

GROWTH AND FRUITING CHARACTERISTICS OF DELTAPINE SEED STRIPPER COTTON

VARIETIES

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Abstract

Cotton growers continually work with new cotton varieties and are pushing these varieties to produce a high yield crop in a shortened period of time. Two new stripper varieties recently released by Deltapine Seed have performed well under a shortened growing season. In order to effectively manage these new varieties in different environments, growth and fruiting parameters need to be known. Cotton plant mapping is a tool used to quickly and effectively characterize the growth and fruiting parameters of cotton varieties across differing environments and management practices. Seven replicated on-farm trials were set up across Texas and Oklahoma in 1997 to effectively characterize the growth and fruiting characteristics of two Deltapine Seed "stripper type" cotton varieties. The plant map data indicates, and is confirmed by the lint yield data, that DP 2156 is more determinant and will set a crop in a very short time period. DP 2156 yielded as well as the standard HS26, but was less than DP 2379 and DP 5409. DP 2156 is most likely best adapted for an environment in which DD60's will be limited either due to a short growing season or late planting. DP 2379 generally is a taller, more columnar type plant with a longer affective bloom period, indicating that it is less determinant and would benefit from a longer growing season. DP 2379, when placed in a full season environment, will look and yield very similarly to early maturing picker type cotton varieties.

Introduction

Cotton growers are increasingly challenged with new cotton (*Gossypium hirsutum*) varieties every year. Because of the increased rate at which new varieties have been brought to the marketplace, the grower's knowledge as well as University and industries knowledge on these new varieties' growth and fruiting characteristics has been limited. Given the increases in the production, seed, and

new technologies costs, it has become increasingly important to manage new cotton varieties to achieve their maximum yield potential. Furthermore, a strong emphasis has been placed on the varieties for earlier maturity to avoid insect and weather related stress and damage later in the season. Yet, the shortened fruiting period is expected without sacrificing lint yield and quality. Cotton plant mapping has recently become an integral tool used to quickly and effectively characterize the growth and fruiting parameters of cotton varieties across differing environments and management practices. Plant mapping information can be effectively used to select and manage a cotton variety based upon a particular environment and growers preferences. Deltapine Seed has recently introduced two new early maturity stripper type cotton varieties. DP 2156 has been grown and has performed extremely well on the Texas High Plains over the last couple of years. DP 2379 was released commercially in 1997. Consequently limited data is available on its vegetative and fruiting characteristics across varying environments and management practices.

Objective

To effectively characterize the growth and fruiting characteristics of two Deltapine Seed "stripper type" cotton varieties across many varying growing conditions, moisture regimes, and management practices.

Testing Procedure

Seven locations were selected across Texas and Oklahoma for test sites in 1997. Four locations were irrigated, and 3 locations were dryland (Table 1). All locations except the Oklahoma site were conducted on grower-cooperator field sites, using grower equipment for all field operations. All management decisions throughout the season were based on sound production practices employed by the cooperator. The location in Oklahoma was conducted on the Oklahoma State University and Extension Center research farm, Altus, OK.

The trials were set up as a randomized complete block design, replicated three times. Plot size was 4 rows with a minimum row length of 500 feet. Data collected included: early season vigor ratings, one inseason plant map following early bloom, one final plant map prior to harvest, and lint yield. Ten random plants per plot were collected for plant mapping. Data collected from the midseason mapping included plant height (PH), total nodes (TN), mainstem vegetative nodes (VN), nodes above the uppermost first position white flower (NAWF), and first position fruit retention. Data collected from the final map included plant height, total mainstem nodes, vegetative nodes, nodes above the upper most first position cracked boll, and fruit retention on all fruiting sites. Entire plots were harvested either by a spindle picker or brush stripper.

The emphasis of this paper is to look at vegetative and fruiting patterns of two stripper varieties, therefore data presented will focus on two varieties-DP 2156 and DP 2379. DP 2156 is a very early maturity stripper variety, whereas DP 2379 is a mid maturity stripper variety. Although they are classified as stripper varieties, both varieties can be harvested with a picker or stripper. The two varieties are compared to a standard stripper variety, Paymaster HS26 and a standard early maturity picker variety DP 5409. Due to the fact that HS26 was present only at one location, comparison made directly to HS26 are only from Terry County. Comparisons with DP 5409 are an average from all seven locations. Plant map data presented is based on TN, VN, the contribution to yield from first position fruiting sites (FP1) and second position fruiting sites (FP2), days to first bloom, and the effective bloom period, referred to as the 95 percent zone. The 95 percent zone represents the number of fruiting branches that contain 95 percent of all FP1 bolls.

Statistical analysis was conducted using ANOVA and means were separated by Fisher's least significant difference at alpha level 0.05.

Discussion

Terry County

DP 2156 had significantly fewer vegetative branches, a smaller 95 percent zone, and shorter plant height compared to DP 2379 and HS26 (Tables 2,3). Although not significant, DP 2156 also required fewer days to reach first open flower, had fewer total nodes, and had a greater distribution of total yield from second position fruiting sites (Tables 2,3). The plant map data indicates that DP 2156 has a shorter, bushier plant structure, tends to initiate fruiting branches very earlier, and sets its total crop within a very short time period. DP 2156 yielded as well as the standard HS26, but was significantly less than DP 2379. The data indicates and is confirmed by the lint yield data, that DP 2156 is more determinant and will set its crop in a very short time period.

DP 2379 had significantly more vegetative branches, and a greater 95 percent zone (Table 2). DP 2379 tended to be very similar to HS26 in respect to plant height, total nodes, and distribution of yield from first and second position fruiting locations (Table 3). The plant map data suggests that DP 2379 tends to initiate fruiting branches later, yet develops rapidly towards initiation of first bloom. DP 2379 generally is a taller, more columnar plant with a longer effective bloom period, indicating that it is less determinant and would benefit from a longer growing season.

Texas and Oklahoma

When averaged across seven locations with very different environmental and management conditions, significant differences between varieties were less. Yet, very clear differences were still present. DP 2156 had significantly

fewer vegetative nodes, smaller 95 percent zone, shorter plant structure and fewer mainstem nodes (Tables 5, 6) when compared to DP 2379 and DP 5409. When grown under full season conditions, DP 2156 still demonstrated to be an early maturing variety. Although not significant, the lint yield of DP 2156 was less than DP 2379 and DP 5409 (Table 7).

DP 2379, even though classified as a stripper variety, demonstrated that it could travel from a short season type environment to a full season type environment and still perform very well. DP 2379 was not significantly different than DP 5409 in respect to days to first bloom, 95 percent zone, total nodes, and distribution of bolls on first and second position fruiting sites (Tables 5,6). Plant map and lint yield data suggest that DP 2379 will develop and yield very similar to a standard early maturity picker type cotton variety under most growing conditions (Table 7). DP 2379 tended to be a taller, less determinant type variety with the majority of the yield coming from first position fruiting sites.

Conclusions

The plant map and yield data from 1997 suggest that DP 2156 is a shorter, determinant, early maturing type cotton variety. DP 2156 is most likely best adapted for an environment in which DD60s will be limited either due to a short growing season or late planting. DP 2379 is a taller, less determinant cotton variety well adapted for varying environments. DP 2379 when placed in a full season environment, will perform very similarly to early maturing picker type cotton varieties.

Table 1. Testing Locations - TX/OK.

<i>County</i>	<i>Irrigated</i>
Refugio, TX	No
Burleson, TX	Yes
Williamson, TX	No
Ellis, TX	No
Terry, TX	Yes
Tom Green, TX	Yes
Jackson, OK	Yes

Table 2. Plant Map Data, Terry County.

	VEG. BRANCH	DAY 1 ST BLOOM	95% ZONE
DP 2156	4.3	69.2	13.9
DP 2379	5.5	70.8	17.3
HS26	5.1	72.3	16.0
LSD@0.05	0.35	N/S	1.27

Table 3. Plant Map Data, Terry County.

	PH (in)*	TN ^f	%FP1 ^δ	%FP2 ^β
DP 2156	18.8	20.7	56	30
DP 2379	22.6	22.7	69	22
HS26	22.9	22.4	67	26
LSD@0.05	0.64	NS	NS	NS

* Plant Height

^f Total Nodes^δ Percent fruiting position 1^β Percent fruiting position 2

Table 4. Lint yield Terry County.

	Lint/Acre (lb)
DP 2156	603
DP 2379	786
HS26	615
LSD@0.05	123

Table 5. Plant map data, TX and OK.

	VEG. NODES	DAY 1 ST BLOOM	95% ZONE
DP 2156	4.7	64.8	13.1
DP 2379	5.2	63.3	15.5
DP 5409	5.8	64.8	16.0
LSD@0.05	0.13	N/S	0.85

Table 6. Plant map data, TX and OK.

	PH* (in)	TN ^f	%FP1 ^δ	%FP2 ^β
DP 2156	24.9	18.7	53.2	23.7
DP 2379	28.5	20.7	55.9	23.3
DP 5409	26.7	20.8	54.8	25.0
LSD@0.05	1.2	0.81	N/S	N/S

*Plant Height

^fTotal Nodes^δ Percent fruiting position 1^β Percent fruiting position 2

Table 7. Lint yield: TX/OK.

	Lint/Acre (lb/acre)
DP 2156	642
DP 2379	718
DP 5409	685
LSD@0.05	N/S