAN would allow producers to make this decision with greater confidence and allow for an earlier harvest. Traditional timings for defoliation include nodes above cracked boll (NACB) 4 or less and open bolls at 60% to 65%. The crop status at the different timings in these studies indicates this optimal complement to occur near 950 HU. However, in practice grower standards tend to approximate 1050 HU.

RESEARCH DESCRIPTION

The defoliation timing study was conducted over six consecutive years, 2001 to 2006, with sites in northeast, central, and southeast Arkansas. Replicated strips ran the

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length of the field and standard defoliation treatments were used at all locations. Defo-
lia tion timings were scheduled at 850, 950, and 1050 HU beyond cutout. The replicated
strips were harvested with the producer’s picker as each treatment became harvest-ready
as weather allowed. Lint fraction, fiber quality, and loan values were determined from
large samples, which were processed through a 20-saw gin with one lint cleaner. Loan
values were calculated from HVI analysis. Value per acre was calculated by multiplying
pounds of lint produced by the calculated loan value.

RESULTS AND DISCUSSION

Yields were similar for the 850 HU, 950 HU, and 1050 HU timings with 1234
lb lint/acre, 1223 lb lint/acre, and 1235 lb lint/acre, respectively. Harvest losses due to
rainfall events were primarily responsible for the similar yields. Traditional timings for
defoliation include NACB 4 or less and open bolls at 60% to 70%. The crop status at the
different timings indicates this complement to occur near 950 HU. However, in practice
grower standards tend to approximate 1000 to 1050 HU (Table1). Yield penalties have
been observed with defoliation prior to 850 HU. As a result, defoliation timings at 750
HU beyond cutout were not included in this evaluation.

Loan values were greatest at the 850 HU timing ($0.5358/lb lint) and decreased
numerically as defoliation was delayed from the 950 HU ($0.5348/lb lint) and 1050
HU ($0.5204/lb lint) timings. Average delays in defoliation from timing of 850 HU to a
standard of 1050 HU were 12 to 14 days. This delay was often enhanced as deteriorating
weather increased time from defoliation application to harvest.

In low-rainfall environments, reported yields generally improve with delayed
defoliation. However, harvest losses due to rainfall events, which commonly occur
in the Mid-South, were responsible for the similar yields in this study. The impact of
earlier defoliation on reducing micronaire and avoiding quality deterioration as a result
of delayed harvest in a wet environment, resulted in greater gross revenues (pounds lint
× loan price) generated per acre.

PRACTICAL APPLICATION

Yields were similar for the three defoliation timings. Loan values were greatest
at the 850 HU timing ($0.5358/lb lint) and decreased as defoliation was delayed to
the 950 HU ($0.5348/lb lint) and 1050 HU ($0.5204/lb lint) timings. Defoliation at
850 HU did not result in lower returns per acre and allowed for an earlier harvest. A
12- to 14-day harvest advantage, in environments where rainfall can result in harvest
losses and fiber quality deterioration (commonly experienced in the Mid-South) can
reap valuable rewards.

ACKNOWLEDGMENTS

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of Arkansas.
Table 1. The effect of defoliation timing on plant maturity status, yield, and lint value.

<table>
<thead>
<tr>
<th>Timing (HU beyond cutout)²</th>
<th>Open bolls (%)</th>
<th>NACB (#)</th>
<th>Lint yield (lb/acre)</th>
<th>Total revenue ($/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>850</td>
<td>43</td>
<td>4.5</td>
<td>1234</td>
<td>661.22</td>
</tr>
<tr>
<td>950</td>
<td>57</td>
<td>3.3</td>
<td>1223</td>
<td>654.02</td>
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<tr>
<td>1050</td>
<td>70</td>
<td>2.0</td>
<td>1235</td>
<td>642.76</td>
</tr>
</tbody>
</table>

² Cutout defined at 5 nodes above the uppermost white flower.