

# TEXAS PEANUT VARIETY TRIALS | 2022



# TEXAS PEANUT VARIETY TRIAL | 2022

## CONTRIBUTING AUTHORS

Dr. Emi Kimura	State Peanut Specialist	AgriLife Extension, Vernon, TX
Dr. John M. Cason	Peanut Breeder	AgriLife Research, Stephenville, TX
Dr. Katie Lewis	Soil Chemistry and Fertility Scientist	AgriLife Research, Lubbock, TX
Dr. Paul DeLaune	Environmental Soil Scientist	AgriLife Research, Vernon, TX
Brian D. Bennett	Research Associate	AgriLife Research, Stephenville, TX
Dwayne Drozd	Technician	AgriLife Research, Yoakum, TX
Dane Leija	Technician	AgriLife Extension, Vernon, TX
TJ Payne	Extension Demonstration Assistant	AgriLife Extension, Vernon, TX
Jonathan Ramirez	Extension Program Specialist I	AgriLife Extension, Corpus Christi, TX
Ira Yates	Technician	AgriLife Extension, Lubbock, TX
Mike Berry	County Extension Agent	AgriLife Extension, Comanche Co., TX
Dale Rankin	County Extension Agent	AgriLife Extension, Atascosa Co., TX
Brianna Gonzales	County Extension Agent	AgriLife Extension, Frio Co., TX
Kenny Patterson	County Extension Agent	AgriLife Extension, Collingsworth Co., TX

## ACKNOWLEDGEMENTS

Appreciation is expressed to the cooperators who provided their land, equipment, and time in assisting for preparation, planting, field management, and harvesting of these plots throughout the year. We would like to extend our appreciation to **National Peanut Board** through the **Texas Peanut Producers Board** for their funding of these trials. Finally, we appreciate peanut industry for providing support for the trials.

## 2022 HIGHLIGHT

According to the USDA National Agricultural Statistics Service, the 2022 average yield was 2,800 lb/ac in TX. The 2022 planted acres were 160,000 acres as compared to 170,000 acres in 2021. Harvested acres were 120,000 acres, down 42,000 acres as compared to 162,000 acres in 2021. The 2022 growing season started with extreme drought condition, which continued throughout the season. High summer heat accelerated the water loss through plant and soil surfaces (Table 2 and 3). Irrigation was running continuously, where available, to provide the water needed for the growth of peanut. Farms without adequate irrigation water had to abandon the crop due to the extreme drought conditions. According to the FSA crop acreage data (January 12, 2023), 29,916 acres were reported as failed acres (Table 1). Rainfall started in October and November, which provided another challenge to the season by limiting the harvesting window. Although in-season pest pressure was lower than average, above average pod rot incidents were observed in the fields where fungicide was not applied. Overall, 2022 season was very challenging year for peanut growers in Texas with increased input cost, supply chain issues, and extreme drought conditions.

Table 1. Sum of planted acres and failed acres by peanut market type in 2022 (FSA, January 12, 2023)

Market type	Sum of planted acres	Sum of failed acres
Runner	32941	5053
Virginia	32609	5162
Spanish	31919	19291
Valencia	26674	410
Total	124,143	29,916

**Weather information for peanut production region in Texas**

**Table 2. Heat unit (DD56 and ceiling at 95F) for peanut production region in Texas during 2018-2022. Data were obtained from NOAA (<https://www.noaa.gov/>)**

	May	Jun	Jul	Aug	Sep	Oct	May- Sep	Date of the first killing frost
<b>Memphis</b>								
2022	498	655	872	776	618	224	3642	11/12
2021	338	651	743	750	655	220	3137	11/19
2020	476	720	848	812	455	237	3311	10/24
2019	344	613	777	808	699	181	3241	10/12
2018	636	727	808	756	546	171	3473	10/15
5 yr average	458	673	810	780	595	207	3361	
<b>Seminole</b>								
2022	610	713	839.5	755	589.5	245.5	3752.5	11/12
2021	424	664	680	691	579	262	3038	11/18
2020	515	637	823	792	451	282	3218	10/27
2019	387	575	628	801	626	233	3017	10/27
2018	630	747	772	722	460	215	3331	10/16
5 yr average	513	667	749	752	541	248	3271	
<b>Stephenville</b>								
2022	678	834	935	878	565	405.5	4295.5	11/12
2021	434	729	809	834	711	420	3517	12/7
2020	597	749	878	864	541	346	3629	10/26
2019	536	719	841	891	770	351	3757	10/31
2018	688	835	894	846	633	333	3896	11/12
5 yr average	587	773	871	863	644	371	3819	
<b>San Antonio</b>								
2022	858	863	920.5	903	808	538.5	4891	N/A
2021	669	524	864	920	815	640	3792	N/A
2020	654	747	884	862	659	512	3806	12/1
2019	713	810	909	955	891	508	4278	11/1
2018	791	891	915	922	792	513	4311	11/13
5 yr average	737	767	899	912	793	542	4216	

**Table 3. Monthly precipitation (inch) for the peanut production region in Texas during 2018-2022. Data were obtained from NOAA.**

	Apr	May	Jun	Jul	Aug	Sep	Apr-Sep
<b>Seminole</b>							
2022	0.32	0.35	1.39	0.10	0.94	0.05	3.15
2021	1.86	2.73	3.76	2.24	2.97	0.48	14.04
2020	0.00	0.03	0.02	0.62	0.34	0.92	1.93
2019	4.35	1.29	2.55	1.91	0.04	3.42	13.56
2018	0.00	0.63	1.91	3.32	2.30	3.50	11.66
5 yr average	1.31	1.01	1.93	1.64	1.32	1.67	8.87
<b>San Antonio</b>							
2022	0.26	1.73	0.00	0.00	1.92	0.53	4.44
2021	1.89	5.00	5.01	5.08	4.63	1.00	22.61
2020	1.58	6.50	1.78	1.33	0.51	2.45	14.15
2019	2.73	2.92	8.11	0.28	0.02	0.68	14.74
2018	1.08	1.81	0.60	2.45	2.30	10.39	18.63
5 yr average	1.51	3.59	3.10	1.83	1.88	3.01	14.91
<b>Stephenville</b>							
2022	0.17	2.43	2.10	0.58	0.42	0.77	6.47
2021	3.86	8.65	4.58	2.31	1.86	0.07	21.33
2020	0.51	2.17	2.86	2.00	0.60	7.92	16.06
2019	6.18	7.83	3.08	1.64	1.76	0.12	20.61
2018	0.25	2.81	0.19	1.95	2.89	6.25	14.34
5 yr average	2.19	4.78	2.56	1.70	1.51	3.03	15.76
<b>Memphis</b>							
2022	0.24	2.51	0.65	0.00	2.97	0.17	6.54
2021	0.42	4.20	6.28	4.15	1.96	0.56	17.57
2020	0.34	1.24	3.57	0.80	2.79	1.47	10.20
2019	3.03	4.68	2.78	3.64	1.47	2.15	17.75
2018	0.57	4.52	3.71	1.24	1.63	4.12	15.79
5 yr average	0.92	3.43	3.40	1.97	2.16	1.69	13.57

2022 state-wide peanut variety trial

West Texas Lubbock  
 Cooperator TAMU  
 Planted on 5/4/2022  
 Dug on 11/4/2022  
 Harvested on 11/16/2022  
 Disease Low disease pressure  
 First killing frost 11/12/2022

184 DAP

ELK: Extra large kernels  
 DK: Damaged kernels  
 OK: Other kernels  
 TSMK: Total Sound Mature Kernels

Lubbock		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
RUNNER	Release	Yield	Yield	Yield	%	%	%	%
<i>DGX 17-1-0517</i>	IPG	4469	-	-	69	26	1	2
<i>IPG QR-14</i>	IPG	4008	4352	3674	63	6	3	6
<i>TP200606-3-10</i>	TAMU	3990	-	-	66	20	2	4
<i>TxL100212-03-03</i>	TAMU	3981	3193	3264	68	20	3	3
<i>Tx144370</i>	TAMU	3938	3171	3247	67	12	2	4
<i>IPG 914</i>	IPG	3868	4304	3993	64	16	4	4
<i>ARSOK R93-1</i>	OK	3859	-	-	68	21	4	3
<i>GA 09B</i>	GA	3607	3877	3665	67	21	3	4
<i>NemaTAM II</i>	TAMU	3502	3058	3279	67	26	3	3
<i>ARSOK R95-1</i>	OK	3372	-	-	62	26	6	3
<i>GA16HO</i>	GA	3337	2601	2770	62	26	6	3
<i>DGX 17-1-0518</i>	IPG	3311	-	-	66	22	2	3
<i>Lariat</i>	OK	3223	3790	3784	66	11	3	4
<i>AG18</i>	TAMU	3189	3045	3017	66	10	2	3
Means		3690	3488	3410	66	19	3	4
CV		22	13	15	7	33	80	39
P0.1		NS	0.001	14.5438	NS	NS	NS	NS

Highlighted values are significantly same as the highest value at P<0.1

Lubbock		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
SPANISH	Release	Yield	Yield	Yield	%	%	%	%
<i>SPan17</i>	ACI	3250	3807	-	61	4	3	4
<i>IPG 3628</i>	IPG	3232	3589	3456	66	7	3	4
<i>AT 9899</i>	AgraTech	2980	2997	-	65	6	2	4
<i>OLe</i>	OK	2884	3136	2834	64	10	2	2
<i>Schubert</i>	TAMU	2875	-	-	60	8	2	3
<i>TAMNUT OL06</i>	TAMU	2701	-	-	63	11	3	2
<i>Georgia-SP/RKN</i>	UGA	2657	-	-	64	9	2	3
Means		2940	3382	3145	63	8	2	3
CV		13	11	11	4.48358	42.97325	41.7946	21.15377
P0.1		NS	0.0969	0.0869	NS	NS	NS	0.0099

Highlighted values are significantly same as the highest value at P<0.1

Lubbock		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
VIRGINIA	Release	Yield	Yield	Yield	%	%	%	%
<b>ACI 442</b>	IPG	4487	4130	4103	54	12	7	2
<b>Wynne</b>	NC	4069	3254	-	62	17	2	2
<b>IPG 464</b>	IPG	3790	3298	3250	60	22	6	2
<b>Contender</b>	OK	3764	2927	2660	65	33	4	1
<b>Comrade (ARSOK)</b>	OK/NC	3459	-	-	56	21	4	1
Means		3914	3402	3338	59	21	5	2
CV		19	18	7	29	25	20	53
P0.1		NS	NS	0.0006	NS	0.0066	NS	NS

Highlighted values are significantly same as the highest value at P<0.1

Lubbock		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
VALENCIA	Release	Yield	Yield	Yield	%	%	%	%
<b>IPG 1288</b>	IPG	5079	4757	4083	68	23	5	2
Means		5709	4757	4083	-	-	-	-
CV		-	-	-	-	-	-	-
P0.1		-	-	-	-	-	-	-

Highlighted values are significantly same as the highest value at P<0.1

2022 state-wide peanut variety trial

Rolling Plains  
Cooperator  
Planted on  
Dug on  
Harvested on  
Disease:  
First killing frost

Collingsworth  
Rex Henard  
5/20/2022  
11/3/2022 167 DAP  
11/10/2022  
Low disease pressure  
11/12/2022

DK: Damaged kernels  
OK: Other kernels  
TSMK: Total Sound Mature Kernels

Collingsworth		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
RUNNER	Release	Yield	Yield	Yield	%	%	%
Lariat	OK	5767	5201	5485	73	0.3	2.2
TP200606-3-10	TAMU	5489	-	-	71.5	0.2	2.2
Tx144370	TAMU	5105	4454	-	71.8	0.2	2.6
TxL100212-03-03	TAMU	4517	4315	-	68.9	0.4	1.3
IPG 914	IPG	4465	4482	4584	69.7	0.3	1.7
ARSOK R95-1	OK	4378	-	-	69.8	0.8	2.9
NemaTAM II	TAMU	4254	-	-	67.9	0.4	1.7
IPG QR-14	IPG	4201	4332	4230	72	0.2	1.7
AG-18	TAMU	3424	4121	4602	69.5	0.3	2.2
GA16HO	GA	2709	3380	-	70.2	0.5	1.4
GA09B	GA	2679	3365	4157	66.8	0.4	3
ARSOK R93-1	OK	1307	-	-	68.4	0.5	1.7
Means		4025	4206	4612	70.0	0.4	2.1
CV		29	15	10	4	61	29
P0.1		0.0265	0.05	0.0332	NS	NS	0.0666

Highlighted values are significantly same as the highest value at P<0.1

Collingsworth		2021	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
SPANISH	Release	Yield	Yield	Yield	%	%	%
IPG 3628	IPG	4025	4466	-	79.1	0.1	1
SPan17	ACI	3507	4282	-	77.6	0.1	1.1
OLe	OK	3110	2978	3116	75	0.1	1.1
AT 9899	AgraTech	3054	3054	-	76.6	0.2	1.1
ACI 236	IPG	2074	2282	3251	78.8	0.2	1.3
Means		3154	3412	3184	77	0	1
CV		14	21	13	2	104	31
P0.1		0.0031	0.0182	NS	0.0469	NS	NS

We were unable to harvest the 2022 Spanish market-type trial due to an issue in a combine

Highlighted values are significantly same as the highest value at P<0.1

Collingsworth		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
VIRGINIA	Release	Yield	Yield	Yield	%	%	%
IPG 464	IPG	4881	3831	-	72.1	0	0.8
ACI 442	ACI	4831	4454	4673	69.8	0.6	1.2
Wynne	NC	4465	3766	-	66.9	0.1	1.2
Contender	OK	4456	3838	4012	69.4	0.2	1.3
Comrade (ARSOK/NCEX17)	NC	4404	-	-	68.9	0.2	0.4
Means		4607	3972	4343	69.4	0.22	0.98
CV		18	16	16	7	113	32
P0.1		NS	NS	NS	NS	NS	0.0698

Collingsworth		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
VALENCIA	Release	Yield	Yield	Yield	%	%	%
<b>IPG 1288</b>	IPG	4905	3990	3875	71.7	0.2	1.2
Means		4905	3990	3875	71.7	0.2	1.2
CV		-	-	-	-	-	-
P0.1		-	-	-	-	-	-

2022 state-wide peanut variety trial

Rolling Plains Haskell  
 Cooperator Larry Short  
 Planted on 5/3/2022  
 Dug on 9/29/2022  
 Harvested on 10/6/2022  
 Disease: Below average pressure due to the drought condition  
 First killing frost 11/12/2022

149 DAP

ELK: Extra large kernels  
 DK: Damaged kernels  
 OK: Other kernels  
 TSMK: Total Sound Mature Kernels

Haskell		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
RUNNER	Release	Yield	Yield	Yield	%	%	%	%
IPG 914	IPG	5631	5553	5079	68.1	12.1	0.2	2.5
NemaTAM II	TAMU	4735	4925	4373	70.9	19.1	0.2	1.9
Lariat	OK	4654	5026	4798	69.6	16.8	0.7	2.1
Tx144370	TAMU	4582	4179	-	69.3	8.7	0.4	1.8
IPG QR-14	IPG	4421	4717	4418	67.9	4.2	1.7	2.1
GA09B	GA	4122	4548	4600	69.4	14.8	0.5	1.6
TP200606-3-10	TAMU	3969	-	-	70.6	15	0.2	1.5
GA16HO	GA	3719	3894	4176	70.9	23.7	0.2	1.5
ARSOK R93-1	OK	3678	-	-	68.8	14	0.5	1.4
TxL100212-03-03	TAMU	3646	3735	4256	69.4	16.2	0.8	1.6
ARSOK R95-1	OK	3557	-	-	69.3	9.2	0.4	1.4
AG-18	TAMU	3299	4566	4541	67.4	6.2	0.4	2.1
Means		4168	4571	4530	69.3	13.3	0.5	1.8
CV		30.0	17	13	3	37	87	33
P0.1		NS	NS	NS	NS	NS	NS	NS

Haskell		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
SPANISH	Release	Yield	Yield	Yield	%	%	%	%
IPG 3628	IPG	5380	5718	5200	69.9	3.5	0.1	1.8
Schubert	TAMU	4832	-	-	62.0	1.6	0.2	1.8
OLe	OK	4501	5023	4406	64.4	2.1	0.2	1.9
AT 9899	AgraTech	4477	-	-	65.2	1.4	0.4	1.8
Georgia-SP/RKN	UGA	4364	-	-	72.0	13.5	0.3	1.4
SPan17	ACI	3945	4937	-	69.9	3.6	0.6	1.7
TAMNUT OL06	TAMU	3703	-	-	64.6	3.1	0.3	1.0
Means		4457	5226	4803	66.9	4.1	0.3	1.6
CV		19.3	15	14	2	41	68	35
P0.1		NS	NS	NS	<.0001	<.0001	NS	NS

Highlighted values are significantly same as the highest value at P<0.1



Haskell		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
VIRGINIA	Release	Yield	Yield	Yield	%	%	%	%
Comrade (ARSOK/NCEX17)	NC	5719	-	-	70.5	45.3	0.5	0.2
<b>Contender</b>	OK	5203	4925	4874	68.5	43.2	0.6	0.9
<b>Wynne</b>	NC	4961	-	-	67.7	43.6	1.2	0.7
<b>ACI 442</b>	IPG	4929	5285	4551	67.2	34.1	0.9	0.6
<b>IPG 464</b>	IPG	4876	4952	4936	65.8	36.6	1.1	1.2
Means		5138	5054	4787	67.9	40.6	0.9	0.7
CV		16.2	11	10	3.5	12.3	86.4	86.2
P0.1		NS	NS	NS	NS	NS	NS	NS

Haskell		2022	2-Yr Avg	3-Yr-Avg	TSMK	ELK	DK	OK
VALENCIA	Release	Yield	Yield	Yield	%	%	%	%
<b>IPG 1288</b>	IPG	3888	4251	4361	71	17.7	1.2	0.4
Means		-	-	-	-	-	-	-
CV		-	-	-	-	-	-	-
P0.1		-	-	-	-	-	-	-

**2022 state-wide peanut variety trial**

Central Texas    Comanche    TSMK: Total Sound Mature Kernels  
 Cooperator    Mark Allison    DK: Damaged kernels  
 Planted on    5/6/2022    OK: Other kernels  
 Dug on    9/14/2022    131    DAP    \*Updated on January 5, 2023.  
 Harvested on    9/20/2022  
 Disease:    Low disease pressure

Comanche		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
RUNNER	Release	Yield	Yield	Yield	%	%	%
<b>GA09B</b>	GA	8113	5547	6403	74.5	0.3	1.7
<b>NemaTAMII</b>	TAMU	7673	5785	-	73.6	0.2	2.8
<b>GA16HO</b>	GA	7559	5383	6437	74.3	0.3	1.7
<b>IPG QR-14</b>	IPG	7462	5487	6172	74.2	0.2	1.7
<b>AG18</b>	TAMU	7397	6006	6569	74.5	0.3	0.1
<i>Tx144370</i>	TAMU	6996	5751	-	73.2	0.4	2.0
<b>Lariart</b>	OK	6761	5743	6553	75.3	0.2	2.8
Means		7423	5672	6427	74.2	0.3	2.4
CV		5	6	8	2	89	40
P0.1		0.0098	NS	0.0063	NS	NS	NS

Highlighted values are significantly same as the highest value at P<0.1

Comanche		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
SPANISH	Release	Yield	Yield	Yield	%	%	%
<b>OLe</b>	OK	6895	5416	6020	70.0	0.0	2.3
<b>Span17</b>	ACI	6877	5188	-	74.6	0.2	2.7
<b>AT9899</b>	AgraTech	6697	5193	-	69.7	0.2	3.1
Means		6823	5266	-	71.4	0.2	2.7
CV		8	11	-	1	79	29
P0.1		NS	NS	-	0.0011	NS	NS

Highlighted values are significantly same as the highest value at P<0.1

Comanche		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
VIRGINIA	Release	Yield	Yield	Yield	%	%	%
<b>Contender</b>	OK	6977	5857	6128	74.6	0.2	2.6
<b>ACI 442</b>	ACI	6803	5833	6560	68.9	0.3	1.8
Means		6890	5845	6344	71.8	0.2	2.2
CV		15	11	5	3	132	62
P0.1		NS	NS	NS	0.0273	NS	NS

**2022 state-wide peanut variety trial**

<b>South Texas</b>	<b>Frio</b>				ELK: Extra large kernels
<b>Cooperator</b>	<b>Grayson Wilmeth</b>				DK: Damaged kernels
<b>Planted on</b>	<b>5/31/2022</b>				OK: Other kernels
<b>Dug on</b>	<b>10/25/2022</b>	<b>147</b>	<b>DAP</b>		TSMK: Total Sound Mature Kernels
<b>Harvested on</b>	<b>10/31/2022</b>				<i>*Updated on January 5, 2023.</i>
<b>Disease:</b>	<b>Minor leaf spot</b>				

STX		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
RUNNER	Release	Yield	Yield	Yield	%	%	%
<b>TP200606-3-10</b>	TAMU	4927	-	-	-	-	-
<b>Tx144370</b>	TAMU	4608	4580	-	-	-	-
<b>TxL10212-03-03</b>	TAMU	4453	5380	4958	-	-	-
<b>AG18</b>	TAMU	4375	5071	5205	-	-	-
<b>IPG 914</b>	IPG	4153	4446	4575	-	-	-
<b>Georgia 09B</b>	GA	4114	4635	4996	-	-	-
<b>NemaTam II</b>	TAMU	3988	4543	-	-	-	-
<b>Georgia 16HO</b>	GA	3262	-	-	-	-	-
Means*		4235	4776	4934			
CV		17	13	13			
P0.1		NS	NS	NS			

STX		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
SPANISH	Release	Yield	Yield	Yield	%	%	%
<b>AT 9899</b>	AgraTech	4230	-	-	-	-	-
<b>SPan17</b>	ACI	3920	3220	-	-	-	-
<b>IPG 3628</b>	IPG	3901	3817	-	-	-	-
<b>Georgia-SP/RKN</b>	UGA	3223	-	-	-	-	-
<b>OLe</b>	OK	3098	3186	3482	-	-	-
<b>Schubert</b>	TAMU	3098	-	-	-	-	-
<b>TP200652-1-1</b>	TAMU	2865	-	-	-	-	-
<b>Olin</b>	TAMU	2633	-	-	-	-	-
Means*		3371	3407.7	-			
CV		15.9428	8.417581	-			
P0.1		0.0202	0.0614	-			

Highlighted values are significantly same as the highest value at P<0.1

STX		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
VIRGINIA	Release	Yield	Yield	Yield	%	%	%
Comrade (ARSOK/NCEX17)	NC/OK	4724	-	-	-	-	-
<b>Contender</b>	OK	4279	4452	4468	-	-	-
Means*		4502	-	-			
CV		13.64496	-	-			
P0.1		NS	-	-			

Highlighted values are significantly same as the highest value at P<0.1

STX		2022	2-Yr Avg	3-Yr-Avg	TSMK	DK	OK
VALENCIA	Release	Yield	Yield	Yield	%	%	%
<b>IPG 1288</b>	IPG	3707	-	-	-	-	-
<b>TamVal OL14</b>	TAMU	1878	3520	3647	-	-	-
Means*		2792.5	-	-			
CV		17.28691	-	-			
P0.1		0.0097	-	-			

Highlighted values are significantly same as the highest value at P<0.1

TEXAS A&M  
**AGRI**LIFE  
RESEARCH | EXTENSION

<http://varietytesting.tamu.edu/peanuts/>



The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by Texas AgriLife Extension Service is implied.

Texas A&M AgriLife Extension Service are equal opportunity employers and program providers.

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. Dr. Rick Avery, Director, Texas A&M AgriLife Extension Service, The Texas A&M University System.

