REPLICATED AGRONOMIC COTTON EVALUATION (RACE) TRIAL IN THE ROLLING PLAINS OF TEXAS-2017

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Abstract

Variety selection is one of the most important decision producers need to make before planting; however, it has become more difficult to make the decision as new varieties are available on market each year with advanced technologies. Cotton (*Gossypium hirsutum* L.) production in the Rolling Plains of Texas was unique this year as the advanced technologies (Enlist and Xtend Flex varieties) were available to Texas cotton producers in 2017 cotton growing season. Our objective of this project is to provide agronomic information of advanced cotton varieties to producers in the Rolling Plains of Texas. Eight cotton varieties were planted in 15 locations across the Rolling Plains of Texas. Cotton were planted on-farm with plot size varying from 0.0006 to 1.15 ac. The study was replicated three times and designed as randomized complete block design.

Introduction and objectives

Cultivar selection is the most important decision made by the cotton producers especially in the Rollins Plains of Texas, where dryland cotton production is dominant. With the expansion of transgenic technology, new seed treatments for both early season insects and disease management, and new genetics, cultivar selection has become even more critical, and one of the biggest expenses of growing cotton. Therefore, the objective of this project was to compare yield and lint quality of Stacked-Gene insect and herbicide tolerant cultivars grown in large plot replicated trials on producer-cooperator fields in the Rolling Plains region of Texas.

Materials and methods

Eight cultivars were planted in 8 drylands and 7 irrigated fields across the Rolling Plains of Texas. Cultivar selection were determined with input from grower cooperators/committees, Extension faculty, and seed industry representatives. Plot size ranged from .0006 to 1.15 acres in size, depending on the location (Table 1). Study was designed as CRBD with 3 replications. All trials were machine harvested with grower harvesters except for Wichita and Stonewall County were hand-picked for yield estimation. Plot weights were determined using a weighing boll buggy equipped with integral electronic scales. Sub-samples from each plot will be ginned on a Continental 10 saw gin with a lint cleaner. Lint quality will be quantified by a high volume instrument (HVI) at the Fiber and Biopolymer Research Institute at Texas Tech University in Lubbock, TX. Analysis of variance was conducted using proc GLM of SAS. Mean separation was conducted at $P < 0.10$.

Table 1. Trial location, cooperator, planting date, harvesting date, plot size information of 2017 Texas A&M AgriLife Extension Service RACE trial

County	Producer cooperators	County Extension Agents	Irri/ dry	Planting date	Harvest date	Rows × width	Seeding Rate (seeds ac^{-1})	Seeds ft^{-1}	Plot size (ac)
Childress	Cade Wyatte	Vacant	D	6/15	12/14	8 rows × 40”	26000	2.0	0.51
Collingsworth	Rex Henard	Vacant	I	5/15	11/7	6 rows × 40”	45000	3.4	0.54
Dickens	Gary Myers	Thomas Boyle	D	5/26	12/22	6 rows × 40”	26000	2.0	1.15
Hardeman	TAMU	Justin Gilliam	D	6/28	NA	4 rows × 40”	52272	4.0	NA
Hardeman	TAMU	Justin Gilliam	I	5/25	11/6	4 rows × 40”	52272	4.0	0.16
Haskell	Steve McGuire	Jason Westbrook	D	5/31	11/16	10 rows × 30”	42471	2.4	0.67
Haskell	Kregg Sanders	Jason Westbrook	I	6/17	TBD	6 rows × 40”	32670	2.5	TBD
Kent	Guy Walker	Brandon Cave	D	6/18	NA	8 rows × 40”	-	-	NA
Kent	Guy Walker	Brandon Cave	I	6/18	NA	8 rows × 40”	-	-	NA
Knox	TAMU	Jerry Coplen	I	6/15	NA	8 rows × 40”	-	-	NA
Motley	Josh Lee	Ryan Martin	D	6/2	NA	1 rows × 40”	40000	-	NA
Motley	Josh Lee	Ryan Martin	I	5/31	NA	1 row × 40”	39000	-	NA
Stonewall	Billy Kirk Meador	Cody Myers	D	6/9	1/9	1 rows × 40”	30000	2.3	0.008
Wichita	Dwayne Peirce	David Graff	I	5/30	12/21	1 rows × 30”	45000	2.6	0.0006
Wilbarger	Donald Shoppa	Langdon Reagan	D	6/9	12/15	8 rows × 40”	23000	1.8	0.51

Results and Discussion

Planted acres in the Rolling Plains increased 15% compared to 2015 and 2016. In-season precipitation during May to October varied widely across the trial sites from 16.7 in to 8.7 in (Fig. 1). The 2017 moisture was two to six inch less than 2016 in-season moisture. Therefore, many producers in the region suffered from lack of moisture in late May to June for planting. Storm during the last week of September flooded many cotton fields, which accelerated the infestation of late bacterial bright. Although the late bright had minimum negative effects on final yield, some producers might have experienced the disturbance by the dead cotton plants at stripping. The first killing frost was one week earlier (27 October 2017) than traditional first killing frost in the region, which was detrimental to the late-planted cotton. Despite the low moisture and early frost, cotton yield remained high in the Rolling Plains of Texas. Among the trials harvested, average yields were 1426 and 596 lb ac^{-1} in irrigated and dryland trials, respectively (Table 2 and 3). Many of trial sites had no herbicide drift damages, except for minor herbicide damage in Hardeman irrigated site and major herbicide damage in Wichita irrigated site in July to August. However, the both trials seemed to recover by the time of harvesting. Stand establishment was poor in Childress dryland, Dickens dryland, and Stonewall dryland trials due to lack of moisture.

Conclusion

Overall, planting timing to catch timely precipitation was critical, especially to dryland cotton production, to achieve high yield for the 2017 cotton growing season. However, 2017 cotton production was above average yield, and cotton acres expect to increase for 2018 growing season in the Rolling Plains of Texas.

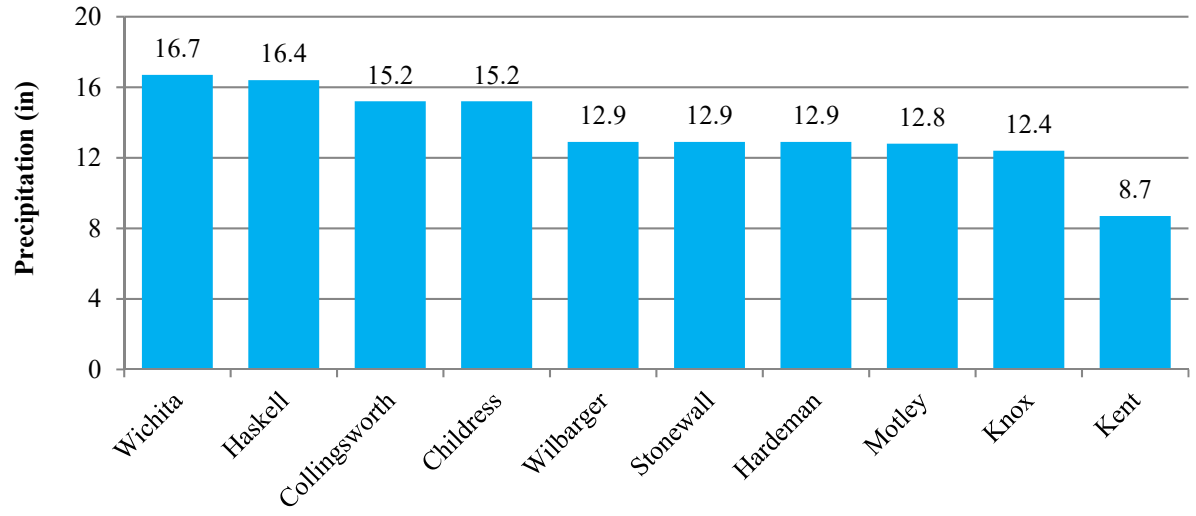

Figure 1. Precipitation during May to October 2017.

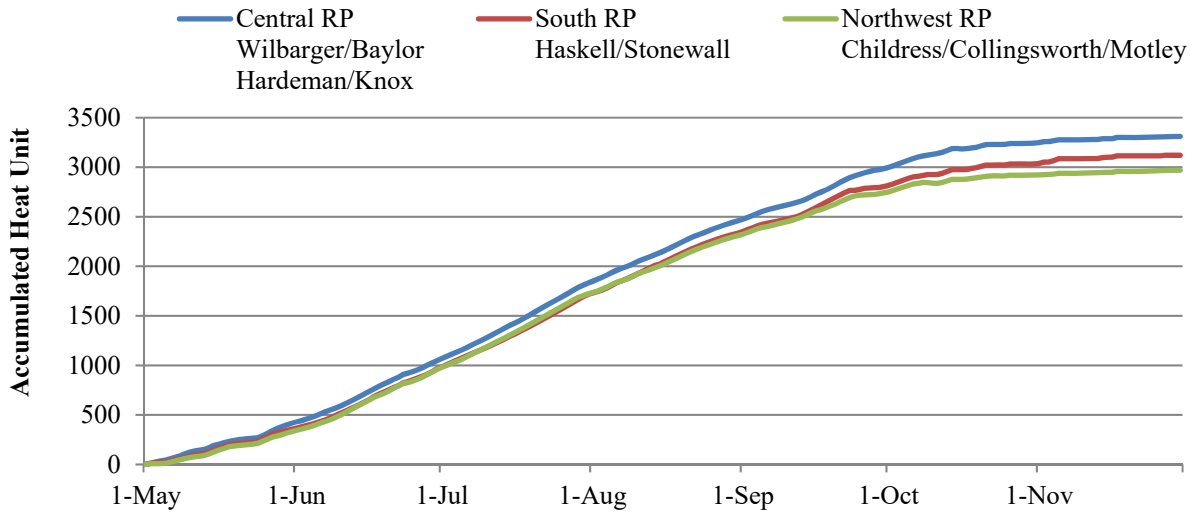

Figure 2. Heat unit during May to November 2017.

Table 2. Lint yield (lb ac^{-1}) in irrigated trials

Varieties	Collingsworth	Haskell	Hardeman	Wichita*	AVG
PHY490W3FE	1284	1451 a	1554 a	2118	**1602**
PHY300W3FE	1426	1394 a	1231 ab	1998	**1513**
FM1830GLT	1569	1274 abc	1347 b	1654	**1459**
DP1646B2XF	1367	1066 c	1395 ab	1774	**1401**
NG4689B2XF	1399	1240 abc	1401 ab	1508	**1387**
DP1549B2XF	1246	1248 abc	1353 b	1649	**1374**
NG3699B2XF	1299	1301 ab	1094 c	1748	**1361**
ST5517GLTP	1515	1097 bc	1136 c	1498	**1312**
Mean	**1388**	**1259**	**1314**	**1742**	**1426**
CV %	**20.1**	**12.6**	**9.6**	**17.1**	**-**

*Turnout of 24% was used to estimate lint yield as plots at Wichita co. was hand-picked.

Table 3. Lint yield (lb ac^{-1}) in dryland trials

Varieties	Childress*	Wilbarger*	Dickens*	Stonewall**	AVG
NG4689B2XF	746 a	884	359 ab	699	**672**
ST5517GLTP	631 ab	938	328 ab	681	**644**
PHY490W3FE	496 bc	908	401 a	640	**611**
DP1549B2XF	444 c	1007	393 a	599	**611**
DP1646B2XF	483 bc	1055	321 ab	551	**602**
FM2334GLT	392 c	887	367 ab	663	**577**
PHY444WRF	357 c	872	295 b	646	**543**
NG4601B2XF	156 d	1039	192 c	634	**505**
Mean	**463**	**949**	**332**	**639**	**596**
CV %	**26.6**	**15.3**	**17.5**	**18.2**	**-**

*Turnout of 33% was used to estimate lint yield.
**Turnout of 24% was used to estimate lint yield.

Conclusion

Dryland cotton production was improved for 2016 in the Rolling Plains of Texas. Early projections are for planted acres of cotton in 2017 to be more than in 2016 in the Rolling Plains region, especially dryland acreage.

Acknowledgement

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