

WEST CENTRAL TEXAS

REPLICATED AGRONOMIC COTTON EVALUATION (RACE) TRIAL REPORT



2020

TEXAS A&M
AGRI LIFE
EXTENSION

Department of
Soil and Crop Sciences
Texas A&M AgriLife
Extension Service



WEST CENTRAL TEXAS RACE TRIALS | 2020

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ACKNOWLEDGEMENTS

We extend our appreciation to **the producer cooperators** (Table 2) who provided their land, equipment, and time for preparation, planting, management, and harvesting of these trials. We also appreciate the support of Cotton Incorporated through the Texas State Support Committee, Americot, Inc. (NexGen), BASF (FiberMax & Stoneville), Bayer Crop Science (DeltaPine), and Corteva Agriscience (Phytogen) for partial funding of these trials.

ADDITIONAL RESOURCES

- General cotton production information for new cotton growers: <http://cotton.tamu.edu/index.html>
- Cotton variety trial results: <http://varietytesting.tamu.edu/cotton/>
- Other agronomy information from the Texas A&M AgriLife Extension Center at San Angelo, TX: <https://sanangelo.tamu.edu/extension/agronomy/>

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2020 OVERVIEW

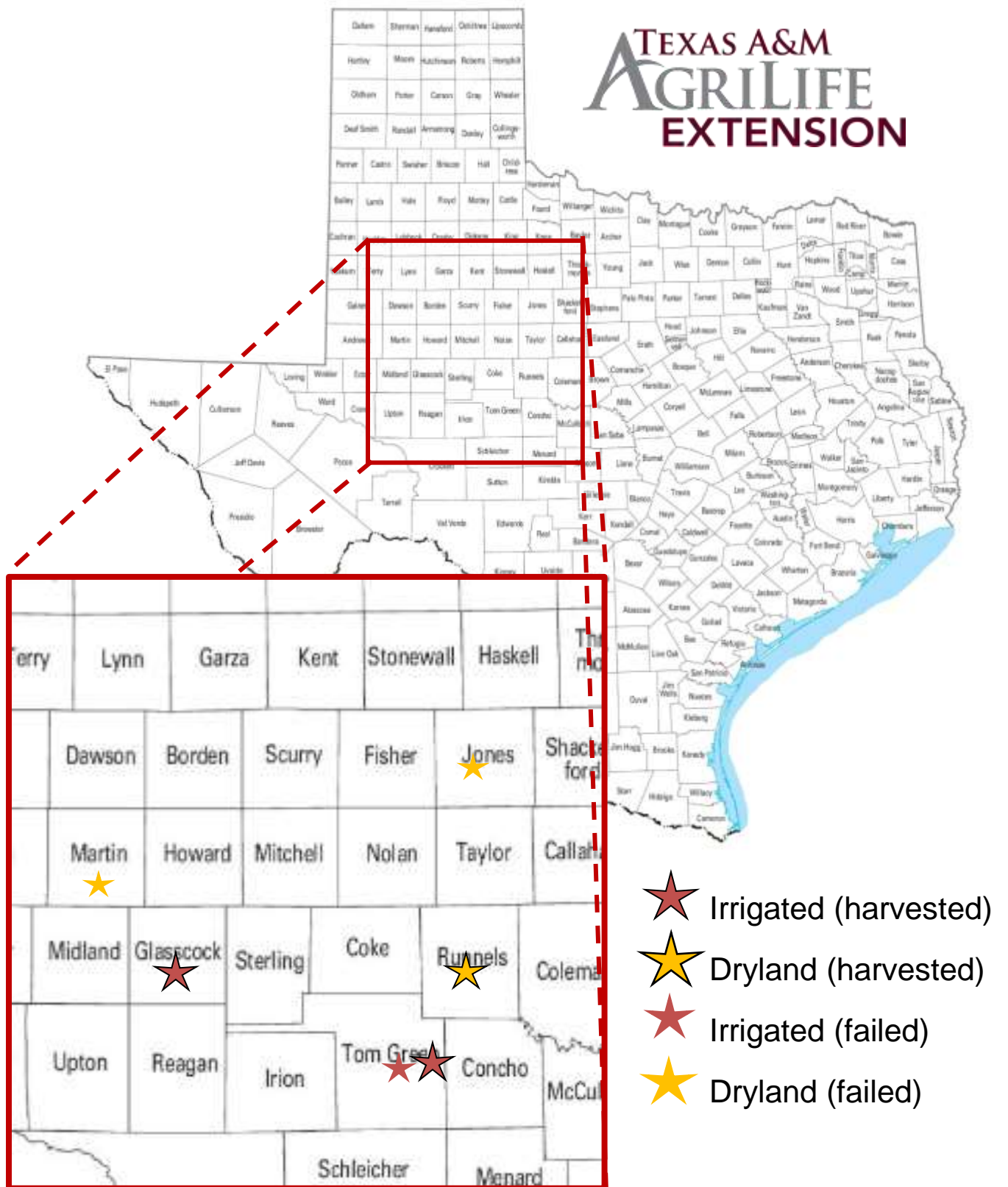
The Texas A&M AgriLife Extension Service agronomy program in San Angelo, TX managed six large-plot, on-farm, replicated variety trials across West Central Texas in 2020 (Fig. 1, Table 1). The region received near- or below-normal rainfall in April and May, followed by an extremely dry June, and generally drier-than-normal July and August (Figure 2). Establishment was challenging across the region and one site in Tom Green County failed due to insufficient emergence. Much of the dryland crop failed this year due to lack of rainfall, including RACE trial sites at Martin and Jones Counties.

All three successful sites were stripper-harvested with on-board burr extractors and seed cotton weights from each entire strip were recorded in the field. Irrigated RACE trials at Tom Green and Glasscock Counties averaged 735 and 521 lbs lint ac⁻¹, respectively, and the dryland site at Runnels County averaged 142 lbs lint ac⁻¹. These three harvested RACE trial sites provided good comparisons of variety performance relative to the year's environmental conditions and locally typical irrigation capacity.

Seed cotton subsamples from harvested locations were ginned at the Texas A&M AgriLife Research Gin at the Texas A&M AgriLife Research and Extension Center in Lubbock, TX. This is a small-scale Lummus gin with lint cleaners that affect turnout and lint quality similar to a commercial gin. HVI quality parameters (Table 1) were measured and reported by the Texas Tech University Fiber and Biopolymer Research Institute. The color, leaf grade, micronaire, length, strength, and uniformity of each sample were used to calculate loan values using the 2020 Cotton Incorporated Loan Value Calculator with a base lint value of \$0.52 lb⁻¹.

Replication and statistical analyses were used to account for variability within test sites and identify effects that can be confidently attributed to the genetic differences between varieties rather than inconsistent conditions or other sources of error. Differences were declared at $\alpha = 0.10$ (or $P < 0.10$), meaning we accept a 10% chance of declaring a false positive, and maintain a 90% chance that declared differences are true and due to the treatments. When P is greater than 0.10, no significant differences exist for that response. Significant P values are indicated by bold font in the results tables. The CV (coefficient of variation) presented in the results table for each site indicates the range of variability in the raw data. A lower CV is better and indicates a more uniform trial. The LSD (least significant difference) is the margin of variation within groups that are statistically similar, so if $P < 0.10$ and the difference between two values is greater than the LSD, then those values are statistically different. In the results for each site, LSD values are only shown if significant differences exist. Otherwise, non-significance is indicated as "n.s."

Figure 1. 2020 West Central Texas RACE Trial Locations



SITE INFORMATION

Table 1. Trial locations and details for harvested 2020 West Central Texas RACE trials.

County	Water Regime	Cooperators	County Extension Agents	Planting date	Harvest date	Rows x width	Seeding Rate (seeds ac ⁻¹)	Plot size (ac)	Soil Series §
Glasscock	Irrigated	Cole Schwartz	Brad Easterling	5/28	11/10	8 rows x 40"	36,000	0.83	Reagan Silty Clay Loam
Runnels	Dryland	Paul Minzenmayer	Marty Vahlenkamp Haley Kennedy	6/3	10/20	8 rows x 36"	28,000	2.06-2.42	Rowena Clay Loam
Tom Green	Irrigated	Kenny Gully	Josh Blaneck Haley Kennedy	6/1	11/12	8 rows x 40"	41,000	1.289	Angelo Clay Loam

§ Soil series and texture obtained from web soil survey.

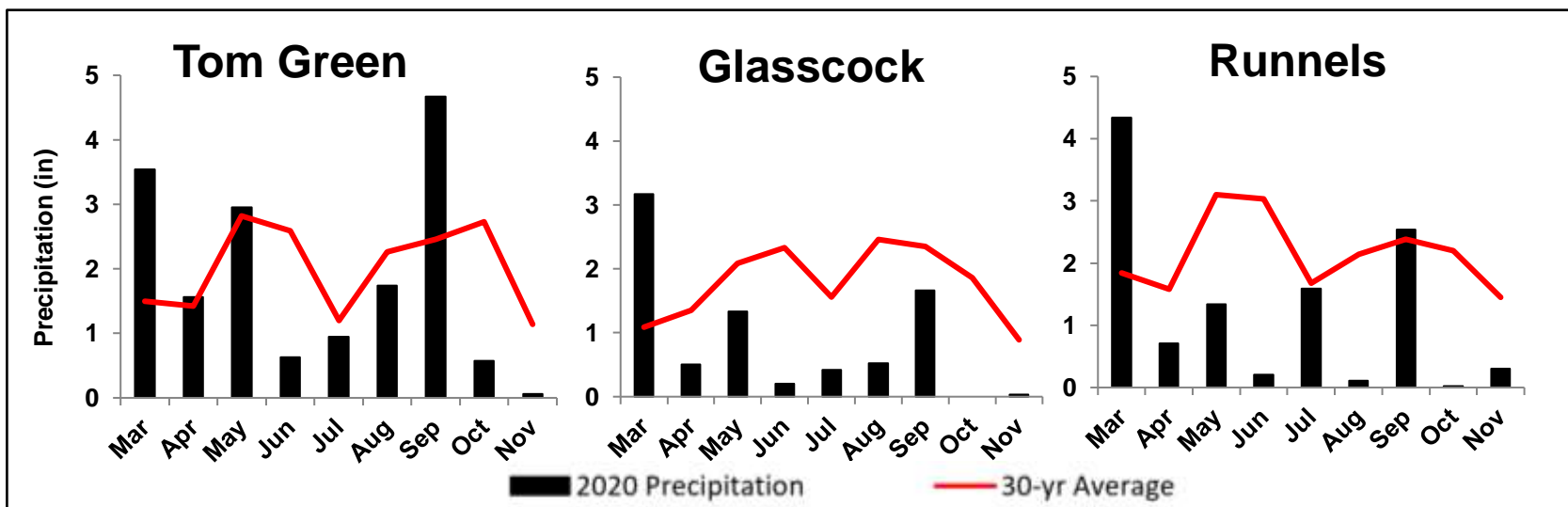


Figure 2. Season precipitation vs. 30-yr normal at each site.

VARIETY CHARACTERISTICS

Table 2. Characteristics of cotton varieties included in the 2020 RACE trials in West Central Texas. Information was obtained from seed company websites.

Variety	Maturity	Leaf Type	Plant Height	Verticilium	Bacterial Blight	Irrigated/ Dryland
DeltaPine 2020 B3XF	early-mid	semi-smooth	med-tall	mod-tol	resistant	I-D
DeltaPine 2022 B3XF	early-mid	semi-smooth	med-tall	mod-tol	resistant	D
DeltaPine 2055 B3XF	full	smooth	tall	mod-sus.	susceptible	I
FiberMax 2398 GLTP	med.	semi-smooth	med-tall	tolerant	resistant	I-D
NexGen 4098 B3XF	med.	semi-smooth	med-tall	mod-tol	mod-res	I-D
NexGen 5711 B3XF	med-full	smooth	tall	mod-sus	resistant	I-D
Phytogen 350 W3FE	early-mid	semi-smooth	med-tall	tolerant	resistant	I-D
Phytogen 480 W3FE	med.	semi-smooth	med.	susceptible	resistant	I-D
Stoneville 4990 B3XF	early-mid	semi-smooth	med.	Fair	susceptible	I
Stoneville 5707 B2XF	med-full	semi-smooth	tall	fair	resistant	D

COTTON ESTABLISHMENT BY VARIETY

Final stand counts were recorded from 10 ft of row at two locations within each strip. Stand counts were not recorded at the Glasscock County site this year.

Table 3. Final cotton stands among varieties at Tom Green County (drip irrigated)

Variety	plants/ac	% emergence
PHY480W3FE	36808	90
FM2398GLTP	35284	86
DP2020B3XF	34195	83
PHY350W3FE	33759	82
NG4098B3XF	32234	79
NG5711B3XF	32017	78
ST4990B3XF	29839	73
DP2055B3XF	26572	65
P > F	0.015	
LSD ($\alpha = 0.1$)	4101	

Table 4. Final cotton stands among varieties at Runnels County (dryland)

Variety	plants/ac	% emergence
NG4098B3XF	27104	97
PHY480W3FE	22022	79
FM2398GLTP	19844	71
DP2022B3XF	18876	67
ST5707B3XF	18150	65
PHY350W3FE	16214	58
DP2020B3XF	13794	49
NG5711B3XF	10890	39
P > F	0.0008	
LSD ($\alpha = 0.1$)	4589	

- PHY 480 W3FE, FM 2398 GLTP, DP 2020 B3XF, and PHY 350 W3FE resulted in the greatest establishment in the irrigated trial at Tom Green County (Table 3).
- NG 4098 B3XF resulted in the greatest emergence in the dryland trial at Runnels County (Table 4).

VARIETY PERFORMANCE ACROSS LOCATIONS

Table 5. Results of irrigated trials (combined) in 2020 West Central Texas RACE trials

Variety	Lint (lbs/acre)	Turnout (%)	Loan Value (cents/lb)	Lint Value (\$/acre)
FM2398GLTP	713 a	30.6 a	54.1 ab	390 a
NG4098B3XF	669 ab	25.9 c	53.9 bc	361 ab
DP2020B3XF	626 bc	27.7 b	53.2 bc	337 bc
PHY350W3FE	631 bc	27.2 bc	52.6 cd	334 bc
DP2055B3XF	584 c	29.7 a	55.6 a	326 c
NG5711B3XF	589 c	29.7 a	54.3 ab	321 c
ST4990B3XF	586 c	27.3 bc	54.4 ab	321 c
PHY480W3FE	622 bc	26.7 bc	51.1 d	320 c
<i>P</i> > <i>F</i>	0.002	0.0002	0.0012	0.0057
LSD ($\alpha = 0.1$)	73	1.7	1.5	31

- FM 2398 GLTP and NG 4098 B3XF resulted in the greatest lint yield and value across irrigated locations (Table 5).
- DP 2055 B3XF, ST 4990 B3XF, NG 5711 B3XF, and FM 2398 GLTP, were among the highest cotton loan value (Table 5).

Tom Green County Irrigated RACE Trial - 2020

Variety	Lint (lbs/ac)	Turnout (%)	Mic	Length (in)*	Strength (g/tex)	Uniformity	Color	Leaf	Loan Value (¢/lb)	Lint Value (\$/ac)
FM2398GLTP	872	31.3	4.6	1.13	29.8	82.1	21,11,21	1,2,1	56.3	491
DP2020B3XF	757	28.7	3.9	1.11	28.4	80.9	21,21,11	1,1,1	55.8	423
NG4098B3XF	763	26.8	3.4	1.16	33.0	79.9	31,21,21	1,2,2	54.2	414
DP2055B3XF	720	31.6	4.2	1.14	28.5	80.1	11,11,11	1,2,1	56.2	405
PHY350W3FE	716	28.5	3.9	1.10	29.8	81.3	21,11,11	1,2,1	55.5	397
ST4990B3XF	686	29.1	4.3	1.14	28.8	81.4	11,21,11	2,1,1	56.3	387
PHY480W3FE	723	27.3	3.6	1.09	29.8	81.2	11,11,11	2,2,2	52.5	381
NG5711B3XF	640	28.5	3.9	1.11	29.6	80.8	11,21,11	1,1,1	55.8	357
P > F	0.07	0.02	<.0001	0.0007	<.0001	0.003	-	-	0.03	0.09
LSD ($\alpha = 0.1$)	108.8	2.29	0.28	0.023	1	0.76	-	-	1.8	65.8
CV (%)	10.4	5.5	4.9	1.5	2.4	0.7	-	-	2.3	11.3

† Within columns, bold values represent the uppermost grouping, and are not statistically different from each other.

*Staple (32^{nds}) = Length (in) × 32

Key Results

- FM 2398 GLTP and NG 4098 B3XF resulted in the greatest lint yields, and FM 2398 GLTP resulted in the greatest overall lint value.
- NG 4098 B3XF, DP 2055 B3XF, ST 4990 B3XF, and FM 2398 GLTP were among the greatest in fiber length.
- NG 4098 B3XF resulted in the greatest fiber strength.
- FM 2398 GLTP, ST 4990 B3XF, and PHY 350 W3FE resulted in the greatest fiber uniformity.

Glasscock County Irrigated RACE Trial – 2020

Variety	Lint (lbs/ac)	Turnout (%)	Mic	Length (in)*	Strength (g/tex)	Uniformity	Color	Leaf	Loan Value (¢/lb)	Lint Value (\$/ac)
NG4098B3XF	575	25.0	4.4	1.07	28.9	78.5	31,21,11	1,2,2	53.6	308
FM2398GLTP	554	29.9	4.5	1.04	26.7	80.0	11,11,21	1,2,1	52.0	289
NG5711B3XF	539	31.0	4.6	1.05	26.9	79.1	11,11,21	2,1,1	52.9	285
PHY350W3FE	547	26.0	4.5	1.01	25.9	79.9	21,11,21	1,1,1	49.6	272
PHY480W3FE	521	26.0	4.3	1.01	26.9	79.5	11,11,21	2,2,1	49.6	259
ST4990B3XF	486	25.5	4.5	1.06	26.2	79.7	21,11,21	1,2,1	52.4	256
DP2020B3XF	495	26.6	4.3	1.05	24.7	78.7	11,21,11	1,1,2	50.6	251
DP2055B3XF	449	27.8	4.7	1.10	28.2	80.0	11,11,11	2,1,2	55.0	247
P > F	0.38	0.003	0.92	0.005	0.04	0.36	-	-	0.08	0.59
LSD ($\alpha = 0.1$)	n.s.	2.35	n.s.	0.033	1.9	n.s.	-	-	3.1	n.s.
CV (%)	12.8	6.1	8.3	2.2	5	1.2	-	-	4.2	15

† Within columns, bold values represent the uppermost grouping, and are not statistically different from each other.

*Staple (32^{nds}) = Length (in) × 32

Key Results

- DP 2055 B3XF, NG 4098 B3XF, and ST 4990 B3XF resulted in the greatest fiber length.
- NG 4098 B3XF and DP 2055 B3XF resulted in the greatest fiber strength.
- DP 2055 B3XF, NG 4098 B3XF, NG 5711 B3XF, ST 4990 B3XF, and FM 2398 GLTP resulted in the greatest loan value.
- Variety did not statistically influence lint yield, uniformity, or lint value at this site.

Runnels County Dryland RACE Trial - 2020

Variety	Lint (lbs/ac)	Turnout (%)	Mic	Length (in)*	Strength (g/tex)	Uniformity	Color	Leaf	Loan Value (¢/lb)	Lint Value (\$/ac)
DP2020B3XF	154	28.3	4.2	1.02	24.9	78.7	12,12,12	1,1,1	47.2	73
ST5707B3XF	148	23.8	4.7	1.04	29.1	79.6	13,22,22	1,2,1	49.1	72
PHY350W3FE	149	27.1	4.5	1.01	26.2	78.4	12,12,12	1,1,2	47.4	71
PHY480W3FE	155	26.0	4.6	0.96	25.4	78.8	22,12,22	1,1,1	45.0	70
FM2398GLTP	137	26.7	4.6	1.03	26.5	79.2	11,21,21	3,4,3	50.1	68
NG4098B3XF	134	23.8	4.3	1.03	28.0	78.4	22,22,32	2,2,1	49.8	67
NG5711B3XF	132	25.1	4.3	1.08	27.8	79.8	44,23,23	3,4,1	47.9	63
DP2022B3XF	130	24.4	4.4	1.00	23.8	78.7	21,21,21	2,3,1	47.9	62
P > F	0.38	0.13	0.004	0.0002	0.0001	0.45	-	-	0.16	0.73
LSD ($\alpha = 0.1$)	n.s.	n.s.	0.21	0.03	1.4	n.s.	-	-	n.s.	n.s.
CV (%)	11.5	8.1	3.4	2.1	3.8	1.1	-	-	4.3	12.6

† Within columns, bold values represent the uppermost grouping, and are not statistically different from each other.

*Staple (32^{nds}) = Length (in) × 32

Key Results

- NG 5711 B3XF resulted in the greatest fiber length.
- ST 5707 B3XF, NG 4098 B3XF, and NG 5711 B3XF resulted in the greatest fiber strength.
- Variety did not statistically influence yield, uniformity, loan value, or lint value at this site.



<http://cotton.tamu.edu/>

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Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Edward G. Smith, Director, Texas A&M AgriLife Extension Service, The Texas A&M University System.

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