Defoliation Timing Based on Heat Units Beyond Cutout

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RESEARCH PROBLEM
Timing of harvest aids continues to be a difficult decision for producers. Producers and crop advisors often are tempted to wait as long as possible for young immature bolls in the top of the plant to develop before making the decision to defoliate. These bolls are often insect damaged, small, and account for little additional gain, but the perception of additional harvestable lint is difficult to overcome. 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.

BACKGROUND INFORMATION
Traditional timings for defoliation include four or less nodes above cracked boll (NACB) and open bolls at 60% to 65% (Robertson, 2000). The crop status at the different timings indicates this to occur near 950 HU after physiological cutout (NAWF = 5) (Table 1). However, in practice grower standards tend to approximate 1050 HU. Average delays in defoliation from a timing of 850 HU to a standard of 1050 HU are approximately 12 days. This time delay is often enhanced in comparing harvest dates. Yield penalties are consistently observed with defoliation timings prior to 850 HU. Yields generally plateau between 850 and 1050 HU. Harvest losses due to rainfall events are primarily responsible for the yield plateau. Impact of the earlier defoliation on reducing micronaire of our most common cultivars grown, and the quality deterioration as a result of weathering with delayed harvest dates in a wet environment, can result in greater value (pounds lint X loan price) generated per acre.

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RESEARCH DESCRIPTION

The defoliation timing study was conducted over two consecutive years with locations in northeast, central, and southeast Arkansas. Replicated strips ran the length of the field and standard defoliation treatments were used at all locations. Dropp (0.1 lb prod./acre) + Def (0.5 pt prod./acre) + Ethephon (5.3 oz prod./acre) followed by Ethephon (1 qt prod./acre) + Def (0.67 pt prod./acre) was used at each location and timing. Defoliation timings were scheduled on 750, 850, 950, and 1050 HU beyond cutout. The replicated strips were harvested with the producer’s picker as each treatment became ready for harvest 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

Defoliation at 750, 850, 950, or 1050 HU’s after physiological cutout had no significant effect on yield or crop value. However, defoliation prior to 850 HU’s resulted in lower yields and loan values. Also, loan values were greatest at the 850 HU timing. Defoliation at 850 HU resulted in numerically greatest returns per acre (Fig. 1).

PRACTICAL APPLICATION

Defoliation timing based on heat units beyond cutout is an effective and easy way of determining the most economical time to terminate the crop without suffering from yield loss and or discountable fiber qualities. The 850 HU timing allowed the crop to be terminated earlier and without yield loss in both years of the study on the most widely planted cultivars grown across Arkansas at the time. It is important to remember that as cultivars we grow change, especially with regard to maturity and fiber quality, these defoliation timings could likely change as well.

LITERATURE CITED

Fig. 1. Lint yield and value of crop per acre with harvest aid programs initiated at various heat units beyond cutout (2001-2002). Differences between treatments were not significantly different (P=0.05).

Table 1. Percent open bolls and NACB at various heat units beyond cutout (2001-2002).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Heat units beyond cutout&lt;sup&gt;a&lt;/sup&gt;</th>
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<tbody>
<tr>
<td></td>
<td>750</td>
</tr>
<tr>
<td>Percent open bolls</td>
<td>27</td>
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<tr>
<td>NACB</td>
<td>5+</td>
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<sup>a</sup> Physiological maturity at NAWF=5.