MANAGEMENT OF MICRONAIRE VALUES IN UPLAND COTTON BY DEFOLIATION TIMING IN THREE MID-FULL SEASON CULTIVARS

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Abstract

This study was conducted to determine the optimum defoliation timings for three different full-season cotton varieties known to receive high micronaire values. Yield was also evaluated to determine the optimal defoliation timing on yield along with non-discounted micronaire values. Percent open bolls were used to verify defoliation timings. Four defoliation timings were used in this trial ranging from 20% to 80% open bolls. The three varieties used in this trial were, Phytogen 565 WRF, Delta Pine 1050 B2RF, and Stoneville 5458 B2RF. Yields for DP 1050 and STV 5458 were similar with PHY 565 being slightly lower. All three cultivars showed the same trend in yields over defoliation timings. Two harvest times were used to better evaluate and compare yields relative to defoliation timings. Micronaire values remained in the premium range level in all treatments for this year's data. Data showed different micronaire trends for each variety in many cases. For example, while the Phytogen and Delta Pine varieties showed a decrease in micronaire value from 20% to 40% open boll treatments, the micronaire values for the Stoneville variety increased.

Introduction

Certain upland cotton (Gossypium hirsutum L.) cultivars in past and present breeding programs used in U.S. cotton production have had the reputation of receiving high micronaire values, especially full-season varieties. The average micronaire value of the U.S. upland cotton crop has increased significantly and continuously in recent years (Lewis, 2000). Many factors, environmental and genetic, determine micronaire. End of season management practices such as defoliation timing can influence micronaire values and yields substantially. Defoliating cotton to improve grade can negatively affect yield and yield components (Barker et al., 1976). Defoliating early in some cases may enhance fiber quality, but yield will be negatively affected. However, if managed correctly, producers can have both high yields and good fiber quality. Varieties can vary in management when trying to achieve these goals. Finding the best defoliation timing for these varieties can help producers make better decisions at the end of the season to maximize profits.

Materials and Methods

The study was conducted at the Texas Agrilife Research Station in College Station, TX on a Weswood silt loam soil. The trial was arranged as a randomized complete block design for each of the three varieties, Phytogen 565 WRF, Delta Pine 1050 B2RF, and Stoneville 5458 B2RF. Plots were 32 feet by four rows with a 40-inch row spacing. The trial was replicated four times with four treatments per variety. Treatments were determined by different open boll percentages, 20%, 40%, 60%, and 80%, respectively. Open boll percentages were determined by counting the number of open and closed bolls in 3 foot of row and dividing the number of open bolls by the total number of bolls. Two open boll counts were taken per plot every other day to determine percentages. Three counts were taken on the day of harvest aid application. The harvest aid used in this study was a tank mixture of Dropp SC (2.4 oz./ac), Ginstar EC (1.0 oz./ac), and Finish Pro 6 (24 oz./ac). The field was fertilized with 134 kg of 32-0-0 liquid nitrogen per hectare with a four row knifing rig prior to planting. The two center rows of each plot were harvested with a John Deere 9910 high drum two row cotton picker. Samples pulled from each plot were ginned with a small scale production style gin at the Agrilife Research Center in Lubbock, TX. The samples were then sent to the Fiber and Biopolymer Lab in Lubbock for HVI analysis to determine fiber quality. Two harvest timings were used to better evaluate differences in yields from the different treatments. The first pick was 7 to 10 days after harvest aid application and the second pick was fourteen days after application. These timings reduced lint exposure to weathering and eliminated the need of a sequential harvest aid application to suppress regrowth.

Alpha	0.05
Error Degrees of Freedom	9
Error Mean Square	0.015833
Critical Value of t	2.26216
Least Significant Difference	0.2013

Means with the same letter are not significantly different.

t Grouping		Mean	N	trt
	A	4.125	4	20%
	A			
B	A	3.925	4	80%
B				
B		3.85	4	60%
B B		3.85	4	40%

Figure 1

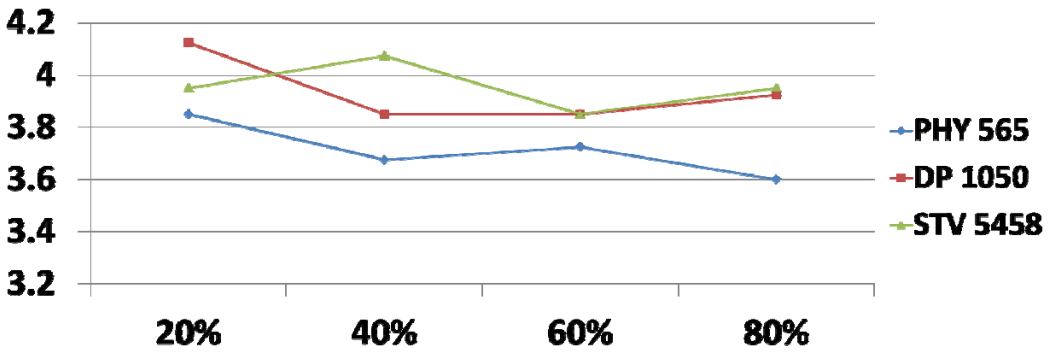

Figure 2

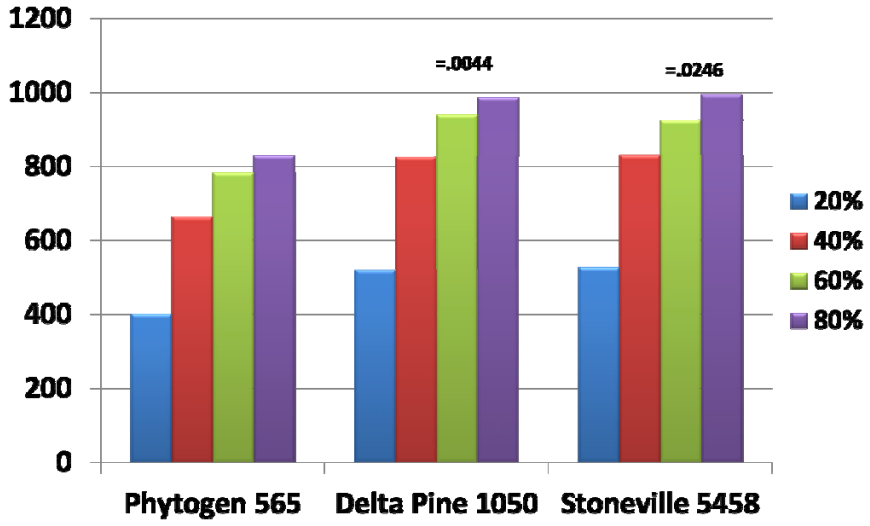

Figure 3

Results and Discussion

No significant differences were seen in the micronaire values for the Stoneville variety. There were differences within micronaire values for the Phytogen and Deltapine varieties; however they did not show the same trend. For the Deltapine variety, treatment 1 (20% open) was significantly different when compared to treatment 2 (60%) and treatment 3 (80%), but treatment 4 was not different when compared to any of the other treatments, (Fig. 1). In the Phytogen variety only treatment 1 and 4 were different when compared to each other. In general, micronaire values decreased as defoliation was delayed for the Phytogen and Deltapine varieties, but not for the Stoneville variety, (Fig. 2). An increase was observed in yield as defoliation timing was delayed in all varieties, (Fig. 3). The only significant differences seen in yield were between 20% and 80% open bolls. This held true for all three of the varieties.

Acknowledgements

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References

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