



Large-Plot Replicated Transgenic Cotton Variety Demonstration Under Drip Irrigation

Cooperator: Matt Wilmeth - 2003

Steve Young, Steve Davis, Randy Boman, Mark Stelter, and Mark Kelley
County Extension Agent-Agriculture, Extension Agent-IPM Crosby and Floyd Counties,
Extension Agronomist-Cotton, Extension Assistant-Cotton,
and Extension Program Specialist-Cotton

Crosby County

- Summary:** Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 24.5% to 27.4% for Deltapine 5415RR and Deltapine 555 BG/RR respectively. Lint yields varied from a low of 1200 lb/acre (Deltapine 5415RR) to a high of 1568 lb/acre (FiberMax 989BG/RR). Lint loan values were generally high across all varieties with a test average of \$0.5490/lb of lint. After adding lint and seed value, total value for varieties ranged from a low of \$792.53 for Deltapine 555BG/RR, to a high of \$1045.89 for FiberMax 989 BG/RR. When subtracting ginning, seed and technology fees (includes fees for Cruiser treatment (Table 3)) the net value/acre among varieties ranged from a low of \$647.36 to high of \$873.27 (Deltapine 555BG/RR and FiberMax 989BG/RR respectively), a difference of \$225.91. These data indicate that substantial differences can be obtained in terms of net value/acre due to variety and technology selection.
- Objective:** The objective of this project was to evaluate Roundup Ready and Roundup Ready/Bollgard "stacked gene" cotton varieties under drip irrigation for lint yield, selected fiber properties and economic returns.
- Materials and Methods:**
- Varieties: FiberMax 989BG/RR, Deltapine 5415RR, Deltapine 555BG/RR, Stoneville 4892BR, Stoneville 5599BR, and Suregrow 215BR
- Experimental design: Randomized complete block with 3 replications
- Seeding rate: 4.0 seed per foot of row in 40-inch row spacing (International 950 vacuum planter)
- Plot size: 6 rows by 1320 feet long
- Planting date: May 1

Weed management: Treflan at 1.5pt/acre was broadcast applied preplant and incorporated with a stalk cutter on April 3. Roundup WeatherMax was applied over-the-top on May 29 at a rate of 22 oz/acre. Buccaneer (glyphosate) was applied with a hooded sprayer on July 7 and July 28 at 1 qt/acre + ammonium sulfate (17 lb/100 gallons of spray mix).

Mepiquat pentaborate: Pentia was applied at a rate of 5 oz/acre on July 16.

Mepiquat chloride: Pix was applied at a rate of 12.8 oz/acre on August 4 and 10 oz/acre on August 13

Drip irrigation: From June 23 to September 9, a total of 17" of water was applied via drip irrigation.

Rainfall: A total of 5 inches of rainfall was acquired during the months of May and June.

Total moisture: 22.00"

Insecticides: Acephate was applied in a band at 2.0 oz/acre on May 29. Dimethoate was applied in a band at .75 pt/acre on June 22, July 10 and July 16. No additional insecticides were required. This location is in an active boll weevil eradication zone, but no applications were made by the Texas Boll Weevil Eradication Program.

Fertilizer management: Using liquid fertilizer, 120 lbs of N, 30 lbs of P and 60 oz of Zinc were applied during the growing season via the drip system.

Harvest aids: Prep at 1.3 pt/acre and Def at 1.3 pt/acre were applied on October 23 followed by Gramoxone Max at 22 oz/acre on November 4. Harvest aids were applied aerially.

Harvest: Plots were harvested on November 20 using a commercial John Deere 484 stripper. Harvested material was dumped into a weigh wagon with integral digital scales to determine individual plot weights. Plots yields were adjusted to lb/acre.

Gin turnout: Grab samples were taken by plot and ginned at the Texas A&M Center at Lubbock to determine gin turnouts.

Fiber analysis: Lint samples were submitted to the International Textile Center (ITC) at Texas Tech University for HVI analysis, and USDA loan values were determined for each variety by plot.

Ginning costs and seed values: Ginning costs are based on \$2.25 per cwt. of bur cotton and seed values are based on \$125 per ton. Ginning costs do not include checkoff.

Seed, tech fees and insecticide costs: Systems cost was determined by variety per acre using manufacturer's suggested retail price for seed, appropriate technology fees for Bollgard and/or Roundup Ready based on 4.0 seed per foot of row, and costs associated with Cruiser treated seed.

Results and Discussion:

Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 24.5% to 27.4% for Deltapine 5415RR and Deltapine 555 BG/RR respectively. Lint yields varied from a low of 1200 lb/acre (Deltapine 5415RR) to a high of 1568 lb/acre (FiberMax 989BG/RR). Lint loan values were generally high across all varieties with a test average of \$0.5490/lb of lint. After adding lint and seed value, total value for varieties ranged from a low of \$792.53 for Deltapine 555BG/RR, to a high of \$1045.89 for FiberMax 989 BG/RR. When subtracting ginning, seed and technology fees (includes fees for Cruiser treatment (Table 3)) the net value/acre among varieties ranged from a low of \$647.36 to high of \$873.27 (Deltapine 555BG/RR and FiberMax 989BG/RR respectively), a difference of \$225.91. These data indicate that substantial differences can be obtained in terms of net value/acre due to variety and technology selection. It should be noted that inclement weather was encountered with high intensity rainfall and high wind events at this location during the growing season and prior to harvest. Picker type varieties did experience some preharvest losses due to these weather conditions. Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments.

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Table 1. Results from the drip irrigated replicated cotton variety demonstration, Wilmeth Farm, 2003.

Variety	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/tech/insecticide fee	Net value
	%	%	lb/acre	lb/acre	lb/acre	\$/lb	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre
Fibermax 989 BG/RR	26.4	44.3	5925	1568	2622	0.5627	882.01	163.89	1045.89	133.31	49.97	862.61 a
Stoneville 4892 BR	26.5	43.3	5275	1398	2281	0.5538	774.55	142.53	917.08	118.68	47.28	751.11 b
Suregrow 215 BG/RR	25.9	46.0	5369	1393	2470	0.5437	758.63	154.35	912.97	120.80	45.20	746.97 bc
Stoneville 5599 BR	24.6	41.5	5603	1379	2325	0.5575	769.02	145.32	914.33	126.08	48.16	740.10 bc
Deltapine 5415 RR	24.5	45.0	4893	1200	2199	0.5498	659.92	137.43	797.35	110.08	29.88	657.39 cd
Deltapine 555 BG/RR	27.4	44.4	4618	1263	2045	0.5267	664.71	127.82	792.53	103.90	46.70	641.93 d
Test average	25.9	44.1	5280	1367	2324	0.5490	751.47	145.22	896.69	118.81	44.53	733.35
CV, %	4.2	4.4	4.4	5.9	5.0	1.9	6.5	5.0	6.1	4.4	---	7.0
OSL	0.0504	0.1760	0.0005	0.0039	0.0016	0.0218	0.0022	0.0016	0.0019	0.0005	---	0.0043
LSD 0.05	2.0	NS	420	148	210	0.0191	88.53	13.13	99.05	9.44	---	93.13

For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level.

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference.

Note: some columns may not add up due to rounding error.

Assumes:

\$2.25/cwt ginning cost.

\$125/ton for seed.

Value for lint based on CCC loan value from grab samples and ITC HVI results.

Table 2. HVI fiber property results from the drip irrigated replicated cotton variety demonstration, Wilmeth Farm, 2003.

Variety	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32 ^{nds} inches	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
Fibermax 989 BG/RR	4.1	36.4	82.0	30.9	5.0	1.0	80.6	7.1	3.0	1.0
Stoneville 4892 BR	4.2	35.0	82.6	27.4	6.8	1.0	78.9	7.8	3.0	1.0
Suregrow 215 BG/RR	3.7	34.8	81.9	26.1	7.5	1.0	80.4	7.7	2.3	1.0
Stoneville 5599 BR	3.6	35.6	81.1	29.6	5.4	1.0	77.7	7.8	3.0	1.0
Deltapine 5415 RR	3.7	35.6	80.9	28.0	7.2	1.0	80.6	7.2	2.7	1.0
Deltapine 555 BG/RR	3.3	35.4	80.4	28.1	5.4	1.0	81.4	7.1	2.7	1.0
Test average	3.7	35.5	81.5	28.4	6.2	1.0	79.9	7.4	2.8	1.0
CV, %	4.4	0.8	0.6	4.1	13.3	---	0.7	3.0	14.2	--
OSL	0.0006	0.0009	0.0037	0.0064	0.0153	---	0.0001	0.0037	0.2946	--
LSD 0.05	0.3	0.5	0.9	2.1	1.5	---	1.0	0.4	NS	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference.

Table 3. Seed, tech fees, and insecticide costs for drip irrigated replicated cotton variety demonstration, Wilmeth Farm, 2003.

Variety	Seed/lb	Seed/50 lb bag	Ac/bag	Seed and tech fee/bag	Cruiser fee per bag	Total fees/ bag	Seed and tech fee/ac	Temik cost/acre	Total seed/tech/ insecticide cost/acre
ST 5599BR	4,650	232,500	4.45	169.90	.	169.90	38.20	9.96	48.16
FM 989BR	4,480	224,000	4.29	171.45	.	171.45	40.01	9.96	49.97
ST 4892BR	4,950	247,500	4.73	176.70	.	176.70	37.32	9.96	47.28
SG 215BG/RR	5,000	250,000	4.78	180.25	35.95	216.20	45.20	.	45.20
DP 5415RR	5,500	275,000	5.26	121.25	35.95	157.20	29.88	.	29.88
DP 555BG/RR	6,700	335,000	6.41	263.35	35.95	299.30	46.70	.	46.70

Seed drop rate 4 seed/row-ft 40-inch rows
 =52272 seed/acre