TITLE:

Replicated Conventional and Transgenic Cotton Variety Demonstration Under LEPA Irrigation, AG-CARES, Lamesa, TX, 2002.

AUTHORS:

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MATERIALS AND METHODS:

Varieties: AFD 2050, AFD Raider 202, All-Tex Atlas RR, FiberMax 958, FiberMax 989, FiberMax 989BR, Paymaster 2344BG/RR, Paymaster 1218BG/RR, Paymaster 2266RR, Paymaster 2326RR, Stoneville 4793R, Phytogen GA-161, Syngenta NK 2165C

Experimental design: Randomized complete block with 3 replications

Seeding rate: 15 lb seed/acre in 40-inch row spacing (John Deere Max Emerge vacuum planter)

Plot size: 4 rows by variable length due to circular pivot rows (340-810 ft long).

Planting date: May 10

Weed management: Treflan was applied preplant incorporated at 1 pt/acre across all varieties on March 10. No Roundup herbicide was applied on Roundup Ready varieties due to insufficient weed pressure.

Irrigation and rainfall: LEPA irrigation

April:	1.00"
May:	3.05"
June:	1.25"
July:	3.28"
August:	4.10"
September:	1.23"

Rainfall

April:	1.69"	July:	1.60"
May:	0.16"	August:	0.17"
June:	1.03"	September:	1.55"

Total moisture: 20.11"

Insecticides: Temik was applied at 3.5 lb/acre in-furrow at planting. Orthene was applied on June 6, at 2.3 oz/acre for thrips. Karate was also applied on June 10, at 2.0 oz/acre for bollworms. This location is in a active boll weevil eradication zone, but no applications were made by the Texas Boll Weevil Eradication Program.

Fertilizer management: Preplant fertilizer of 10-34-0 was applied at 100 lb/acre on April 17. An additional 90 lb N/acre (32-0-0) was fertigated in 30 lb N/acre increments during the season.

Harvest aids: Harvest aids included Boll'd (6-lb ethephon/gal) at 1 pt/acre plus Ginstar at 6 oz/acre applied at 70 percent open bolls on September 18, with a follow-up application of Gramoxone Max at 16 oz/acre on October 25.

Harvest: Plots were harvested on October 14 using a commercial John Deere 7445 with field cleaner bypassed. Harvested material was dumped into a weigh wagon with integral digital scales to determine individual plot weights. Plot 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	Ginning costs were based on $2.25 per cwt. of bur cotton and $95 per ton. Ginning costs do not include checkoff.
Systems costs:	Systems cost was determined by variety per acre using manufacturer's suggested retail prices for seed, and appropriate technology fees for Bollgard and/or Roundup Ready based on the 15 lb/acre seeding rate.

RESULTS AND DISCUSSION:

Significant differences were noted for most characteristics measured (Tables 1 and 2). Lint turnout ranged from 25.1% to 30.8%. Lint yields varied from a low of 820 lb/acre to a high of 1067 lb/acre. Lint loan values varied from a low of $0.4600/lb to a high of $0.5577/lb. Lint Loan values were generally very high, with the exception of discounts for high micronaire in some replications of Stoneville 4793R (average 5.0). Micronaire ranged from a low of 4.3 units to a high of 5.0 units. After adding lint and seed value, total value/acre for varieties ranged from a low of $516.14 to a high of $625.66. When subtracting ginning and systems costs, the net value/acre among varieties ranged from a high value of $500.53 to $416.01, a difference of $84.52. These data indicate that substantial differences can be obtained in terms of net value/acre due to variety selection. It should be noted that some inclement weather was encountered in this trial prior to harvest. Some picker type varieties did experience some preharvest losses due to weather conditions, however, high intensity rainfall and/or high wind events were not excessive. These losses were more associated with the open boll picker-type varieties (FiberMax 989, FiberMax 989BR, Paymaster 1218 BG/RR, Phytogen GA161, Stoneville 4793R, and Stoneville 4892BR) and the less-stormproof stripper type (AFD 2050). Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments. A two-year summary of lint yields, loan values and gross loan value/acre for varieties planted in both years is presented in Table 3.

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Table 1. Harvest results from the LEPA irrigated replicated cotton variety demonstration, AG-CARES, 2002.

Variety	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Systems cost	Net value	
	%	%	lb/acre	lb/acre	lb/acre	$/lb	$/acre	$/acre	$/acre	$/acre	$/acre	$/acre	
FM 989BR	28.3	42.7	3620	1025	1547	0.5383	552.18	73.48	625.66	81.46	43.67	500.53	a
FM 989	26.9	40.8	3501	942	1428	0.5525	520.30	67.84	588.14	78.76	17.91	491.47	ab
Phytogen GA161	27.4	42.8	3330	912	1427	0.5577	508.89	67.75	576.65	74.93	15.95	485.77	abc
FM 958	28.5	40.3	3251	928	1309	0.5478	508.17	62.17	570.34	73.15	17.91	479.28	abc
AFD 2050	29.4	44.5	3269	962	1453	0.5048	485.71	69.04	554.75	73.55	8.29	472.91	abc
ST 4793R	28.6	39.6	3732	1067	1476	0.4600	491.50	70.12	561.62	83.96	26.96	450.70	abcd
AFD Raider 202	25.7	46.1	3186	820	1470	0.5525	453.03	69.80	522.83	71.68	8.29	442.86	bcd
PM 2326RR	26.6	43.7	3492	930	1526	0.5012	465.98	72.48	538.46	78.57	19.50	440.40	bcd
NK 2165C	30.8	43.5	3105	957	1351	0.4757	455.67	64.15	519.82	69.85	12.18	437.79	bcd
All Tex Atlas RR	26.8	44.2	3544	948	1565	0.4853	460.82	74.33	535.15	79.73	18.19	437.23	cd
PM 1218BG/RR	30.3	42.9	3224	977	1382	0.4995	486.72	65.63	552.35	72.53	43.25	436.57	cd
PM 2266RR	25.3	42.8	3578	906	1530	0.4897	443.48	72.67	516.14	80.50	19.50	416.15	d
PM 2344BG/RR	25.1	43.4	3702	929	1605	0.4975	462.19	76.23	538.42	83.28	39.13	416.01	d
Test average	27.7	42.9	3426	946	1467	0.5125	484.20	69.67	553.87	77.07	22.36	454.44	
CV, %	2.8	2.5	5.6	5.8	5.5	2.9	6.7	5.6	6.5	5.6	--	7.1	
OSL	<0.0001	<0.0001	0.0038	0.0044	0.0046	<0.0001	0.0140	0.0047	0.0448	0.0038	--	0.0367	
LSD 0.05	1.3	1.8	321	92	137	0.0249	54.64	6.52	60.52	7.23	--	54.00	

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, LSD - least significant difference.

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

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

Assumes:

$2.25/cwt ginning cost. $95/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 LEPA irrigated replicated cotton variety demonstration, AG-CARES, 2002.

Variety	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32^{nds} inches	%	g/tex	%	grade	reflectance	yellowness	Color 1	Color 2
FM 989BR	4.5	33.9	82.8	31.8	4.5	1.3	77.4	8.2	3.0	1.0
FM 989	4.3	34.8	82.4	34.0	4.3	1.7	76.5	8.4	3.0	1.0
Phytogen GA161	4.4	35.5	83.1	33.4	4.9	1.3	77.3	8.6	3.0	1.0
FM 958	4.6	35.3	82.4	32.4	3.6	2.0	76.5	7.9	3.3	1.0
AFD 2050	4.5	33.2	81.6	30.4	5.7	1.7	76.0	8.8	3.0	1.0
ST 4793R	5.0	33.0	83.0	29.8	5.6	2.3	73.1	9.1	4.0	1.0
AFD Raider 202	4.6	35.4	83.3	34.4	4.6	2.3	74.8	8.6	3.3	1.0
PM 2326RR	4.7	33.0	83.9	32.7	5.8	2.7	73.7	8.3	4.0	1.0
NK 2165C	4.9	32.3	81.5	29.4	5.5	1.3	77.3	9.1	2.3	1.0
All Tex Atlas RR	4.6	32.0	82.2	31.4	6.0	2.3	74.6	8.5	3.7	1.0
PM 1218BG/RR	4.9	33.2	82.3	29.0	5.6	1.3	76.0	8.9	3.0	1.0
PM 2266RR	4.5	33.0	82.7	32.1	6.1	3.3	73.9	8.2	4.0	1.0
PM 2344BG/RR	4.7	33.1	82.9	31.6	6.0	3.3	73.2	7.5	4.0	1.0
Test average	4.6	33.7	82.6	31.7	5.3	2.1	75.4	8.5	3.4	1.0
CV, %	2.6	1.57	0.7	2.3	4.3	29.4	1.0	2.1	8.6	--
OSL	<0.0001	<0.0001	0.0031	<0.0001	<0.0001	0.0013	<0.0001	<0.0001	<0.0001	--
LSD 0.05	0.2	0.9	1.0	1.2	0.4	1.0	1.3	0.3	0.5	--

CV - coefficient of variation.

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

LSD - least significant difference.

Table 3. AG-CARES 2001 and 2002 common varieties' lint yield, loan value, and gross value per acre.									
	2001			2002			Average		
	Lint yield	Lint loan value	Lint value	Lint yield	Lint loan value	Lint value	Lint yield	Lint loan value	Lint value
Variety	lb/acre	$/lb	$/acre	lb/acre	$/lb	$/acre	lb/acre	$/lb	$/acre
FM 989BR	1071	0.5471	585.97	1025	0.5383	551.97	1048	0.5427	568.87
FM 958	1089	0.5485	597.45	928	0.5478	508.21	1008	0.5482	552.80
FM 989	1028	0.5575	573.25	942	0.5525	520.27	985	0.5550	546.65
AFD 2050	1024	0.5416	554.76	962	0.5048	485.65	993	0.5232	519.63
ST 4793R	993	0.5363	532.23	1067	0.4600	490.97	1030	0.4981	513.03
PM 2326RR	926	0.5075	469.82	930	0.5012	466.09	928	0.5043	467.96
PM 2266RR	830	0.5288	438.86	906	0.4897	443.80	868	0.5092	442.08
Test Average	994	0.5382	536.05	966	0.5135	495.28	980	0.5258	515.86
Maximum	1089	0.5575	597.45	1067	0.5525	551.97	1048	0.5550	568.87
Minimum	830	0.5075	438.86	906	0.4600	443.80	868	0.4981	442.08
Maximum difference	259	0.0500	158.59	161	0.0925	108.17	180	0.0569	126.79