

**ON-FARM AGRONOMIC AND ECONOMIC EVALUATION OF STACKED-GENE COTTON
CULTIVARS IN THE UPPER COASTAL BEND REGION OF TEXAS**

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Abstract

Cotton variety selection is one of the most important decisions a producers will make each season. The cotton variety and associated technology will dictate the management decisions for the entire season and can significantly impact the profitability of a farm. To gather unbiased information on cotton varieties, Texas AgriLife Extension Service conducts about 20 large-plot replicated cotton variety trials across the southern, eastern and central portions of Texas each year. The objective of these variety trials are to compare yield and lint quality of stacked-gene Bollgard II and WideStrike Roundup Ready Flex cultivars grown in large plot replicated trials on producer-cooperator fields across this region. Because of the various environmental conditions and site locations that these trials are conducted annually, these trials produce a wealth of data on variety performance. These variety results are made available to local producers throughout these regions of the state. Due to limited space, a summary of 5 county cotton variety trials conducted in 2011 across the Coastal Bend Region of Texas is summarized below. All trial sites have three replicates and plot sizes range from 0.45 to 0.80 acres and are managed according to the farmer cooperator standard practices.

Introduction

Cultivar selection is the most important decision made by the cotton (*Gossypium hirsutum* L.) grower; however, with the proliferation 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 most expensive inputs of the production enterprise. Unlike herbicide or insecticide decisions that can be changed during the season to address specific conditions and pests, cultivar selection is made only once and that selection dictates field management for the entire season.

Because of the rapid introduction of new cultivars/technologies into the marketplace today, growers and practitioners are forced to make cultivar selection decisions with less information than in the past. In most cases, decisions are based upon single-year information from academic/public sources, and sometimes the only information available is derived from seed company reports. Due to the rapid turnover of cultivars (three to four year life-cycle), multiple-year testing has virtually become a “thing-of-the-past.”

Traditional small-plot cultivar testing programs are inadequate in scale and design to investigate the economic impact of new cultivars/technologies. Generally, small-plot testing programs are not managed under field-scale, grower conditions. Agronomic management of weed, insect and plant growth regulator use and harvest operations will not be reflective of the commercial system. Consequently, an on-farm, large-plot cultivar testing program was developed by Texas AgriLife Extension cotton agronomists with the goal of providing growers and practitioners

with information necessary in making cultivar decisions. These extension led, grower managed, replicated, large-plot variety trials are referred to as RACE (Replicated Agronomic Cotton Evaluation) trials.

Texas producers planted 7.1 million acres in 2011 which was about 1.4 million acres more than 2010 or more than 2.2 million than in 2009. Transgenic varieties accounted for 86% of the state acreage in 2011. Percent transgenic cotton acreage in 2011 is down from 94% in 2010, which was the first percentage decrease in transgenic acres since this technology became commercially available. According to the USDA-Agricultural Marketing Service "Cotton Varieties Planted 2011 Crop" survey, the following Brands were planted to the highest percentage of acres in Texas, Alltex had 2%, Americot had 20%, Croplan Genetics had 1%, Delta Pine had 18%, Dyna-Grow had 3%, FiberMax had 45%, Phytogen had 7%. and Stoneville had 3%.

Objective

The first objective of this project was to compare yield and lint quality of Stacked-Gene Bollgard II and WideStrike Roundup Ready Flex cultivars grown in large plot replicated trials on producer-cooperator fields in the Coastal Bend Region of Texas. The second objective is to disseminate these results to cotton producers through key educational meetings and publication distribution.

Materials and Methods

Up to twelve cultivars were planted at each location and cultivar selections were determined with input from grower cooperators/committees, Extension faculty, and seed industry representatives. Only the seven varieties that were consistent at each of the five locations were used for the analysis of this paper. Variety entries consisted of Bollgard II and WideStrike Roundup Ready Flex cultivars. All of the trials in this paper were grown without supplemental irrigation.

Plot dimensions ranged from 0.45 to 0.80 acres in size, depending upon the location (Table 1). Studies were arranged in a randomized complete block design with three replications. All trials were machine harvested with grower picker or stripper harvesters. Plot weights were determined at harvest using a weighing boll buggy equipped with integral electronic scales. All samples were ginned on a Continental 10 saw gin with no lint cleaner (which produces a higher lint turnout percent than a commercial gin would), except for the Matagorda Co location which was ginned on a mini-research gin that included lint cleaners, thus leading to lower, more realistic, lint turnouts. Consequently, higher turnouts equate to lint yields higher than area-wide commercial yields. Lint samples were obtained from each plot for turnout. All lint samples were then sent to the Texas Biopolymer Research Center for classing, however only the loan value calculated from the classing data is shown here. . Additionally, all data were standardized to a color grade and leaf of 41 – 4. Per pound loan value was calculated using Cotton Incorporated's 2010 Cotton Loan Calculator. Data was analyzed with ARM 8 using LSD $P=0.05$.

Table 1. Summary of trial location, cooperator and planting information for the four cotton variety trials in the Texas Coastal Bend Region of Texas, 2011.

County	Cooperator	Planting Date	Harvest Date	Row Spacing (inches)	Plot Dimensions	Irrigated or Dryland	Area harvested /plot
Victoria	Justin Leita	Mar 11	July 29	38	6 rows x 1024 ft	Dryland	0.45 Ac
Matagorda	Hansen Farms	Mar 24	Aug 8	40	8 rows x 1303ft	Dryland	0.80 Ac
Wharton	Kresta Farms	Mar 22	Aug 1	40	6 rows x 1395 ft	Dryland	0.64 Ac
Fort Bend	Allen Stasney	Mar 24	Sept 6	36	8 rows x 1452 ft	Irrigated	0.80 Ac

For HVI analysis, fiber samples were sent to the Fiber and Biopolymer Research Institute at Texas Tech University in Lubbock, Texas. Statistical analysis for comparison among cultivars was conducted using Agricultural Research Manager 8, using LSD ($P=0.05$).

Results and Discussion

The 2011 season was characterized by very dry conditions. For the most part, planting moisture was marginal and soil moisture profile varied across locations. Limited rainfall fell during the planting season and all but one location were dryland fields. Extreme heat and dry conditions made for a very challenging growing season for producers across the state. Table 2 is a summary of the mean lint yield, turnout %, loan value, and lint value. Tables 3-6 provide summaries for each of the four locations, Victoria, Matagorda, Wharton and Fort Bend Counties) that are summarized in this poster.

Overall yields for all locations averaged 966 lbs/a. Mean loan value was 51.55 ¢/lb of lint and the mean lint value was \$515/a.

The Matagorda Co site had the highest mean yield, 1402 lbs/ac, while the Victoria Co and Wharton sites had the lowest mean yields, 766 and 767 lbs/ac, respectively. The Matagorda Co and Victoria Co sites had the highest and lowest mean loan value of 52.93 ¢/lb and 50.66 ¢/lb, respectively. Mean yields across the four locations ranged from 1177 to 917 lbs/ac for PHY 499 WRF and NG 4012 B2F, respectively. PHY 499 WRF was first in 3 locations and second in the other.

Table 2. Summary of four county (Victoria, Matagorda, Wharton and Fort Bend counties) trials yield, turnout, loan value and lint value, 2011

Variety	Yield (lbs/acre)	Turnout %	Loan Value (¢/lb)	Lint Value (\$/acre)
PHY 499 WRF	1177	45.9	51.68	605
DP 1044 B2F	1054	42.9	51.81	546
FM 1740 B2F	1041	43.9	51.65	539
DP 1032 B2F	968	44.6	51.42	504
ST 5458 B2F	990	43.4	50.53	501
PHY 367 WRF	950	43.4	51.94	495
ST 4288 B2F	947	41.4	51.95	493
CG 3220 B2F	921	41.9	51.49	481
NG 4012 B2F	917	42.9	51.50	475
Mean	996	43.3	51.55	515
P>F	0.0005	0.0001	0.7212	0.0005
LSD (P=.05)	102.94	1.461	1.5395	50.97
STD DEV	70.36	0.998	1.0523	34.84
CV%	7.06	2.3	2.04	6.76

In 2011, unlike 2010 where yields were exceptional across the region, the overall cotton crop was generally below average. Conditions were slightly warmer early in the spring around planting time, thus, growers who were able to get their crop planted and to a stand before planting moisture was gone had a chance to make a crop. Some varieties struggled to make it to a great stand, due to the relatively dry conditions at planting that only became worse as the season progressed while other varieties seemed to be unaffected by the conditions and emerged to near perfect stands.

The Matagorda Co site had the highest mean yield, 1402 lbs/ac, while the Victoria Co and Wharton sites had the lowest mean yields, 766 and 767 lbs/ac, respectively. The Matagorda Co and Victoria Co sites had the highest and lowest mean loan value of 52.93 ¢/lb and 50.66 ¢/lb, respectively. Mean yields across the four locations ranged from 1197 to 917 lbs/ac for PHY 499 WRF and NG 4012 B2F, respectively. PHY 499 WRF was first in 3 locations and second in the other.

Table 3. Lint yield, turnout, loan value and lint value for Victoria Co RACE trial, 2011 (LSD P=0.05).

Variety	Lint (lbs/acr)	Turnout %	Loan Value (¢/lb)	Lint Value (\$/acre)
PHY 499 WRF	890 a	47.0 a	51.70	443 a
ST 5458 B2F	779 b	43.3 cde	51.58	400 b
FM 1740 B2F	777 b	43.8 c	51.35	394 bc
ST 4288 B2F	771 b	42.8 ef	51.00	390 bc
DP 1044 B2F	755 b	42.8 ef	50.78	376 bcd
PHY 367 WRF	752 b	43.2 def	50.62	377 bcd
NG 4012 B2F	749 b	43.5 cd	50.18	373 cd
DP 1032 B2F	748 b	45.0 b	49.83	387 bc
CG 3220 B2F	696 c	42.0 g	49.77	359 d
Mean	766	43.6	50.66	388
P>F	0.0001	0.0001	0.3473	0.0002
LSD (P=.05)	46.71	0.54	NS	25.61
STD DEV	27.23	0.315	1.17	14.93
CV%	3.56	0.72	2.31	3.85

Table 4. Lint yield, turnout, loan value and lint value for Matagorda Co RACE trial, 2011 (LSD P=0.05).

Variety	Yield (lbs/acre)	Turnout %	Loan Value (¢/lbs)	Lint Value (\$/Ac)
PHY 499 WRF	1670 a	39.3	52.03 bc	869 a
FM 1740 B2F	1427 bcd	36.6	53.43 a	762 bc
ST 5458 B2F	1461 bc	37.3	50.95 c	744 bc
DP 1032 B2F	1372 bc	37.3	53.70 a	737 bc
DP 1044 B2F	1369 bcd	34.5	53.33 a	730 bc
ST 4288 B2F	1348 bcd	33.7	53.15 ab	716 bc
PHY 367 WRF	1300 cd	35.5	53.50 a	695 c
CG 3220 B2F	1289 cd	35.6	52.90 ab	682 c
NG 4012 B2F	1264 d	35.7	53.43 a	675 c
Mean	1402	36.7	52.93	742
P>(F)	0.0038	NS	0.0061	0.0173
LSD (P=.05)	175.93	4.733	1.2537	98.75
STD DEV	102.56	2.759	0.7308	57.57
CV %	7.31	7.52	1.38	7.76

Table 5. Lint yield, turnout, loan value and lint value for Wharton Co RACE trial, 2011 (LSD P=0.05).

Variety	Yield	Turnout	Loan Value	Lint Value
PHY 499 WRF	945 a	50.7	51.28 a	485 a
DP 1044 B2F	811 b	47.7	51.78 a	420 b
PHY 367 WRF	799 bc	48.5	51.65 a	413 b
CG 3220 B2F	778 bc	48.1	51.80 a	402 bc
FM 1740 B2F	791 bc	48.1	50.70 a	402 bc
DP 1032 B2F	743 bcd	49.0	52.37 a	389 bc
ST 4288 B2F	714 bcd	45.7	51.35 a	367 bcd
ST 5458 B2F	771 bc	47.2	47.60 b	367 bcd

NG 4012 B2F	651 d	46.6	50.22 a	327 d
Mean	767	47.3	50.93	391
P>(F)	0.0043	NS	0.0142	0.0027
LSD (P=.05)	115.55	5.405	2.1967	60.68
STD DEV	67.36	3.151	1.2805	35.37
CV %	8.75	6.65	2.52	9.03

Table 6. Lint yield, turnout, loan value and lint value for Fort Bend Co RACE trial, 2011 (LSD P=0.05).

Variety	Yield	Turnout	Loan Value	Lint Value
DP 1044 B2F	1282 a	46.6 a	51.35	658 a
PHY 499 WRF	1202 ab	46.6 a	51.72	622 ab
FM 1740 B2F	1170 ab	46.9 a	51.10	599 ab
PHY 375 WRF	1121 bc	47.0 a	51.63	579 bc
CG 3787 B2F	1078 bcd	47.3 a	52.28	563 bcd
NG 4012 B2F	1003 cde	45.6 a	52.18	523 cd
DP 1032 B2F	1010 cde	47.1 a	49.77	502 d
ST 4288 B2F	954 de	43.3 b	52.28	499 d
PHY 367 WRF	950 de	46.4 a	52.00	494 d
ST 5458 B2F	949 d	45.6 a	52.00	493 d
Mean	1072	46.2	51.63	553
P>(F)	0.0002	0.0064	NS	0.0007
LSD (P=.05)	128.24	1.772	1.8687	72.52
STD DEV	74.76	1.033	1.0893	42.27
CV %	6.97	2.23	2.11	7.64

Summary

The information in this article represents only 4 of the 20 different Replicated Agronomic Cotton Evaluations (RACE) trials that were conducted in South and East-Central Texas in 2011. For information about these and other RACE trials, visit <http://varietytesting.tamu.edu>.

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