Effect of Planting Date On Cotton Growth, Yield, and Fiber Quality

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Abstract: Maximizing lint yield is dependent on picking a variety that is adapted to the growing environment. The presence of four-bract squares indicate boll shedding and potential yield loss; however it is not known if planting date has any affect on the percentage present during the growing season. Therefore, a field study was conducted to investigate variety by planting date interactions on lint yield, fiber quality and four-bract squares. Six newly released cultivars were planted in four-row plots on three planting dates. Percentage of four-bract squares were recorded 60 days after emergence. Results showed lint yields were highest on the May 1st planting and appeared to decrease with later planting dates. Fiber strength was highest at the first planting, while fiber length was higher in the second and third planting. In conclusion, May 1st appeared to be the optimum planting date in 2012 except for DP1219 which preferred April 15th.

Introduction

Cotton is a major economic crop in the southern US. In TN, it brings in approximately $300 million/year. Proper management, including appropriate planting date, ensures better crop performance and yield-profit. Historically, based on weather patterns, optimum planting dates are within the range April 15th to May 15th (Main et al., 2010). Planting too early allows a risk of frost and too late creates a shorter growing season and exposure to possible inclement weather; both potentially limiting yield. It is valuable for producers to know the response of new varieties to planting date before planting. In recent years, the presence of four-bract squares have become a concern because it indicates boll shed. It is unknown whether planting date impacts four-bract square numbers.

Objective

The objective of this experiment was to determine the effects of planting date on plant growth, yield performance, fiber quality and percentage of four bract squares for six new cotton varieties.

Materials and Methods

A field study was conducted at the West Tennessee Research and Education Center in Jackson, TN, on a newly bedded Lexington silt loam. The trial was established as a strip-split plot design. Six varieties were planted on three dates. Plots were four rows and replicated four times. University of Tennessee Extension recommended practices were followed for fertility, insect and weed management and defoliation. Plant parameters recorded included the number of four-bract squares 60 days after emergence for each variety-planting date combination. A two-row mechanical cotton picker harvested the center two rows of each plot; seed cotton was then processed on a 10-saw gin. Lint yield and fiber quality data were analyzed using analysis of variance in SAS.

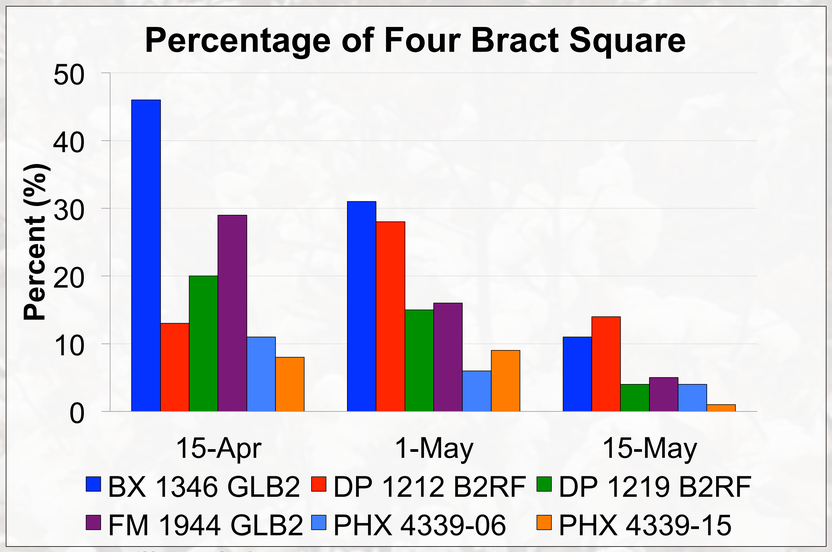

Figure 1. Effect of planting date and cotton variety on the development of four-bract squares.

Results and Discussion

Increased incidence of four-bract squares have become a concern among producers due to the threat of dropped squares. However, the percentage of four-bract squares tend to decrease among the varieties evaluated with later planting dates (Figure 1). Figures 2 and 3 show examples of four bract squares, figure 2 exemplifies the fourth bract and why it can be a problem for farmers.

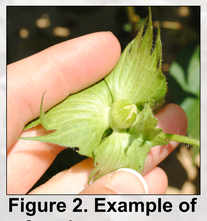

Figure 2. Example of a four-bract square.

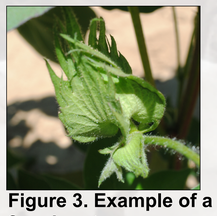

Figure 3. Example of a four-bract square.

Lint yield did not differ among the varieties planted at April 15th. However, DP 1212 B2RF showed difference with decreased yields as planting date increased (Figure 4) as shown by the letter groupings on the graph.

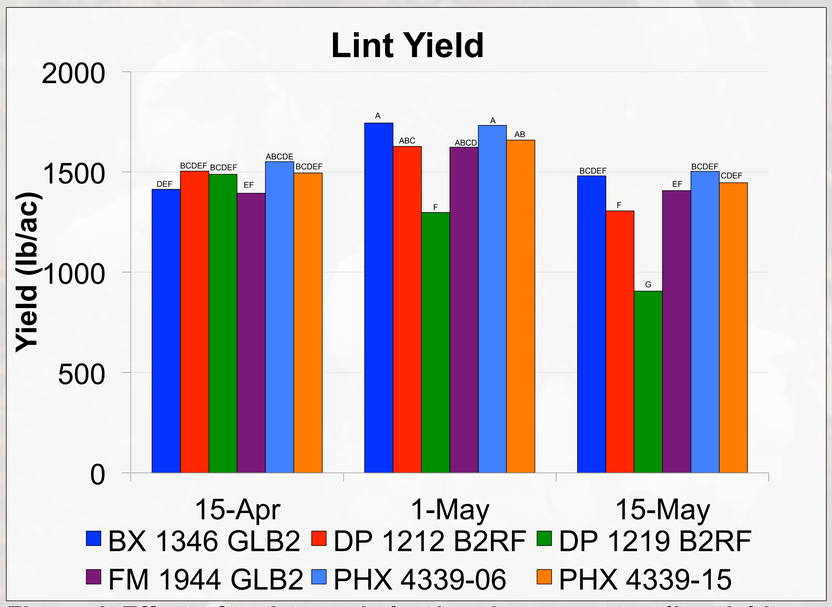

Figure 4. Effect of variety and planting date on cotton lint yield.

Fiber quality is effected by both planting date and variety (Table 1) but the interaction of both was non-significant, thus not shown. Fiber strength is highest in the April 15th planting with DP 1219 B2RF having the highest strength among the varieties. Fiber length is highest in the May 1st and May 15th planting dates with PHX 4339-15 having the longest fibers within the varieties. The overall uniformity percentage tended to be higher in both of the May plantings with PHX 4339-15 having the highest percentage. Micronaire, however, proved to be higher with the May 1st planting and highest in the DP 1212 B2RF variety.

Table 1. Fiber quality parameters of four cotton varieties and effect of planting date.

Variety	Micronaire	Fiber Length (in)	Fiber Strength (g/tex)	Uniformity (%)
BX 1346 GLB2	4.6	1.22	34.2	86
DP 1212 B2RF	4.7	1.26	34.5	86.3
DP 1219 B2RF	4.5	1.25	35.1	85.4
FM 1944 GLB2	4.4	1.25	33.9	85.4
PHX 4339-06	4.3	1.24	33.2	85.6
PHX 4339-15	4.3	1.27	32.7	86.5
LSD (0.05)	0.05	0.01	0.3	0.3
Pr>F	<.0001	0.0001	<.0001	0.0023
Planting Date	**Micronaire**	**Fiber Length (in)**	**Fiber Strength (g/tex)**	**Uniformity (%)**
April 15	4.4	1.24	35.0	85.3
May 1	4.6	1.25	33.4	86.1
May 15	4.3	1.26	33.4	86.2
LSD (0.05)	0.1	0.01	0.2	0.3
Pr>F	0.0002	0.0022	<.0001	0.0009

Conclusion

- **Cotton variety and planting date interaction are significant in the percentage of four-bract squares and in overall yield. However, the interaction is not significant for fiber quality.**
- **DP 1219 B2RF was the only variety whose yield dropped significantly from an early to a late planting.**
- **Four-bract squares were shown to be higher in the first planting for varieties with the GLB2 trait.**

Acknowledgments

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References

Main, C.L., D.M. Dodds and L.T. Barber. 2010. Planting Date Effects With Modern Cotton Cultivars. Proc. Beltwide Cotton Conf.