

TEXAS A&M AGRI LIFE EXTENSION

Replicated LEPA Irrigated RACE Variety Demonstration,
Lamesa, TX - 2012

Cooperator: Lamesa Cotton Growers/Texas A&M AgriLife Research/
Texas A&M AgriLife Extension

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Dawson County

Objective: The objective of this project was to compare agronomic characteristics, yields, gin turnout, fiber quality, and economic returns of transgenic cotton varieties under LEPA irrigated production in the Texas High Plains.

Materials and Methods:

Varieties: All-Tex Nitro-44 B2RF, Deltapine 0912B2RF, Dyna-Gro 2570B2RF, FiberMax 2484B2F, NexGen 1511B2RF, NexGen 4012B2RF, PhytoGen 499WRF, and Stoneville 5458B2RF

Experimental design: Randomized complete block with three (3) replications.

Seeding rate: 4.0 seed/row-ft in 40 inch row spacings. (John Deere MaxEmerge XP Vacuum planter)

Plot size: 4 rows by variable length (253-872 ft)

Planting date: 22-May

Weed management: Prowl H2O was applied preplant incorporated at 3 pt/acre across all varieties. Roundup PowerMax was applied over-the-top before planting at 32 oz/acre on 13-April, and at 28 oz/acre on 11-May. In-season Roundup PowerMax applications were on 20-June at 32oz plus Warrant at 3 pints/acre, 28 oz/acre on 13-July, and 32 oz on 28-August.

Irrigation: 3.75" inches of irrigation were applied preplant, with 8.4" applied during the growing season for a total of 12.15" of irrigation applied.

Rainfall: Based on the nearest Texas Tech University – West Texas Mesonet station at Lamesa, rainfall amounts were:

| | |
|--------------|------------------|
| April: 0.58" | August: 1.55" |
| May: 3.04" | September: 4.21" |
| June: 0.11" | October: 0.25" |
| July: 0.51" | |

Total rainfall: 10.25"

Insecticides: This location is in an active boll weevil eradication zone, but no applications were made by the Texas Boll Weevil Eradication Program.

Fertilizer management: Soil test results prior to planting accounted for 107 lbs N available in the soil. An additional 52 lbs N was applied during the growing season for a total of 159 lbs N/acre.

Plant growth regulators: None were applied at this location.

Harvest aids: Harvest aids included 3 pt/acre Prep + 2.0 oz/acre ET with 1% v/v crop oil on 3-October followed by 1 qt/acre Gramoxone Inteon with 0.25% v/v NIS on 17-October.

Harvest: Plots were harvested on 23-November using a commercial John Deere 9996 basket picker. Harvested material was transferred into a weigh wagon with integral electronic 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 AgriLife Research and Extension Center at Lubbock to determine gin turnouts.

Fiber analysis: Lint samples were submitted to the Texas Tech University – Fiber and Biopolymer Research Institute for HVI analysis, and USDA Commodity Credit Corporation (CCC) loan values were determined for each variety by plot.

Ginning cost and seed values: Ginning cost were based on \$3.00 per cwt. of bur cotton and seed value/acre was based on \$250/ton. Ginning cost did not include check-off.

Seed and Technology fees: Seed and technology costs were calculated using the appropriate seeding rate (4.0 seed/row-ft) for the 40-inch row spacing and entries using the online Plains Cotton Growers Seed Cost Comparison Worksheet available at: <http://www.plainscotton.org/Seed/PCGseed12.xls> .

Results and Discussion:

Agronomic data including plant population, nodes above white flower (NAWF) and final plant map data are included in Tables 1-3.

Significant differences were noted for some yield and economic parameters (Table 4). Picker harvested lint turnout ranged from a low of 34.6% for All-Tex Nitro-44 B2RF to a high of 38.7% for PhytoGen 499WRF. Seed turnouts averaged 52.9 with a high of 54.7 for Stoneville 5458B2RF and low of 50.1 for NexGen 1511B2RF. There were no significant differences in bur cotton yield and the test average was 1876 lb/acre. Lint yields were significant (alpha 0.10) and ranged from a low of 533 lb/acre (NexGen 4012B2RF) to a high of 782 lb/acre (Stoneville 5458B2RF and NexGen 1511B2RF). Lint loan values ranged from a low of \$0.4837/lb to a high of \$0.5747/lb for Deltapine 0912B2RF and FiberMax 2484B2F, respectively. Lint value was not significant with a test average of \$367.83/acre. When subtracting ginning and seed and technology costs, the net value/acre averaged \$361.08, and no significant differences were observed among varieties.

Significant differences were observed for most fiber quality parameters at this location (Table 5). Micronaire values ranged from a low of 4.2 for All-Tex Nitro-44B2RF to a high of 5.2 for Deltapine 0912B2RF. Staple averaged 35.0 across all varieties with a low of 32.9 (Deltapine 0912B2RF) and a high of 37.5 (All-Tex Nitro-44 B2RF). Uniformity was not significant and averaged 81.8%. Strength ranged from a low of 29.3 g/tex for Deltapine 0912B2RF to a high of 35.4 g/tex for All-Tex Nitro-44 B2RF. Significant differences were observed among varieties for percent elongation (10.3% avg), Rd or reflectance (75.9 avg), and +b or yellowness (9.1 avg). Leaf grades were mostly 1 and 2, and color grades were mostly 31.

These data indicate that substantial differences can be obtained in terms of net value/acre due to variety selection. Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments.

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Disclaimer Clause:

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Table 1. Inseason plant measurement results from the picker harvested Dawson County irrigated RACE variety demonstration, AG-CARES Farm, Lamesa, TX, 2012.

| Entry | Plant population | | Nodes Above White Flower (NAWF) for week of | | | |
|-----------------------|------------------|-------------|---|--------|--------|--------|
| | plants/row ft | plants/acre | 19-Jul | 27-Jul | 3-Aug | 10-Aug |
| NexGen 1511B2RF | 3.9 | 50,457 | 7.9 | 6.6 | 5.3 | 3.7 |
| All-Tex Nitro-44 B2RF | 4.0 | 52,272 | 7.1 | 6.4 | 4.9 | 2.6 |
| Dyna-Gro 2570B2RF | 3.8 | 49,005 | 8.1 | 7.1 | 5.1 | 3.1 |
| Deltapine 0912B2RF | 3.7 | 48,642 | 7.7 | 6.7 | 4.7 | 3.1 |
| FiberMax 2484B2F | 3.9 | 50,457 | 7.9 | 6.7 | 4.3 | 2.8 |
| NexGen 4012B2RF | 3.7 | 47,916 | 7.9 | 6.6 | 4.9 | 2.7 |
| PhytoGen 499WRF | 4.0 | 52,635 | 7.6 | 6.9 | 4.9 | 3.3 |
| Stoneville 5458B2RF | 3.7 | 47,916 | 7.2 | 7.0 | 4.9 | 2.9 |
| Test average | 3.8 | 49,913 | 7.7 | 6.8 | 4.9 | 3.0 |
| CV, % | 5.3 | 5.2 | 7.7 | 6.4 | 11.2 | 18.9 |
| OSL | 0.2892 | 0.2344 | 0.4929 | 0.5028 | 0.4692 | 0.4112 |
| LSD | NS | NS | NS | NS | NS | NS |

For NAWF, numbers represent an average of 5 plants per variety per rep (15 plants per variety)

CV - coefficient of variation.

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

LSD - least significant difference at the 0.05 level, NS - not significant

Table 2. Final plant map results from the picker harvested Dawson County irrigated RACE variety demonstration, AG-CARES Farm, Lamesa, TX, 2012.

| Entry | Final plant map 11-Oct | | | | | | |
|-----------------------|--------------------------|----------------------------------|-------------------------|----------------------|----------------------------|---------------|--|
| | plant height (inches) | node of first fruiting branch | total mainstem nodes | height to node ratio | total fruiting branches | open boll (%) | |
| All-Tex Nitro-44 B2RF | 19.9 | 7.0 | 15.9 | 1.3 | 9.9 | 96.6 | |
| Dyna-Gro 2570B2RF | 23.7 | 7.4 | 16.3 | 1.5 | 9.9 | 95.4 | |
| Deltapine 0912B2RF | 20.6 | 6.6 | 15.7 | 1.3 | 10.1 | 83.2 | |
| FiberMax 2484B2F | 21.6 | 8.4 | 16.9 | 1.3 | 9.6 | 85.4 | |
| NexGen 1511 B2RF | 24.1 | 5.8 | 15.7 | 1.5 | 10.8 | 93.6 | |
| NexGen 4012B2RF | 23.2 | 8.1 | 18.5 | 1.3 | 11.4 | 90.4 | |
| PhytoGen 499WRF | 22.2 | 7.3 | 15.8 | 1.4 | 9.5 | 92.0 | |
| Stoneville 5458B2RF | 20.2 | 7.2 | 15.5 | 1.3 | 9.3 | 89.7 | |
| Test average | 21.9 | 7.2 | 16.3 | 1.3 | 10.1 | 90.8 | |
| CV, % | 12.4 | 5.7 | 4.1 | 9.4 | 6.7 | 6.2 | |
| OSL | 0.4222 | <0.0001 | 0.0013 | 0.1265 | 0.0283 | 0.1163 | |
| LSD | NS | 0.7 | 1.2 | NS | 1.2 | NS | |

For Final plant map, numbers represent and average of 6 plants per variety per rep (18 plants per variety)

CV - coefficient of variation.

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

LSD - least significant difference at the 0.05 level, NS - not significant

Table 3. Final plant map results from the picker harvseted Dawson County irrigated RACE variety demonstration, AG-CARES Farm, Lamesa, TX, 2012.

| Entry | Fruiting and Retention 11-Oct | | | | | | |
|-----------------------|-------------------------------|------------------------------|-------------|----------------------------|----------------------------|---------------------|--|
| | % of fruit from 1st position | % of fruit from 2nd position | total fruit | 1st position retention (%) | 2nd position retention (%) | total retention (%) | |
| All-Tex Nitro-44 B2RF | 66.0 | 34.0 | 5.2 | 34.5 | 26.0 | 32.04 | |
| Dyna-Gro 2570B2RF | 78.5 | 21.5 | 6.9 | 52.8 | 22.9 | 41.05 | |
| Deltapine 0912B2RF | 69.9 | 30.1 | 8.1 | 54.7 | 33.5 | 45.67 | |
| FiberMax 2484B2F | 79.7 | 20.3 | 6.7 | 54.9 | 24.0 | 42.70 | |
| NexGen 1511B2RF | 75.2 | 24.8 | 7.9 | 51.8 | 25.7 | 40.49 | |
| NexGen 4012B2RF | 80.1 | 19.9 | 6.2 | 41.8 | 21.6 | 33.73 | |
| PhytoGen 499WRF | 77.1 | 22.9 | 6.8 | 52.5 | 24.3 | 42.05 | |
| Stoneville 5458B2RF | 71.2 | 28.8 | 6.6 | 49.2 | 28.8 | 40.96 | |
| Test average | 74.7 | 25.3 | 6.8 | 49.0 | 25.8 | 39.84 | |
| CV, % | 15.0 | 44.3 | 23.4 | 15.9 | 50.6 | 18.4 | |
| OSL | 0.7215 | 0.7215 | 0.4774 | 0.0628 [†] | 0.9640 | 0.3685 | |
| LSD | NS | NS | NS | 11.2 | NS | NS | |

For Final plant map, numbers represent and average of 6 plants per variety per rep (18 plants per variety)

CV - coefficient of variation.

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

LSD - least significant difference at the 0.05 level, [†]indicates significance at the 0.10 level, NS - not significant

Table 4. Harvest results from the picker harvested Dawson County irrigated RACE variety demonstration, AG-CARES Farm, Lamesa, TX, 2012.

| Entry | Lint | Seed | Bur cotton | Lint | Seed | Lint loan | Lint | Seed | Total | Ginning | Seed/technology | Net |
|-----------------------|---------------|---------|---------------------|---------------------|--------|-----------|--------|--------|---------------------|---------|-----------------|--------|
| | turnout | turnout | yield | yield | yield | value | value | value | value | cost | cost | value |
| | ----- % ----- | | ----- lb/acre ----- | | | \$/lb | | | ----- \$/acre ----- | | | |
| Stoneville 5458B2RF | 37.5 | 54.7 | 2086 | 782 | 1140 | 0.5340 | 417.34 | 142.51 | 559.85 | 62.58 | 76.63 | 420.64 |
| NexGen 1511B2RF | 38.2 | 50.1 | 2049 | 782 | 1026 | 0.5158 | 403.51 | 128.19 | 531.71 | 61.47 | 70.53 | 399.71 |
| PhytoGen 499WRF | 38.7 | 53.4 | 1871 | 725 | 999 | 0.5477 | 396.80 | 124.89 | 521.69 | 56.14 | 77.17 | 388.38 |
| FiberMax 2484B2F | 36.1 | 53.6 | 1871 | 675 | 1002 | 0.5747 | 387.63 | 125.22 | 512.84 | 56.12 | 76.63 | 380.10 |
| Dyna-Gro 2570B2RF | 37.0 | 53.6 | 1920 | 710 | 1030 | 0.5157 | 366.13 | 128.71 | 494.84 | 57.59 | 76.71 | 360.54 |
| Deltapine 0912B2RF | 36.5 | 53.0 | 2019 | 737 | 1071 | 0.4837 | 356.29 | 133.85 | 490.14 | 60.58 | 77.44 | 352.12 |
| All-Tex Nitro-44 B2RF | 34.6 | 52.4 | 1684 | 582 | 882 | 0.5675 | 330.38 | 110.30 | 440.68 | 50.53 | 72.80 | 317.36 |
| NexGen 4012B2RF | 35.4 | 52.6 | 1505 | 533 | 791 | 0.5337 | 284.54 | 98.89 | 383.43 | 45.14 | 68.46 | 269.82 |
| Test average | 36.7 | 52.9 | 1876 | 691 | 993 | 0.5341 | 367.83 | 124.07 | 491.90 | 56.27 | 74.55 | 361.08 |
| CV, % | 2.4 | 2.2 | 14.5 | 14.6 | 14.1 | 4.0 | 14.5 | 14.1 | 14.4 | 14.5 | -- | 17.3 |
| OSL | 0.0006 | 0.0129 | 0.2230 | 0.0750 [†] | 0.1631 | 0.0024 | 0.1223 | 0.1632 | 0.1492 | 0.2227 | -- | 0.1648 |
| LSD | 1.5 | 2.0 | NS | 145 | NS | 0.0370 | NS | NS | NS | NS | -- | NS |

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 at the 0.05 level, [†]indicates significance at the 0.10 level, NS - not significant.

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

Assumes:

\$3.00/cwt ginning cost.

\$250/ton for seed.

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

Table 5. HVI fiber property results from the picker harvested Dawson County irrigated RACE variety demonstration, AG-CARES Farm, Lamesa, TX, 2012.

| Entry | Micronaire | Staple | Uniformity | Strength | Elongation | Leaf | Rd | +b | color 1 | color 2 |
|-----------------------|------------|------------------------|------------|----------|------------|--------|-------------|------------|---------|---------|
| | units | 32 ^{nds} inch | % | g/tex | % | grade | reflectance | yellowness | color 1 | color 2 |
| All-Tex Nitro-44 B2RF | 4.2 | 37.5 | 82.7 | 35.4 | 10.3 | 2.7 | 76.4 | 8.7 | 2.7 | 1.0 |
| Dyna-Gro 2570B2RF | 5.0 | 34.1 | 81.2 | 31.3 | 10.9 | 1.0 | 75.8 | 9.5 | 2.7 | 1.7 |
| Deltapine 0912B2RF | 5.2 | 32.9 | 81.8 | 29.3 | 10.5 | 1.3 | 74.2 | 9.0 | 3.3 | 1.3 |
| FiberMax 2484B2F | 4.4 | 36.8 | 82.0 | 32.1 | 9.1 | 1.3 | 78.6 | 8.2 | 2.7 | 1.0 |
| NexGen 1511B2RF | 4.9 | 34.0 | 80.7 | 29.9 | 11.4 | 1.7 | 75.1 | 9.2 | 3.0 | 1.3 |
| NexGen 4012B2RF | 4.8 | 35.4 | 81.5 | 31.9 | 8.7 | 1.3 | 75.6 | 9.4 | 3.0 | 1.7 |
| PhytoGen 499WRF | 4.8 | 34.3 | 82.3 | 32.8 | 11.5 | 2.0 | 75.4 | 9.0 | 3.0 | 1.0 |
| Stoneville 5458B2RF | 5.0 | 34.8 | 82.0 | 31.2 | 10.0 | 2.3 | 75.7 | 9.4 | 3.0 | 1.3 |
| Test average | 4.8 | 35.0 | 81.8 | 31.7 | 10.3 | 1.7 | 75.9 | 9.1 | 2.9 | 1.3 |
| CV, % | 3.7 | 1.9 | 1.2 | 2.5 | 3.5 | 48.6 | 1.5 | 4.1 | -- | -- |
| OSL | 0.0002 | <0.0001 | 0.2910 | <0.0001 | <0.0001 | 0.2656 | 0.0153 | 0.0092 | -- | -- |
| LSD | 0.3 | 1.2 | NS | 1.4 | 0.6 | NS | 1.9 | 0.6 | -- | -- |

CV - coefficient of variation.

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

LSD - least significant difference at the 0.05 level, NS - not significant