

Examining Effects of NAWF and Heat Units On Last Effective Boll Populations

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ABSTRACT

Proper defoliation timing on cotton is critical to maximize profit, lint yield and fiber quality. Cotton fiber quality directly impacts the value of cotton, and hence the profitability (Williford, 1992). A cotton-management system, COTMAN, is used for in-season plant monitoring based on heat unit (HU) accumulation at 5 nodes above white flower (NAWF=5) to time defoliation. A trial was conducted at the Texas AgriLife Research Farm in Burleson County using COTMAN to establish the best nodal position, after an 850 HU accumulation, for defoliation timing. Plants were tagged at one of three designated nodal positions (NAWF=3,4,5) and hand harvested after 850 HU accumulation. Although there was no significance in the lint quality or total lint pounds per acre, statistical difference was found in the percentage of yield above the nodal position.

INTRODUCTION

Across the US, different optimum defoliation timings are established with heat unit (HU) accumulation after plant maturity (cutout) method. The current system of crop monitoring, COTMAN, has indicated that harvest aid application timings may not be consistent across the Cotton Belt. Oosterhuis et al. (1993) state that a cotton plant is physiologically mature at cutout after a 850 HU accumulation and at five nodes above white flower (NAWF=5). It is possible that cutout may occur at a different nodal position than 5 for various areas in the Cotton Belt.

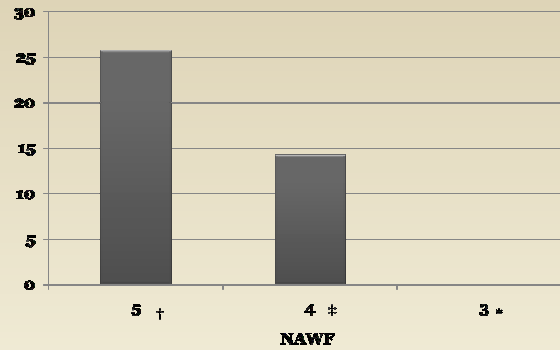
OBJECTIVE

To compare effects of different nodal positions for cutout after 850 heat unit accumulation and the impact on defoliation timing, lint yield and fiber quality.



Fig. 1- Plots defoliated at NAWF=3 could not be harvested due to rainout.

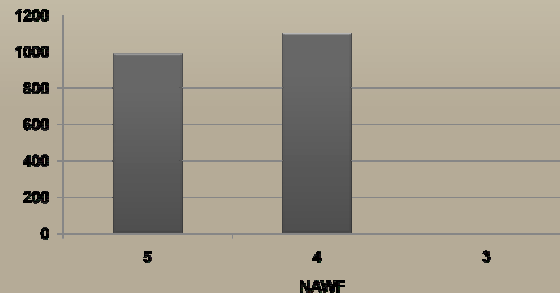
Percent of Lint Above NAWF



† At NAWF=5, 26% of yield was above the white flower indicating that the crop was not at physiological maturity
‡ At NAWF=4, 14% of yield was above the white flower indicating that the crop was not at physiological maturity
* At NAWF=3, rain prolonged the crop into unharvestable conditions, 28 days after 14 DAT (days after treatment)

t Grouping	Mean	Nodes Above White Flower (NAWF)
A	25.8	NAWF 5
B	14.3	NAWF 4
-	0	NAWF 3
<i>P Value: 0.0032</i>		
Coefficient Variance: 9.3541		
<i>R² value: 0.9635</i>		

Lint Yield (lbs/A)



t Grouping	Mean	Nodes Above White Flower (NAWF)
A	990	NAWF 5
A	1102	NAWF 4
-	0	NAWF 3
<i>P Value: 0.2022</i>		
Coefficient Variance: 9.2786		
<i>R² value: 0.7885</i>		

METHODS AND MATERIALS

The experiment was conducted on a Weswood silt loam soil at the Texas AgriLife Research Farm in Burleson County, Texas. Plots were arranged in a Randomized Complete Block design seeded with one variety, Delta and Pine Land 0949 Bollgard II Roundup Ready Flex® cotton. The plot area was fertilized uniformly with 120 units of nitrogen per acre. An AquaSpy® field weather station monitored environmental conditions at the site. Each treatment was defoliated at 850 HU beyond one of 3 nodal positions (NAWF= 5,4,3). Plants were tagged at designated nodal position, and heat units were calculated by the following equation: [(daily high °F+ daily low °F/2)]-60°F. Defoliation application consisted of a tank-mix of Dropp SC (2.4 oz/A) + Ginstar EC (1 oz/A) + Finish Pro 6 (26 oz/A). All treatments were harvested 14 days after defoliation, with the exception of the NAWF=3 position due to weather complications. Tagged plants were hand harvested to determine the percentage of yield above and below each experimental nodal position. Fiber samples were sent to the International textile Center in Lubbock, Texas for HVI fiber quality measurements.

RESULTS & DISCUSSION

Statistical difference was shown for percentage of lint above the determined NAWF, but there was no significance in the lint pounds per acre (total yield). In Burleson County, the use of NAWF=3 for initiation of heat unit accumulation coincided with a period of inclement weather (prolonged rain events) that prevented timely harvest and resulted in loss of this treatment (Fig.1). No significance was found in HVI lint quality parameters. The trial will be replicated for two more years due to weather related complications: 2008- Hurricane Ike, 2009-irregular weather patterns in later part of harvest season.

REFERENCES

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