FINAL REPORTS FOR NATIONAL PEANUT BOARD PROJECTS SPONSORED IN 2022

(AGRONOMY AND PLANT PATHOLOGY)

I. Abstract

Project Title
Improving Texas Peanut Grower Profitability

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Summary:
In an effort to improve grower profitability, Texas A&M AgriLife Research and Extension Services in cooperation with the Texas Peanut Producers Board conducted applied peanut research trials and outreach effort in areas of ***agronomy, weed and disease management, fertility, soil health, and economic and mark et outlook***. Peanut types and varieties were tested in the four main peanut production areas of Texas. Peanuts were evaluated for yield, grade, and disease resistance. Growers have made significant improvements in peanut profitability by selecting high yielding hybrids; therefore, variety testing is the backbone of our Extension program. Growers had access to all trial information throughout the season (URL: shorturl.at/eqzW9). The results were shared with growers through tours, field days as well as published materials at AgriLife Extension Peanut website. The Development of herbicide resistance in weed population has been causing problems for peanut growers in cotton/corn rotations. Pigweed is now known to have Roundup™ and 2,4 DB resistance and testing were conducted to evaluate pre- and post-chemical controls along with application timing and rates for long-time proven controls. Peanut disease management is one of, if not the main concern for peanut growers. Outside choosing a resistant variety to plant, growers struggle with how and when to control peanut diseases. Current fungicide programs need to be updated. Research was conducted to look at fungicide chemistries, application timing and varietal resistance to help assure peanut profitability for Texas. Management of soil health and fertility is important on profitable and sustainable peanut production. Certain crops have specific nutrient requirements. To achieve the best quality and highest yields, peanut farmers must develop nutrient management plants to ensure the plant has the nutrients it needs. While all nutrients are important, calcium is one of the most important with demands being greatest during pegging. Research evaluated sources of calcium and methods of application to alleviate deficiency symptoms. Residue management and cover crop practice were evaluated for weed control, soil health parameters, and disease suppression.

II. Main Body of Report

Project Title

Improving Texas Peanut Grower Profitability

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Objectives

1. Evaluate all four market types of peanuts for agronomic performance, yields and grades in four peanut growing regions in TX;
2. Evaluate the efficacy and peanut tolerance of herbicide options and peanut variety response to herbicides;
3. Evaluate issues related to variety susceptibility/resistance to peanut diseases and/or chemical control methods;
4. Evaluate soil fertility (e.g., Ca and Mg) to alleviate deficiency symptoms;
5. Evaluate residue management for improving soil health;
6. Provide market outlook for Texas peanut growers; and
7. Conduct outreach effort to deliver results from Objective 1-6 to peanut growers.

2022 YEAR IN REVIEW

Emi Kimura, State Extension Peanut Specialist, Texas A&M AgriLife Extension, Vernon, TX

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 peanuts. 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.

RESOURCES

Texas A&M AgriLife Peanut Project Information

- Texas A&M AgriLIfe Peanut Website
  - Where?
    - http://varietytesting.tamu.edu/peanuts/
  - What?
    - All peanut Extension publications and contact information

- State-wide peanut variety testing information
  - Where?
    - shorturl.at/eqzW9
  - What?
    - State-wide variety trial information (plot map, entries, locations, planting dates etc.)

EVALUATION OF DIFFERENT PEANUT MARKET-TYPES ACROSS TEXAS

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INTRODUCTION

Variety selection is the most important decision a grower can make prior to planting. Unlike herbicide or fungicide decisions that can be changed during the season to address specific conditions and pests, variety selection is made only once, and it dictates the management of a field for the entire season. It is important to review available peanut types and varieties at your local points and select a variety that includes appropriate disease package and maturity characteristics. Texas is a unique peanut production region, where all four market-types, Runner, Spanish, Valencia and Virginia, can be grown. To assist Texas peanut producers remaining competitive in the U.S., the Texas A&M AgriLife Research and Extension has conducted on-farm replicated variety trials. A total of five locations were selected in the west Texas (1), Rolling Plains (2), central Texas (1) and south Texas (1) to evaluate Runner, Spanish, Virginia, and Valencia market-types. Trials were conducted on-farm with the help of grower collaborators.

MATERIALS AND METHODS

Studies were designed as randomized complete block design with three replications. Plot size was two rows by 25 ft length by 40 inch spacing for Rolling Plains and west Texas sites, 10 ft by 40 inch for the central Texas, and 30 ft by 40 inch for south Texas sites. Background information of all trials is listed in Table 1.

RESULTS AND DISCUSSION

Trials were planted on 3 May, 4 May, 6 May, 20 May, and 31 May on Haskell, Lubbock, Comanche, Collingsworth, and Frio County, respectively. State-wide average yields were 4720, 4398, 5006, and 4166 lb/ac for Runner, Spanish, Virginia and Valencia market-types, respectively. Among marketed Runner type varieties, numerically higher yields were observed on IPG QR-14 (4008 lb/ac) in west Texas, IPG 914 (5631 lb/ac) and Lariat (5767 lb/ac) in Rolling Plains, GA-09B (8113 lb/ac), Lariat (6761 lb/ac) and AG18 (7397 lb/ac) in central Texas, and AG18 (4375 lb/ac) in south Texas (Table 1). The overall grade was lower than average in 2022 due to the hot and dry weather. Yields and grades results for each location are found in this report and at TAMU variety testing website at http://varietytesting.tamu.edu/peanuts/.

Table 1. Average yield (lb/ac) all market-types in 2022 trial, 2-yr, and 3-yr average. Values highlighted with yellow are statistically the highest values within the year, location, and market-type at $p<0.1$.

	WTX			RP1			RP2			STX			CTX		
RUNNER	**2022**	**2-Yr**	**3-Yr**	**2022**	**2-Yr**	**3-Yr**	**2022**	**2-Yr**	**3-Yr**	**2022**	**2-Yr**	**3-Yr**	**2022**	**2-Yr**	**3-Yr**
AG18	3189	3045	3017	3299	4566	4541	3424	4121	4602	4375	5071	5205	7397	6006	6569
ARSOK R93-1	3859	-	-	3678	-	-	1307	-	-	-	-	-	-	-	-
ARSOK R95-1	3372	-	-	3557	-	-	4378	-	-	-	-	-	-	-	-
DGX 17-1-0517	4469	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DGX 17-1-0518	3311	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GA 09B	3607	3877	3665	4122	4548	4600	2679	3365	4157	4114	4635	4996	8113	5547	6403
GA16HO	3337	2601	2770	3719	3894	4176	2709	3380	-	3262	-	-	7559	5383	6437
IPG 914	3868	4304	3993	5631	5553	5079	4465	4482	4584	4153	4446	4575	-	-	-
IPG QR-14	4008	4352	3674	4421	4717	4418	4201	4332	4230	-	-	-	7462	5487	6172
Lariat	3223	3790	3784	4654	5026	4798	5767	5201	5485	-	-	-	6761	5743	6553
NemaTAM II	3502	3058	3279	4735	4925	4373	4254	-	-	3988	4543	-	7673	5785	-
TP200606-3-10	3990	-	-	3969	-	-	5489	-	-	4927	-	-	-	-	-
Tx144370	3938	3171	3247	4582	4179	-	5105	4454	-	4608	4580	-	6996	5751	-
TxL100212-03-03	3981	3193	3264	3646	3735	4256	4517	4315	-	4453	5380	4958	-	-	-
Means	3690	3488	3410	4168	4571	4530	4025	4206	4612	4235	4776	4934	7423	5672	6427
SPANISH															
AT 9899	2980	2997	-	4477	-	-	-	-	-	4230	-	-	6697	5193	-
Georgia-SP/RKN	2657	-	-	4364	-	-	-	-	-	3223	-	-	-	-	-
IPG 3628	3232	3589	3456	5380	5718	5200	-	-	-	3901	3817	-	-	-	-
OLe	2884	3136	2834	4501	5023	4406	-	-	-	3098	3186	3482	6895	5416	6020
Olin	-	-	-	-	-	-	-	-	-	2633	-	-	-	-	-
Schubert	2875	-	-	4832	-	-	-	-	-	3098	-	-	-	-	-
SPan17	3250	3807	-	3945	4937	-	-	-	-	3920	3220	-	6877	5188	-
TAMNUT OL06	2701	-	-	3703	-	-	-	-	-	-	-	-	-	-	-
TP200652-1-1	-	-	-	-	-	-	-	-	-	2865	-	-	-	-	-
Means	2940	3382	3145	4457	5226	4803	3154	3412	3184	3371	3408	3482	6823	5266	6020
VIRGINIA															
ACI 442	4487	4130	4103	4929	5285	4551	4831	4454	4673	-	-	-	4251	4557	5709
Comrade (ARSOK/NCEX17)	3459	-	-	5719	-	-	4404	-	-	4724	-	-	6803	5833	6560
Contender	3764	2927	2660	5203	4925	4874	4456	3838	4012	4279	4452	4468	6977	5857	6128
IPG 464	3790	3298	3250	4876	4952	4936	4881	3831	-	-	-	-			
Wynne	4069	3254	-	4961	-	-	4465	3766	-	-	-	-			
Means	3914	3402	3338	5138	5054	4787	4607	3972	4343	4502	4452	4468	4305	4553	5483
VALENCIA															
IPG 1288	5079	4757	4083	3888	4251	4361	4905	3990	3875	3707	-	-	-	-	-
Means	5709	4757	4083	3888	4251	4361	4905	3990	3875	3707	-	-	-	-	-

*WTX, TRP1, TRP2, CTX, and STX are west TX in Lubbock, TX Rolling Plains in Haskell, TX Rolling Plains in Collingsworth, Central TX in Comanche, and South TX in Frio County, respectively.

CONTROL OF KEY WEEDS IN SOUTH TEXAS PEANUT

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INTRODUCTION

Everman et al. (2008) found that the critical weed free period of broadleaf weed interference in peanut was approximately eight weeks after planting, thus effective early-season control is of utmost importance for maintaining yield potential. Palmer amaranth (*Amaranthus palmeri* S. Wats.) emerging with the crop is capable of out-competing peanut for sunlight, water, and nutrients and is likely to produce extremely large amounts of seed if allowed to compete season-long (Mahoney et al. 2021). Burke et al (2007) found that peanut yield was decreased 28% due to season-long competition from one Palmer amaranth individual plant per meter of row.

In studies near Yoakum, TX, Grichar (220008) found that Prowl H2O applied preplant incorporated (PPI) alone only provided 41% control of Palmer amaranth, but this was improved to 88 to 100% by adding a preemergence (PRE) application of Pursuit, diclosulam, Dual Magnum, or Outlook. In one year of a study by Dobrow et al (2011) in Florida peanut, Valor applied preemergence provided 67 days of Palmer amaranth suppression, followed by Dual Magnum + Gramoxone + 2,4-DB applied at-cracking, which provided 54 days of suppression.

In a previous study near Pearsall, TX in 2021, effective season-long control of Palmer amaranth was achieved with Prowl H2O + Valor + Dual Magnum PRE followed by Dual Magnum + 2,4-DB MPOST (98% control), Prowl H2O + Dual Magnum PRE followed by Dual Magnum + 2,4-DB MPOST (97%), Prowl H2O + Valor + Dual Magnum PRE (95%), Prowl H2O PRE followed by imazapic + 2,4-DB EPOST (92%), Prowl H2O PRE followed by Anthem Flex + 2,4-DB EPOST (88%), Prowl H2O + Dual Magnum PRE (83%), Prowl H2O + Valor PRE (78%), and Prowl H2O + Anthem Flex (78%).

The objective of this study was to evaluate the efficacy of herbicide programs for season-long control of key weed species and crop safety.

MATERIALS AND METHODS

A field study was conducted in 2022 in an irrigated peanut field near Pearsall, TX. Soil at the study site was a Miguel very fine sandy loam. The trial included fifteen treatments and was arranged as a randomized complete block with three replications. Plots were two rows (38” spacing) wide by 30 ft long. Treatments included preemergence (PRE) applications of Prowl H2O 1 qt/A either alone or in combination with Valor (2 oz/A), Dual Magnum (1.33 pt), Valor + Dual Magnum (2 or 3 oz + 1.33 pt/A), Outlook (12 oz/A), or Warrant (48 oz/A). These were followed by either at-cracking applications of Gramoxone + Zidua (16 oz + 2.0 oz/A), early postemergence (EPOST) applications of either Anthem Flex + Storm (3.5 oz + 1.5 pt/A) or Cadre + Storm (4.0 oz + 1.5 pt/A), or mid postemergence (MPOST) applications of Dual Magnum + 2,4-DB (1.33 pt + 1.6 pt/A). Applications were made with a CO2 pressurized backpack sprayer with a handheld spray boom equipped with TeeJet Drift Guard 11002 spray nozzles calibrated to deliver a total spray volume of 20 GPA. Environmental conditions at application are shown in Table 1 and photos of the study site are shown in Figures 1-3.

Table 1. Environmental conditions at applications, Pearsall, TX, 2022.

Application timing	PRE	At-cracking	EPOST	MPOST
Application date	6/12/22	6/29/22	7/11/22	7/29/22
Application start time	9:00 AM	8:30 AM	8:20 AM	8:30 AM
Air temperature (ºF)	84	76	83	79
Relative humidity (%)	67	84	63	77
Soil temperature (at 10 cm) (ºF)	86	81	86	80
Soil moisture	Good	Fair	Excellent	Excellent
Cloud cover (%)	90	40	10	40

RESULTS AND DISCUSSION

Fourteen days after the PRE applications were made, all herbicide treatments provided 97 to 100% control of Palmer amaranth, 96 to 100% control of Texas panicum, and 87 to 100% control of smellmelon (Table 2). By eighteen days after EPOST applications were made, all treatments resulted in 90 to 100% control of all three species, other than Prowl H2O alone (78, 73, and 90% control of Palmer amaranth, Texas panicum, and smellmelon) (Figure 1, Table 3).

By the final evaluation (41 days after MPOST applications), all treatments provided 90 to 100% control of Palmer amaranth, 83 to 100% control of Texas panicum, and 80 to 100% control of smellmelon, except for Gramoxone + Zidua applied at cracking (only 79% control of Palmer amaranth) (Table 4). Control of ivyleaf morningglory was greatest with Prowl + Valor + Dual Magnum PRE (Figure 2), Prowl + Dual Magnum PRE, Prowl + Valor + Dual Magnum PRE followed by Dual Magnum + Storm MPOST, Prowl + Outlook PRE, Prowl PRE followed by Gramoxone + Zidua at cracking, Prowl PRE followed by Anthem Flex + Storm EPOST, Prowl PRE followed by Cadre + Storm EPOST, Prowl + Valor + Dual Magnum PRE followed by Dual Magnum + 2,4-DB MPOST, and Prowl + Dual Magnum PRE followed by Dual Magnum + 2,4-DB MPOST.

Applications of Gramoxone + Zidua at cracking resulted in 40 to 50% stunting of peanut 12 days after those applications were made (Figure 3, Table 5). By July 29, stunting with these two treatments was estimated at 40% and crop injury became apparent with Prowl + Valor + Dual Magnum PRE followed by Dual Magnum + Storm MPOST (10%), Prowl PRE followed by Anthem Flex + Storm EPOST (22%), and Prowl PRE followed by Cadre + Storm EPOST (18%). By the final evaluation, stunting was no greater than 10% with any treatment, however visual observations made after peanuts were dug indicated a possible yield loss with treatments of Gramoxone + Zidua at cracking.

Figure 1. Prowl H2O 1.0 qt/A applied PRE.

Figure 2. Prowl H2O 1.0 qt/A + Valor 2.0 oz/A + Dual Magnum 1.33 pt/A applied PRE showing lack of peanut stunting.

Figure 3. Prowl 1.0 qt/A applied PRE followed by Gramoxone 1.0 pt/A + Zidua 2.0 oz/A applied at peanut cracking. Stunting caused by Gramoxone. Also note stunting in plot in background (same herbicide treatment).

Table 2. Weed control at 14 days after (DA) preemergence applications (%), Pearsall, TX, 2022.

Treatment	Rate/A	Timing	Palmer amaranth		Texas panicum		Smellmelon	
Nontreated			0	c	0	b	0	b
Prowl H2O	1.0 qt	PRE	99	ab	96	a	99	a
Prowl H2O Valor	1.0 qt 2.0 oz	PRE PRE	100	a	97	a	100	a
Prowl H2O Valor Dual Magnum	1.0 qt 2.0 oz 1.33 pt	PRE PRE PRE	100	a	98	a	100	a
Prowl H2O Dual Magnum	1.0 qt 1.33 pt	PRE PRE	100	a	98	a	100	a
Prowl H2O Valor Dual Magnum	1.0 qt 3.0 oz 1.33 pt	PRE PRE PRE	100	a	100	a	100	a
Prowl H2O Valor Dual Magnum Dual Magnum Storm	1.0 qt 3.0 oz 1.33 pt 1.33 pt 1.5 pt	PRE PRE PRE MPOST MPOST	100	a	97	a	100	a
Prowl H2O Outlook	1.0q t 12.0 oz	PRE PRE	100	a	100	a	100	a
Prowl H2O Warrant	1.0 qt 1.5 qt	PRE PRE	99	a	98	a	98	a
Prowl H2O Gramoxone Zidua	1.0q t 1.0pt 2.0 oz	PRE at-crack at-crack	99	ab	99	a	90	a
Prowl H2O Anthem Flex Storm	1.0 qt 3.5 oz 1.5 pt	PRE EPOST EPOST	97	b	97	a	87	a
Prowl H2O Cadre Storm	1.0 qt 4.0 oz 1.5 pt	PRE EPOST EPOST	100	a	100	a	93	a
Gramoxone Zidua	1.0 pt 2.0 oz	at-crack at-crack	0	c	0	b	0	b
Prowl H2O Valor Dual Magnum Dual Magnum 2,4-DB	1.0 qt 2.0 oz 1.33 pt 1.33 pt 1.6 pt	PRE PRE PRE MPOST MPOST	100	a	98	a	100	a
Prowl H2O Dual Magnum Dual Magnum 2,4-DB	1.0 qt 1.33 pt 1.33 pt 1.6 pt	PRE PRE MPOST MPOST	100	a	98	a	100	a

Within a column, means followed by the same letter do not significantly differ at P=0.05.

Table 3. Weed control at 18 days after (DA) EPOST applications (%), Pearsall, TX, 2022.

Treatment	Rate/A	Timing	Palmer amaranth	Texas panicum	Smellmelon
Nontreated			0 c	0 c	0 c
Prowl H2O	1.0 qt	PRE	78 b	73 b	90 b
Prowl H2O Valor	1.0 qt 2.0 oz	PRE PRE	97 a	90 ab	100 a
Prowl H2O Valor Dual Magnum	1.0 qt 2.0 oz 1.33 pt	PRE PRE PRE	98 a	93 ab	100 a
Prowl H2O Dual Magnum	1.0 qt 1.33 pt	PRE PRE	97 a	94 ab	100 a
Prowl H2O Valor Dual Magnum	1.0 qt 3.0 oz 1.33 pt	PRE PRE PRE	97 a	95 ab	100 a
Prowl H2O Valor Dual Magnum Dual Magnum Storm	1.0 qt 3.0 oz 1.33 pt 1.33 pt 1.5 pt	PRE PRE PRE MPOST MPOST	100 a	92 ab	100 a
Prowl H2O Outlook	1.0q t 12.0 oz	PRE PRE	100 a	97 a	98 a
Prowl H2O Warrant	1.0 qt 1.5 qt	PRE PRE	100 a	94 ab	96 ab
Prowl H2O Gramoxone Zidua	1.0q t 1.0pt 2.0 oz	PRE at-crack at-crack	100 a	100 a	97 a
Prowl H2O Anthem Flex Storm	1.0 qt 3.5 oz 1.5 pt	PRE EPOST EPOST	97 a	95 ab	95 ab
Prowl H2O Cadre Storm	1.0 qt 4.0 oz 1.5 pt	PRE EPOST EPOST	97 a	100 a	100 a
Gramoxone Zidua	1.0 pt 2.0 oz	at-crack at-crack	94 a	94 ab	99 a
Prowl H2O Valor Dual Magnum Dual Magnum 2,4-DB	1.0 qt 2.0 oz 1.33 pt 1.33 pt 1.6 pt	PRE PRE PRE MPOST MPOST	98 a	93 ab	100 a
Prowl H2O Dual Magnum Dual Magnum 2,4-DB	1.0 qt 1.33 pt 1.33 pt 1.6 pt	PRE PRE MPOST MPOST	97 a	94 ab	100 a

Within a column, means followed by the same letter do not significantly differ at P=0.05.

Table 4. Weed control at 41 days after (DA) MPOST applications (%), Pearsall, TX, 2022.

Treatment	Rate/A	Timing	Palmer amaranth	Texas panicum	Smellmelon
Nontreated			0 c	0 b	0 b
Prowl H2O	1.0 qt	PRE	90 ab	83 a	80 a
Prowl H2O Valor	1.0 qt 2.0 oz	PRE PRE	93 a	88 a	87 a
Prowl H2O Valor Dual Magnum	1.0 qt 2.0 oz 1.33 pt	PRE PRE PRE	99 a	96 a	99 a
Prowl H2O Dual Magnum	1.0 qt 1.33 pt	PRE PRE	95 a	92 a	99 a
Prowl H2O Valor Dual Magnum	1.0 qt 3.0 oz 1.33 pt	PRE PRE PRE	100 a	97 a	100 a
Prowl H2O Valor Dual Magnum Dual Magnum Storm	1.0 qt 3.0 oz 1.33 pt 1.33 pt 1.5 pt	PRE PRE PRE MPOST MPOST	100 a	95 a	100 a
Prowl H2O Outlook	1.0q t 12.0 oz	PRE PRE	97 a	96 a	100 a
Prowl H2O Warrant	1.0 qt 1.5 qt	PRE PRE	93 a	97 a	97 a
Prowl H2O Gramoxone Zidua	1.0q t 1.0pt 2.0 oz	PRE at-crack at-crack	98 a	100 a	97 a
Prowl H2O Anthem Flex Storm	1.0 qt 3.5 oz 1.5 pt	PRE EPOST EPOST	100 a	97 a	80 a
Prowl H2O Cadre Storm	1.0 qt 4.0 oz 1.5 pt	PRE EPOST EPOST	97 a	100 a	100 a
Gramoxone Zidua	1.0 pt 2.0 oz	at-crack at-crack	79 b	96 a	89 a
Prowl H2O Valor Dual Magnum Dual Magnum 2,4-DB	1.0 qt 2.0 oz 1.33 pt 1.33 pt 1.6 pt	PRE PRE PRE MPOST MPOST	100 a	93 a	100 a
Prowl H2O Dual Magnum Dual Magnum 2,4-DB	1.0 qt 1.33 pt 1.33 pt 1.6 pt	PRE PRE MPOST MPOST	100 a	99 a	100 a

Within a column, means followed by the same letter do not significantly differ at P=0.05.

Table 5. Herbicide injury (% stunting) to peanut, Pearsall, TX, 2022.

Treatment	Rate/A	Timing	Palmer amaranth		Texas panicum		Smellmelon	
Nontreated			0	a	0	d	0	c
Prowl H2O	1.0 qt	PRE	0	a	0	d	0	c
Prowl H2O Valor	1.0 qt 2.0 oz	PRE PRE	0	a	0	d	0	c
Prowl H2O Valor Dual Magnum	1.0 qt 2.0 oz 1.33 pt	PRE PRE PRE	0	a	0	d	0	c
Prowl H2O Dual Magnum	1.0 qt 1.33 pt	PRE PRE	0	a	0	d	0	c
Prowl H2O Valor Dual Magnum	1.0 qt 3.0 oz 1.33 pt	PRE PRE PRE	0	a	0	d	0	c
Prowl H2O Valor Dual Magnum Dual Magnum Storm	1.0 qt 3.0 oz 1.33 pt 1.33 pt 1.5 pt	PRE PRE PRE MPOST MPOST	0	a	10	c	0	c
Prowl H2O Outlook	1.0q t 12.0 oz	PRE PRE	0	a	0	d	0	c
Prowl H2O Warrant	1.0 qt 1.5 qt	PRE PRE	0	a	0	d	0	c
Prowl H2O Gramoxone Zidua	1.0q t 1.0pt 2.0 oz	PRE at-crack at-crack	40	a	40	a	18	ab
Prowl H2O Anthem Flex Storm	1.0 qt 3.5 oz 1.5 pt	PRE EPOST EPOST	0	a	22	b	13	b
Prowl H2O Cadre Storm	1.0 qt 4.0 oz 1.5 pt	PRE EPOST EPOST	0	a	18	b	0	c
Gramoxone Zidua	1.0 pt 2.0 oz	at-crack at-crack	50	a	40	a	23	a
Prowl H2O Valor Dual Magnum Dual Magnum 2,4-DB	1.0 qt 2.0 oz 1.33 pt 1.33 pt 1.6 pt	PRE PRE PRE MPOST MPOST	0	a	0	d	0	c
Prowl H2O Dual Magnum Dual Magnum 2,4-DB	1.0 qt 1.33 pt 1.33 pt 1.6 pt	PRE PRE MPOST MPOST	0	a	0	d	0	c

Within a column, means followed by the same letter do not significantly differ at P=0.05.

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Using Anthem Flex in a Peanut Weed Control Program

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INTRODUCTION

Weed management in peanut is challenging because of the prostrate growth habit of the peanut plant which allows weeds to become established if weed control practices are not properly implemented. Weed control can be influenced by the ability of peanut to compete with weeds, cultural practices that minimize the soil seed bank and weed infestation, mechanical practices such as primary tillage prior to planting, cultivation during the growing season, and also by efficacy of herbicides. Weeds interfere with peanut through direct competition for light, soil water, nutrients, essential gases, and space and can also interfere with peanut growth through allelopathy.

Anthem Flex® was released in 2020 as a premix herbicide combination produced by the FMC Corporation for use in peanut. It contains 3.733 lb ai/gal of pyroxasulfone and 0.267 lb ai/gal of carfentrazone. Pyroxasulfone is the active ingredient in Zidua® while carfentrazone is the active ingredient in Aim®. Zidua is a recently registered herbicide in the U.S. for either preplant (PP), preplant incorporated (PPI), preemergence (PRE), or early postemergence (EPOST) use in corn, cotton, peanut, soybean, and wheat. Application timing is crop specific. It controls annual grasses such as crabgrass, Coloradograss, goosegrass and crowfootgrass as well as broadleaf weeds such as the pigweed species. Although Zidua has a similar weed control spectrum as Dual Magnum and Outlook, it has a higher specific activity allowing for use rates approximately eight times lower than Outlook. Anthem Flex is presently cleared for use in corn, cotton, lentil, soybean, and wheat and was cleared for use in peanut in 2020. The objective of this research was to determine the spectrum of weed control in north-central and south Texas peanut production areas with Anthem Flex systems.

MATERIALS AND METHODS

Field studies were conducted at the Texas A&M Agrilife Research site located near Yoakum in south Texas and in Wilbarger County near Vernon in north-central Texas to evaluate weed control in peanut with Anthem Flex herbicide systems. All studies was arranged as a randomized complete block design with 3 replications at Yoakum and 4 replications at the Vernon location. An untreated check was included for comparison.

Soils at the Yoakum study site was a Tremona loamy fine sand with pH of 7.6. Plot size was 2 rows (38" spacing) by 30' long. Spray applications were made with a CO_2-pressurized backpack sprayer with a handheld boom equipped with TeeJet DG 11002 spray nozzles calibrated to deliver a total spray volume of 20 gal/A. This test was planted June 14 with Georgia 09B at the rate of 90 lbs/A and was not harvested for yield. Soil in Wilbauger County near Vernon was a Miles loamy fine sand with pH of 7.5. Plot size was 2 rows (40" spacing) by 25' long. Spray applications were similar to those at Yoakum with the exception that TTI 04 spray tips were used for the PRE application and AI 110015 spray tips were used for the CRACK and POST applications and sprays were calibrated to deliver 15 gal/A.

RESULTS AND DISCUSSION

Peanut injury. At either location, no injury was noted with Anthem Flex applied preemergence (PRE); however, postemergence (POST) applications resulted in minor leaf burn that was present for 10 to 14 days after application. The new growth did not show any effects (data not shown). Aim alone will also cause a similar type of leaf burn so this leaf burn can be attributed to the carfentrazone (Aim) in the premix.

***Weed control*.**

Texas millet. At Yoakum when evaluated 27 days after PRE treatment (DAT) any herbicide system which included Prowl H_2O PRE provided $\geq$ 84% control while systems that included Anthem Flex applied at CRACK and POST provided 83% control (Table 1). At the 126 DAT evaluation, only Prowl H_2O PRE fb (followed by) Dual II Magnum CRACK fb Anthem Flex + Select POST and Dual II Magnum + Gramoxone CRACK fb Dual II Magnum + Select POST provided $\geq$ 90% control.

Palmer amaranth. At Yoakum, when evaluated 126 DAT, all herbicide systems with the exception of Prowl H_2O fb Cadre POST provided $\geq$ 94% control (Table 1). At Vernon, when evaluated 20 days after planting (DAP), all systems provided 96% or better control (Table 2). At the 91 DAP evaluation, only Prowl H_2O fb Anthem Flex CRACK fb Anthem Flex + Select POST and Dual II Magnum + Gramoxone CRACK fb Dual II Magnum + Select POST controlled Palmer amaranth at least 85%. Prowl H_2O systems which included either Anthem Flex or Cadre POST improved peanut yield over the untreated check (Table 2).

Smellmelon. At the 27 DAT evaluation all herbicide systems, with the exception of Dual II Magnum + Gramoxone CRACK fb Anthem Flex + Select POST provided 78 to 97% control while at the 126 DAT evaluation, Prowl H_20 + Cadre POST provided 100% control while Anthem Flex systems provided 58 to 87% control (Table 1).

CONCLUSION

Anthem Flex will typically provide excellent season-long control of Palmer amaranth and smellmelon, which are broadleaf weeds that can cause Texas peanut growers considerable problems and are hard-to-control with current herbicides. This premix will control ALS- (WSSA Group 2 herbicides) and glyphosate- (WSSA Group 9 herbicides) resistant Palmer amaranth, which is becoming more widespread across the Texas peanut producing areas. Control of annual grasses such as Texas millet can be erratic and will usually require the use of a postemergence grass herbicide to provide season-long control.

Table 1. Weed control with Anthem Flex programs at Yoakum.							
Treatment[a]	**Rate**	**Appl. timing[b]**	**Texas millet**		**Palmer amaranth**	**Smellmelon**	
			Days after PRE treatment				
	Oz/A		**27**	**126**	**126**	**27**	**126**
			%				
1. Untreated	-	-	0	0	0	0	0
2. Anthem Flex + Gramoxone	3.5 + 16.0	CRACK					
Anthem Flex + Select Max	3.5 + 14.0	POST	83	79	98	89	87
3. Dual II Magnum + Gramoxone	16.0 + 16.0	CRACK					
Anthem Flex + Select Max	3.5 + 14.0	POST	74	89	98	52	58
4. Prowl H20	32.0	PRE					
Anthem Flex	3.5	CRACK					
Anthem Flex + Select Max	3.5 + 14.0	POST	96	66	99	93	86
5. Prowl H20	32.0	PRE					
Dual II Magnum	16.0	CRACK					
Anthem Flex + Select Max	3.5 + 14.0	POST	96	90	98	95	76
6. Prowl H20	32.0	PRE					
Dual II Magnum	16.0	CRACK					
Dual II Magnum + Select Max	16.0 + 14.0	POST	95	82	94	95	60
7. Dual II Magnum + Gramoxone	16.0 + 16.0	CRACK					
Dual II Magnum + Select Max	16.0 + 14.0	POST	89	93	95	78	32
8. Prowl H20	32.0	PRE					
Cadre	4.0	POST	84	75	58	97	100
LSD (0.05)			**25**	**33**	**32**	**25**	**43**

[a] All CRACK and POST treatments included Induce at 0.25% v/v.
[b] Application timing: PRE, preemergence; CRACK, peanut cracking, 10 days after plant (DAP); POST, postemergence, 29 DAP.

Table 2. Weed control and peanut yield with Anthem Flex programs at Vernon.					
Treatment[a]	**Rate**	**Appl. timing[b]**	**Palmer amaranth**		**Yield**
			DAP[c]		
	Oz/A		**20**	**91**	
			%		**Lbs/A**
1. Untreated	-	-	0	0	1555
2. Anthem Flex + Gramoxone	3.5 + 16.0	CRACK			
Anthem Flex + Select Max	3.5 + 14.0	POST	98	78	2702
3. Dual II Magnum + Gramoxone	16.0 + 16.0	CRACK			
Anthem Flex + Select Max	3.5 + 14.0	POST	99	79	2565
4. Prowl H20	32.0	PRE			
Anthem Flex	3.5	CRACK			
Anthem Flex + Select Max	3.5 + 14.0	POST	100	85	2911
5. Prowl H20	32.0	PRE			
Dual II Magnum	16.0	CRACK			
Anthem Flex + Select Max	3.5 + 14.0	POST	97	65	2918
6. Prowl H20	32.0	PRE			
Dual II Magnum	16.0	CRACK			
Dual II Magnum + Select Max	16.0 + 14.0	POST	96	35	2620
7. Dual II Magnum + Gramoxone	16.0 + 16.0	CRACK			
Dual II Magnum + Select Max	16.0 + 14.0	POST	99	88	3532
LSD (0.05)			**3**	**24**	**1347**

[a] All CRACK and POST treatments included Induce at 0.25% v/v.
[b] Application timing: PRE, preemergence; CRACK, peanut cracking, 6 days after plant ; POST, postemergence, 30 days after plant.
[c] Abbreviation: DAP, days after planting.

Peanut Response to Soil-Applied Liberty® (Glufosinate)

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INTRODUCTION

Liberty® (glufosinate) is registered for preplant burndown and postemergence weed control programs in numerous row crops but not peanut. Additionally, current labels prohibit peanut planting for 180 days after application. Therefore, the objective of this research was to evaluate the response of peanut to soil applications of Liberty in order to obtain data to change the current label.

MATERIALS AND METHODS

A study was conducted at the Texas A&M Agrilife Research site located at Yoakum to evaluate Liberty at 32.0, 64.0 and 96 oz/A applied 7 day before planting (DBP) or preemerge (PRE) immediately after planting. An untreated check was included for comparison.

Soil at the study sites was a Tremona loamy fine sand with pH of 7.6. The studies was arranged as a randomized complete block design with three replications and plot size was 2 rows (38" spacing) by 25' long. Spray applications were made with a CO2-pressurized backpack sprayer with a handheld boom equipped with TeeJet DG 11002 spray nozzles calibrated to deliver a total spray volume of 20 gal/A. This test was planted June 14 with Georgia 09B at the rate of 90 lbs/A. All plot areas were maintained weed-free using a combination of labeled herbicides and hand-weeding. Plots were dug but not combined due to rains soon after digging and persistent misty, foggy conditions for about 4 weeks after digging. Also, crows were beginning to find the plots after being on top of the ground for such a long time and made accurate yield evaluations impossible.

Table 1. Georgia 09B tolerance to glufosinate (Liberty) applied seven days before plant or immediately after planting.

	Rate	Appl timing[a]	Stand[b]	Plant height		Plant width	
Treatment			Plants/ft	Days after planting			
	Fl oz/A			24	44	24	44
				Inches			
Untreated	-	7 DBP	1.9	1.5	5.2	3.5	10.0
Glufosinate	32.0	7 DBP	1.6	2.0	5.2	3.8	9.7
Glufosinate	64.0	7 DBP	1.7	1.8	5.1	3.7	9.3
Glufosinate	96.0	7 DBP	2.2	1.7	5.2	3.3	10.7
Untreated	-	PRE	0.9	1.9	4.7	3.2	9.0
Glufosinate	32.0	PRE	1.5	2.2	4.7	3.5	10.0
Glufosinate	64.0	PRE	1.6	2.0	4.5	3.7	9.7
Glufosinate	96.0	PRE	1.5	2.2	5.2	3.3	11.0
LSD (0.05)			1.0	0.9	0.8	0.7	1.6

[a] **Abbreviations: DBP, days before plant; PRE, preemergence.**
[b] **Stand counts taken 21 days after planting.**

RESULTS AND DISCUSSION

Peanut plant stands were not affected by glufosinate applications (Table 1). Plant height were not affected by glufosinate application timing or rate at the 24 or 44 days after planting (DAP) evaluation. Plant width was not affected at the 24 DAP evaluation; however, at the 44 DAP evaluation peanut plants showed a greater width with either glufosinate at 64.0 or 96.0 oz/A applied PRE than the untreated check.

CONCLUSION

These data indicate that glufosinate is safe to use on peanut and would provide a viable option to cleaning up a field prior to planting. Currently, glufosinate is going through the IR-4 program and in the future we should have a preplant label.

Screening of TX 144370 (Murray) for Herbicide Tolerance

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INTRODUCTION

Tolerance to different pesticides including herbicides can be a big issue with any recently released peanut cultivar. This point is best illustrated with FL 458 and the Strongarm® (diclosulam) issues observed in west Texas in the late 1990's, early 2000's. Research in south Texas had shown no issues when using Strongarm with peanut varieties commonly used in that area. In the late 1990's FL 458 became a new peanut variety grown in west Texas but no research had been done on the variety response to Strongarm. When Strongarm was introduced and became used, issues such as stunting and poor growth resulting in reduced yield became a major issue. As a result of the response of FL 458, Strongarm was pulled from the Texas market and is not cleared for use on peanut grown in the Texas, New Mexico, or Oklahoma peanut growing areas. I now tell the breeders that we need to screen any new potential varieties for herbicide tolerance. Herbicide issues can develop but at least we can get an idea of any potential problems and undertake more research to address any issues.

MATERIALS AND METHODS

This study was conducted at the Texas A&M Agrilife Research site located near Yoakum to evaluate TX 144370 (Murray) for tolerance to various herbicides alone and in combination (Table 1). Herbicides were applied either preemergence (PRE), at peanut cracking (CRACK), or postemergence (POST).

Soil at the study site was a Tremona loamy fine sand with pH of 7.6. Eight 200' rows of TX 144370 were planted and herbicides were sprayed across each of the 8 rows with a CO_2-pressurized backpack sprayer with a handheld boom equipped with TeeJet DG 11002 spray nozzles calibrated to deliver a total spray volume of 20 gal/A. Spray width was approximately 6'.

RESULTS AND DISCUSSION

When evaluated 9 weeks after the PRE application or 5 weeks after the POST application, stunting was evident with Valor at the 3,0 oz/A rate but not the 2.0 oz rate (Table 1). Dual Magnum + Gramoxone did cause some stunting but was less severe than Valor at 3.0 oz/A. In south Texas Gramoxone has resulted in stunting and a reduction in yield in many instances. With POST applications, Cadre resulted in 8% stunting while stunting with Zidua was 3% (Table 1). Cadre can cause some stunting and this reduction in growth is usually visible for 2 to 4 weeks after application but normally the peanut plant grows out of it and there is no reduction in yield. Some stunting with Zidua has been seen previously especially on the sandier soils. POST applications of Gramoxone and Anthem Flex resulted in minor leaf burn that was present for 10 to 14 days after application. The new growth did not show any effects (data not shown). Gramoxone typically causes from 10-20% leaf burn while Anthem Flex leaf burn is also typically seen and usually ranges from 10-15%. Aim alone will also cause a similar type of leaf burn so this leaf burn can be attributed to the carfentrazone (Aim) in the premix.

CONCLUSION

This year was such an abnormal year with extremely hot, dry conditions that more research is needed to determine if the stunting with Cadre and Valor at 3.0 oz/A rate is normal or just an anomaly.

Table 1. Herbicide tested either alone or in combination for TX 144370 response.		
Herbicides	**Rate/A**	**Stunt (9 WAPRE) 5 WAPOST)[a]**
Preemergence		**%**
Dual Magnum	1.33 pt	0
Prowl H20	1.0 qt	0
Valor	2.0 oz	0
Valor	3.0 oz	15
Strongarm	0.45 oz	0
Dual Magnum + Gramoxone	1.33 pt + 16.0 fl oz	4
Anthem Flex + Gramoxone	3.5 fl oz + 16.0 fl oz	0
Postemergence		
Cadre + Induce	4.0 fl oz + 0.25% v/v	8
Anthem Flex + Select Max + Induce	3.5 fl oz + 14.0 fl oz + 0.25% v/v	0
Gramoxone + Zidua + Induce	16.0 fl oz/a + 2,0 oz + 0.25%	0
Zidua	3.5 oz	3
[a]Abbreviations: WAPRE, weeks after PRE application; WAPOST, weeks after POST application.		

PEANUT RESPONSE TO PARAQUAT IN THE SOUTHWEST GROWING REGION

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INTRODUCTION

Weed pressure in peanut [*Arachis hypogaea* (L.)] is a valid concern for producers, and is detrimental from germination to harvest. Weeds compete for the same nutrients, water, and sunlight as peanut, often leading to stunted plant growth. Weed pressure at harvest can lower both digging and combining efficiency. Excessive weed densities can cause yield losses upwards of 40% (Chaudhari et al., 2018). York and Coble (1977) stated that timely weed control is key to maximum peanut yield. Paraquat is one of the herbicide options available to producers to control troublesome weeds. Gramoxone is labelled for use in peanut from ground crack to 28 days after cracking. Gramoxone is effective at controlling several early-season weeds including kochia and Russian thistle. Many growers do not like to use Dual Magnum preemergence due to the concern of slowing peanut emergence. Instead, growers delay the application until peanut emergence has occurred. The objective of this trial was to examine peanut response to Gramoxone plus Dual Magnum when applied in tank mix at 14 and 28 days after ground crack (DAC).

MATERIALS AND METHODS

Treatments included Gramoxone 3.0 SL (paraquat) applied at either 10.8 fl oz/A (1X) or 21.6 fl oz/A (2X) alone or in combination with Dual Magnum (S-metolachlor) at either 1.33 pt/A (1X) or 2.66 pt/A (2X). All treatments were applied with Induce at 0.25% v/v, either 14 days after cracking (DAC), 28 DAC, or 14 DAC followed by 28 DAC. Plots were 4, 36-inch rows by 25 feet long. Treatments were arranged in a randomized complete block design with either three or four replications. Plots were maintained weed free throughout the season. Stand reduction, plant stunting, leaf necrosis, and overall plant injury were evaluated throughout the season. Peanuts were dug, field dried, and harvested with a commercial peanut thrasher. Due to weather conditions at Yoakum, TX, only the 28 DAC timing was applied, and the trial was not harvested.

RESULTS AND DISCUSSION

Gramoxone at 1X applied 14 DAC injured peanut 28% when evaluated 14 days after treatment (DAT). When tank-mixed with Dual Magnum at the 1X rate and applied 14 DAC, peanut injury was 37%. Peanut injury from Gramoxone at 2X, with and without Dual Magnum, ranged from 35-40% at this application timing. In general, peanut injury following applications at 28 DAC were less than applications made at 14 DAC. The addition of Dual Magnum at 1X to Gramoxone at 1X was similar to Gramoxone applied alone. Following the 28 DAC application, the 2X rate of Gramoxone and Dual Magnum was most severe (38%). Sequential applications of Gramoxone plus Dual Magnum at 14 DAC and 28 DAC were more severe than individual applications made at either 14 DAC or 28 DAC. When evaluated at 28 days after treatment, similar trends were still apparent. Dual Magnum tended to increase peanut injury when tank mixed with Gramoxone, regardless of rate. Early applications (14 DAC) were more injurious than later applications (28 DAC). The most several injury (48 to 53%) was observed following Gramoxone plus Dual Magnum at the 2X rates applied at both 14 and 28 DAC. Although serious peanut injury (stunt and necrosis) was observed early season following both application timings, no difference in peanut yield was observed. Peanut injury following Gramoxone plus Dual Magnum is a poor indicator of yield. This data would suggest the field use rates of Gramoxone plus Dual Magnum applied early season is safe and effective weed control option for peanut growers.

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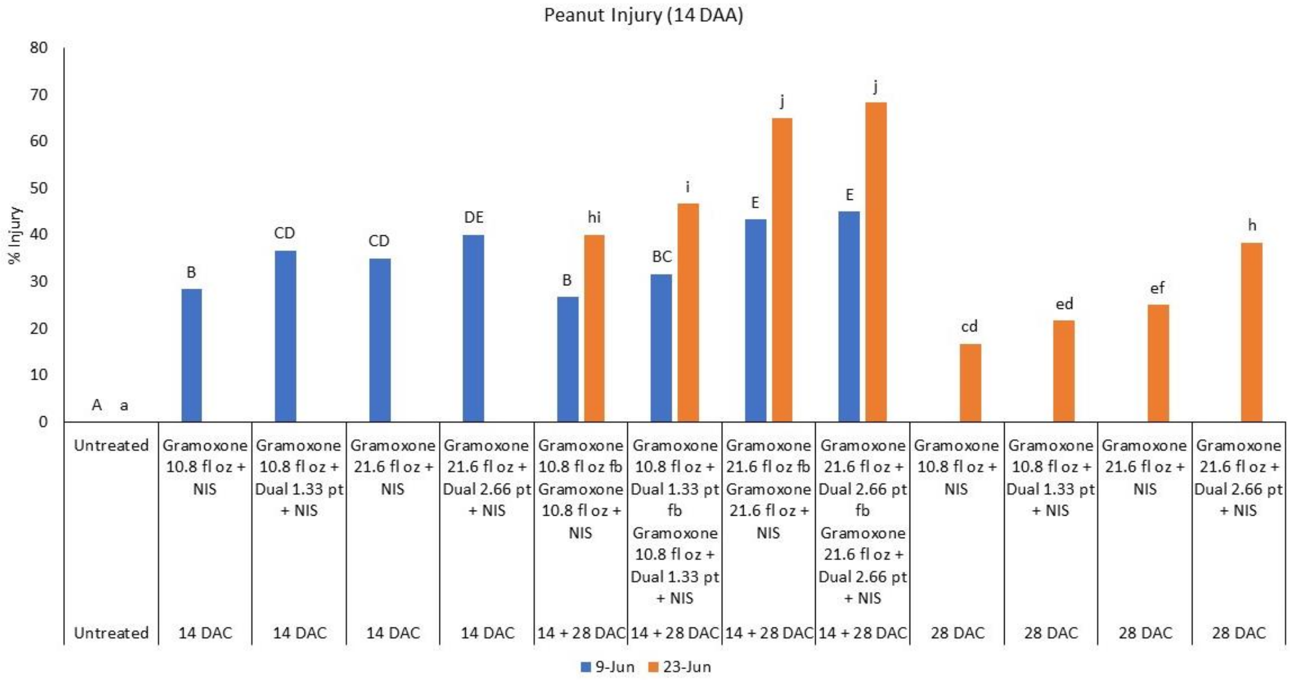

Figure 1. Peanut injury at 14 days after application.

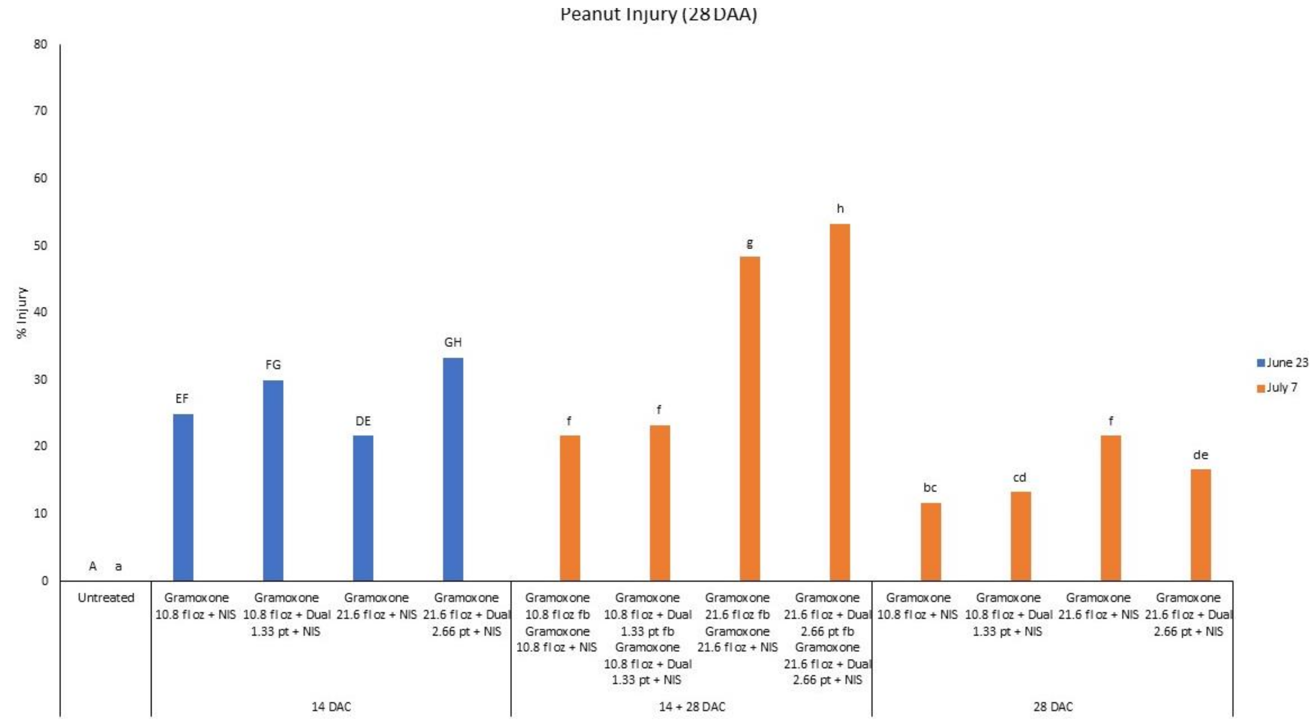

Figure 2. Peanut injury 28 Days After Application.

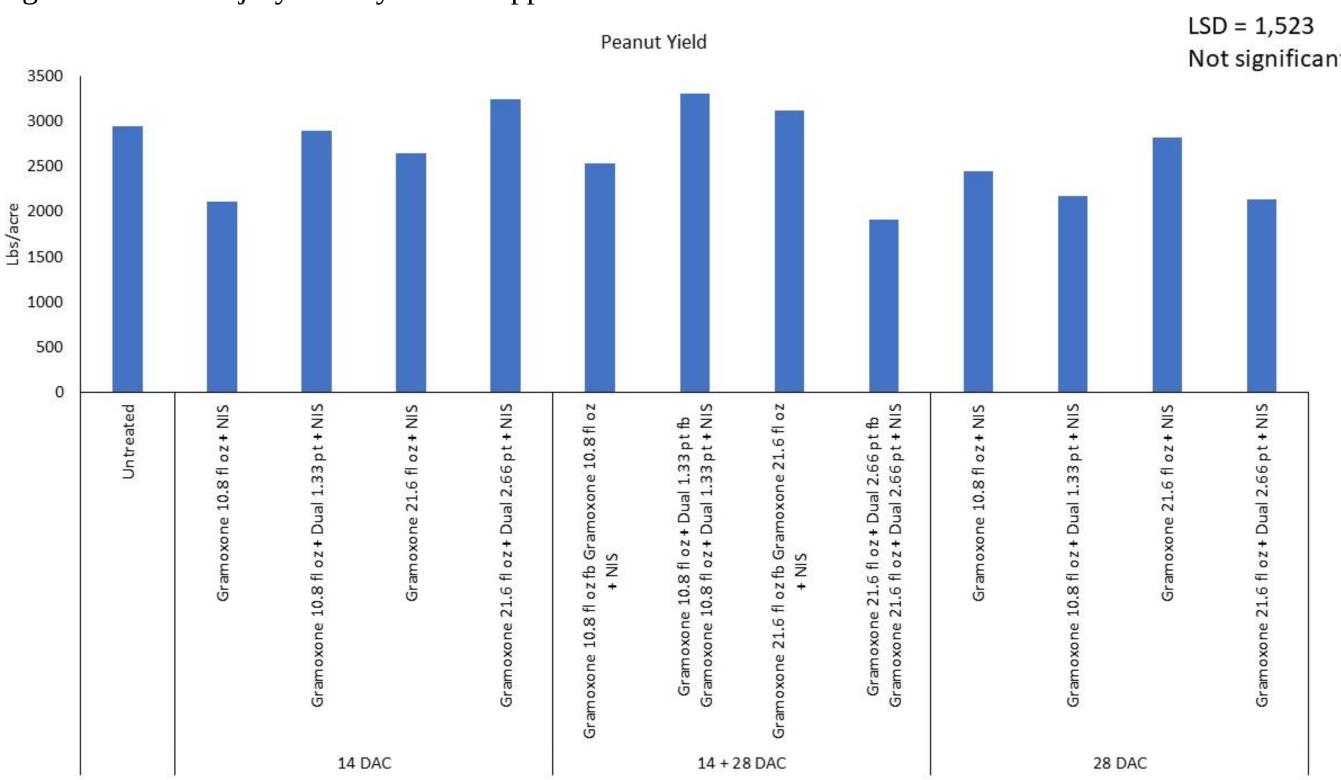

Figure 3. Peanut yield.

FUNGICIDE TIMINGS AND COMBINATION TO CONTROL PEANUT POD ROT

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INTRODUCTION

Peanut pod rot remains one of the most challenging diseases to manage for peanut producers in the Southern High Plains. Pod rot is historically known to be caused by fungus *Rhizoctonia solani* and oomycete *Pythium* spp (Wheeler et al., 2005). In West Texas, we have observed *Fusarium* spp. to also contribute to the pod rot symptoms and damage. Fungicide applications have multiple challenges such as efficacy of product delivery, product coverage, and effective timing. Traditionally the recommendation was to make a preventive application 60 days after planting regardless of disease onset or environmental factors. This project seeks to evaluate different fungicide spray timings to determine timing and fungicide rotations that are most effective to manage peanut pod rot in the field while also reducing the development of fungicide resistance.

MATERIALS AND METHODS

Field trial. A field trial was established in Brownfield Texas. Virginia variety Wynn was planted on May 6 and threshed on October 25. The field has a history of both *Pythium* and *Rhizoctonia* Pod Rot. Eleven different treatments were evaluated using multiple timing and fungicide rotations of Abound® (Azoxystrobin; FRAC: 11); Ridomil Gold® (Mefenoxam; FRAC: 4); Propulse® (Fluopyram; FRAC: 7, and Prothioconazole FRAC: 3); and Lucento® (Flutriafol; FRAC: 3, and Bixafen; FRAC:7). Fungicides were applied following the label rates (table 1). Fungicide combinations and application timings are presented on table 2, including treatment 1 that is the untreated check. Disease incidence and severity was assessed at the time of digging. Disease incidence refers to how many plants showed infection per plot. Disease severity refers to of those plant what degree of infection the plants showed. Stand counts and yield data was also collected. Analysis of variance conducted with SAS 9.4.

Table 1. Fungicides used in this study.

Product	Active Ingredient	Class	Concentration (% ai)	Application Rate	Note
Abound Flowable	Azoxystrobin	QoI	22.9	12.0-24.5 fl oz/A 0.20-0.40 lb ai/A	Rate listed for pod rot
Lucento™	Bixafen Flutriafol	SDHI DMI	15.55 26.47	5.5 fl oz/A	*Rhizoctonia* limb rot
Propulse®	Fluopyram Prothioconazole	SDHI DMI	17.4 17.4	13.6 fl oz/A	*Rhizoctonia* limb rot
Ridomil Gold SL	Mefenoxam	PA	45.3	8.0-16.0 fl oz/A 0.25-0.50 lb ai/A	Rate listed for *Pythium* pod rot

QoI = quinone outside inhibitor, FRAC code 11. SDHI = succinate dehydrogenase inhibitor, FRAC code 7. DMI = DeMethylation Inhibitors, FRAC code 3. PA = phenylamides, FRAC code 4

Table 2. Treatments 1-12 with fungicide rotations and application timings.

Treatments	Chemical	45 DAP (6/20)	60 DAP (7/5)	75 DAP (7/20)	90 DAP (8/4)
1	Check				
11	Ridomil	X			
12	Ridomil	X			
	Lucento		X		
13	Ridomil	X			
	Abound		X		X
14	Abound		X		X
15	Abound				X
16	Lucento		X		
17	Abound		X		X
	Propulse			X	
18	Propulse		X		X
19	Propulse			X	
20	Abound		X		X
	Lucento			X	

RESULTS AND DISCUSSION

No significant differences were observed in all treatments in the number of total plants, infected plants, percent incidence, severity, and yield in 2022 trial (table 3). Average values for total plants, infected plants, incidence, severity, and yield were 161.3 plants, 8.89 infected plants, 5.95%, 35.34%, and 3817 lb/ac, respectively. Percent incidence observed during the study was only 5.95%. This may not have been high pressure to show treatment differences on the response variables. Over the past two years, there was no significant effect of treatments on the response variable observed.

CONCLUSIONS

Timely fungicide application is important for disease control while maximizing agricultural input that results in a higher yield and pod quality. In an effort to increase sustainable practices in agriculture and manage the development of fungicide resistance fungicide selection and application timings play an important role. This trial provides two major conclusions, (1) disease management for pod rot might require application of multiple products to control multiple pathogens; (2) application timing has an effect on disease severity and yield. Although not definitive correlation between treatment and yield was observed, in the past two years' results, disease reduction was detected based on the controlled pathogens.

Table 3. Average values for total plants, infected plants, incidence, severity and yield in 2021, 2022, and 2-year average.

Treatment	**Total Plants (N)**			**Infected Plants (N)**			**Incidence (%)**			**Severity (%)**			**Yield (lb/ac)**		
	2021	**2022**	**2-yr**	**2021**	**2022**	**2-yr**	**2021**	**2022**	**2-yr**	**2021**	**2022**	**2-yr**	**2021**	**2022**	**2-yr**
1	150.0	154.5	152.3	6.41	9.50	7.96	9.75	6.07	7.91	20.50	41.25	30.88	3619	3429	3524
11	137.0	135.0	136.0	4.42	11.25	7.84	6.25	8.39	7.32	21.75	61.25	41.50	3552	3673	3613
12	151.0	164.8	157.9	5.23	6.00	5.62	7.75	4.01	5.88	16.50	26.25	21.38	4133	4149	4141
13	156.0	184.0	170.0	4.81	3.25	4.03	7.25	1.96	4.61	7.50	22.50	15.00	3797	3742	3769
14	152.5	173.3	162.9	7.80	7.00	7.40	12.00	4.51	8.25	26.25	25.00	25.63	3822	4155	3989
15	143.5	174.8	159.1	5.50	6.50	6.00	8.00	3.78	5.89	22.50	20.00	21.25	4436	3935	4185
16	149.5	172.8	161.1	3.71	9.75	6.73	5.25	5.65	5.45	8.50	37.50	23.00	4077	3695	3886
17	148.8	141.0	144.9	2.79	15.75	9.27	4.25	11.87	8.06	14.25	45.00	29.63	4035	3697	3866
18	135.3	159.3	147.3	8.33	7.25	7.79	11.25	5.12	8.19	27.50	40.00	33.75	3825	3941	3883
19	151.3	162.8	157.0	5.52	13.00	9.26	8.25	8.11	8.18	23.00	41.25	32.13	3850	3801	3826
20	144.0	151.8	147.9	4.95	8.50	6.73	7.25	6.03	6.64	11.50	28.75	20.13	3454	3765	3609
Pr(>F)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mean	147.2	161.3	154.2	5.40	8.89	7.15	7.93	5.95	6.94	18.16	35.34	26.75	3873	3817	3845
CV	11.48	20.5	17.5	71.18	64.8	70.19	71.52	71.3	69.6	58.09	58.8	70.29	14.09	15.5	14.68

LITERATURE CITED

Wheeler, T.A., C.R Howell, J. Cotton, and D. Porter. 2005. *Pythium* species associated with pod rot on west Texas peanuts and in vitro sensitivity of isolates to mefenoxam and azoxystrobin. Peanut Sci. 32:9-13.

Perform whole-genome sequencing, assembly, and annotation of two isolates of two new bacterial pathogens of peanut

INTRODUCTION

Bacterial wilt, caused by *Ralstonia solanacearum*, is a species complex comprising several strains with phenotypic and genotypic variations (**Fegan et al. 1998**; **Gillings and Fahy 1994**), and is an important disease affecting >250 plant species (**Buddenhagen 1986**); it causes up to 30% yield loss, with total crop failure in extreme cases (**Yu et al. 2011**). The *R. solanacearum* species complex is subdivided into four phylotypes, a taxonomic equivalent of subspecies; and at least 23 sequevars, the equivalent of infra-subspecific groups (**Fegan and Prior 2005**). *R. solanacearum* isolates that cause wilt disease in peanut belong to phylotype I. At the infra-subspecific level, they are represented in at least six sequevars (**Jiang et al. 2017**) Bacterial wilt disease of peanut caused by *R. solanacearum* was first reported in the coastal belt of Natal, in South Africa, during 1924 to 1925, where it has since occurred every year thereafter (**McClean 1930**). The disease is now known to be distributed across peanut-growing regions in tropical and subtropical humid countries (**Wicker et al. 2007**). The bacterial wilt disease of peanut is considered soilborne and favored by soils with high-moisture-holding capacities, such as heavy loam soils. In the soil, infection proceeds with the penetration of root cortical cells; this is followed by an increase in bacteria cell density, which results in sudden wilting of affected plants. Management of bacterial wilt in peanut is challenging, given the broad host range of the pathogen and the soilborne nature of the disease. Conventional management strategies, such as soil treatment, crop rotation, and other cultural methods, have not proven effective against the disease (**Cao et al. 2009**). Consequently, use of resistant varieties remains the most cost-effective strategy for the management of bacterial wilt in peanut worldwide, despite the known inverse relationships between the available genetic resistances and peanut yield and quality (**Lu et al. 2010**).

During the 2020 production season, widespread incidences of poor stand establishments were reported in production fields in Donley County in the Texas Panhandle planted with Spanish-type peanut varieties. Symptoms observed in the affected fields included seed rot, pre- and postemergence damping-off, poor seedling vigor, poorly developed roots with little to no nodule formation, and death (Fig. 1). The observed above-ground symptoms looked identical to those of peanut bacterial wilt caused by *R. solanacearum*, a disease that is not known to be present in the United States. Unlike peanut wilt caused by *R. solanacearum*, the observed symptoms and disease severity were greater in fields with sandier soils (sandy-loam) compared with those with heavier loam soils.

The observed constant association of two bacterial species with symptomatic peanut plants from spatially isolated production fields suggested a possible association of at least one of the two bacterial isolates with the observed diseased symptoms. This study therefore investigated a possible causative role for the observed disease symptoms by the two bacterial isolates through a possible association of either or both bacteria with peanut seeds to determine if they are seed-transmissible and/or seedborne; and the identity of the two bacterial isolates by sequence comparison with representative members of closely related species.

Fig. 1. Field-grown peanuts in Donley County in the Texas Panhandle in 2020 showing symptoms including **A,** seed rot; **B,** poor seedling vigor/senescence; **C,** normal root development; and **D,** poorly developed roots lacking nodules.

MATERIALS AND METHODS

Bacterial isolation, purification, and identification.

Symptomatic peanut seedling stems, cotyledons, and seeds were rinsed in sterile-distilled water and surface-sterilized by soaking in 10% hypochlorite solution for 1 min and rinsing in five changes of sterile distilled water. The surface-sterilized seedling tissues were blotted dry on Kimwipes (catalog #34155; Kimberly-Clark, Roswell, GA) and cut into 0.5- to 1-cm-long sections with sterile scalpel blades. The cut tissue sections were placed in Petri dishes containing water agar (WA) using sterile forceps and the plates were incubated overnight in the dark at 25°C. Surface-sterilized seeds were split in half along the divide between the two cotyledons of each seed, and each half was placed face-down on WA and incubated using the same parameters described above. After the incubation period, bacterial outgrowth from the sectioned tissue samples or seeds were purified for single colonies by streaking onto Luria Bertani (LB) agar plates and incubated overnight in the dark at 28°C. Representative colonies from the resulting single colonies were selected and further purified through a second round of streaking on LB agar plates and similarly incubated overnight. Single colonies from the second purification round were transferred separately into LB broth and incubated overnight at 28°C and 240 rpm. Genomic DNA was extracted, as described by **Maniatis et al. (1982)**, from the overnight cultures and used in downstream analysis. The 16S rRNA PCR amplification was carried out using the primer pair 27F (AGAGTTTGATCCTGGCTCAG) and 1492R (GGTTACCTTGTTACGACTT; **Galkiewicz and Kellogg 2008**) at a final concentration of 0.5 μM and 1× final concentration of 2× HF Master-Mix (Bio-Rad, Hercules, CA) in a 25-μl total reaction volume. The PCR amplification cycle consisted of an initial denaturing step at 98°C for 3 min, 35 cycles of three steps consisting of 98°C for 10 s, 57°C for 30 s, 72°C for 30 s, and a final step of 72°C for 10 min. The PCR products, ∼1,500-bp amplicons, were sequenced, and the resulting sequences used to identify the respective bacteria through Basic Local Alignment Search Tool (BLAST; https://blast.ncbi.nlm.nih.gov/Blast.cgi) searches.

RESULTS AND DISCUSSION

Whole-genome sequencing has been completed for two target bacterial pathogens of peanut plant. The fully assembled and annotated genomes for the two bacteria have also been submitted to the National Center for Biotechnology Information (NCBI) database and are now publicly available with the GenBank accession numbers JAHCSY000000000 and JAHCSX000000000, respectively.

The widespread incidence of early-season poor stand establishments and failure of peanut crops in several fields in the Texas Panhandle in 2020 led to the discovery of two new bacterial pathogens of peanut that were initially identified based on their respective 16S rRNA fragments and BLAST (**Altschul et al. 1990**) searches (https://www.ncbi.nlm.nih.gov/). Using 676- and 661-bp 16S rRNA sequence fragments, the first bacteria and the second bacteria returned a 99.7 and 100% identity match with *R. pickettii* and *P. dispersa*, respectively.

The successful recovery of the two bacterial pathogens, *Ralstonia* sp. strain B265 and *Pantoea* sp. strain B270, from the same batches of peanut seeds planted and those harvested from the affected fields indicated that both bacteria are seedborne and seed-transmissible. This finding is supported by the fact that all of the affected fields, though spatially removed from each other, were planted with seeds purchased from the same source. The seedborne attribute of this new disease contrast with that of peanut bacterial wilt, which is soilborne. Investigation is underway to determine if, additionally, either or both bacteria can become established and soilborne in infested soils. The successful infection of peanut varieties of the Spanish- and Valencia-types, however, suggests that other peanut varieties and types could potentially also be susceptible to this new bacterial disease designated “bacterial early-decline disease of peanut.”

The seed-transmissible attribute of this disease pathogens, unlike the peanut bacterial wilt pathogen, provides disease management opportunities for limiting the spread of the pathogens. For instance, seed-testing could be used to detect the presence of the bacterial pathogens in peanut seeds, thus allowing for the exclusion of infected seeds from the supply chain, trade, and planting in farmer’s fields. Implementation of such management strategy can help to mitigate the risk to farmers of the potential economic losses associated with bacterial early-decline disease of peanut, as well as safeguard peanut trade at all levels, including international trade.

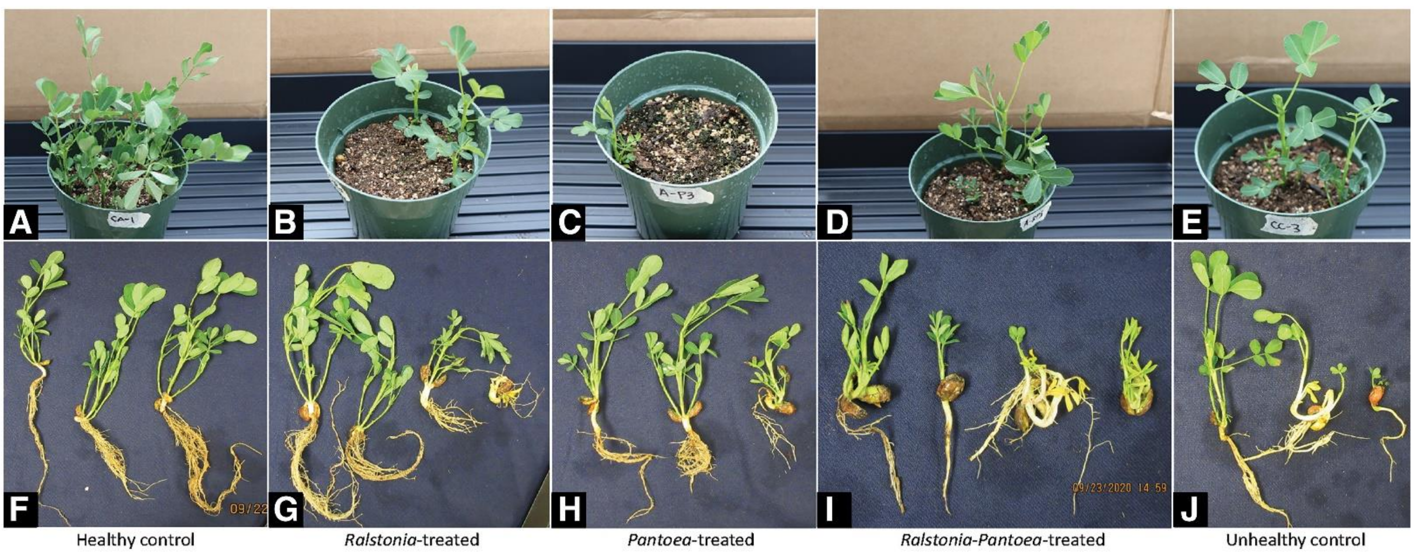

Fig. 2. Comparison of non-treated healthy peanut seeds (**A** and **F**), and non-treated unhealthy peanut seeds (**E** and **J**) grown in sterile potting media under greenhouse conditions 4 weeks after planting with the effect of inoculation of healthy peanut seeds with *Ralstonia* sp. B265 (**B** and **G**), *Pantoea* sp. B270 (**C** and **H**), and a combination of *Ralstonia* sp. B265 and *Pantoea* sp. B270 (**D** and **I**), respectively.

OVERCOMING CALCIUM LIMITATIONS IN PEANUT PRODUCTION

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INTRODUCTION

To achieve the best quality and highest yields, peanut farmers must develop nutrient management plans to ensure the plant has the nutrients it needs. While all nutrients are important, calcium (Ca) is one of the most important with demands being greatest during pegging. Calcium is absorbed directly from the soil by the developing fruit rather than by roots like most other plants. Liming material is commonly applied to raise the pH of acidic soil and provide the Ca the plant needs. In the basic to alkaline soil of Texas' Southern High Plains, Ca is present in high quantities according to soil tests and should not be limiting to plants. However, high levels of magnesium (Mg) and potassium (K) can compete with Ca for plant uptake, possibly resulting in calcium deficiency (high incidence of pod rot and unfilled pods). This will result in low yields, low grades, and poor germination. High levels of Mg exist in irrigated fields with sandy soil, and preliminary observations depict Mg-induced Ca deficiency in peanuts in Gaines and Yoakum Counties, TX. Since soil testing often indicates adequate Ca, it is difficult to justify the application of Ca fertilizer. Research was aimed at evaluating methods/times of Ca application to alleviate deficiency symptoms. Additionally, we evaluated the effects of excessive Mg on plant uptake of Ca, K, and manganese.

MATERIALS AND METHODS

Trials were conducted in Lubbock, TX to evaluate the effect of Ca fertilizer applied as CN-9 (10 gal/acre) in combination with PhycoTerra, and treatments included: 1) grower standard practice w/ no added fertility (GSP1); 2) grower standard practice with 32-0-0 @ 3.1 gpa (GSP2); 3) GSP1 + PhycoTerra @ 1 qt/a (in-furrow); 4) GSP2 + PhycoTerra @ 1 qt/a; 5) PhycoTerra @ 1 qt/a (in-furrow) + CN-9 (21 DAP); 6) PhycoTerra @ 1 qt/a + CN-9 (21 DAP) w/ PhycoTerra @ 1 qt/a. CN-9 is a calcium nitrate fertilizer, and at 10 gal/acre 11 lb N/acre and 13.4 lb Ca/acre were applied. PhycoTerra is a microbial carbon source that is meant to enhance microbial activity resulting in soil health benefits. It was applied at 1 qt/a as an in-furrow application or side-dressed with CN-9. Georgia 09-B peanuts were planted at 5 seed/ft on 17 May 2022 in Lubbock. Soil samples collected prior to preplant fertilizer applications were also sent to the lab in College Station for macro- and micronutrient determination. Peanuts were dug on 5 November 2022 and harvested on 15 November 2022.

RESULTS AND DISCUSSION

Soil characterization data for the Lubbock location in reported in Table 1. Soil pH was moderately alkaline and ranged from 7.8 to 8.1 pH at the 0-6" depth to the 12-24" depth. It is well above what is considered optimum for peanuts (5.8 to 6.2 pH) (HGIC 1315, Clemson Fact Sheet). At this alkaline pH, availability of micronutrients can be limited. In the 0-6" depth, iron (Fe) is rated as low and zinc (Zn) is rated as moderate, whereas manganese (Mn) and copper (Cu) are rated as high (ratings based on the Texas A&M AgriLife Extension Soil, Water, and Forage testing laboratory). Phosphorus (P) is rated as moderate, respectively, in the 0-6" soil depth. Potassium (K), sulfur (S), calcium (Ca), and magnesium (Mg) are well above the sufficiency range rated as high or very high. The ratio of Ca to Mg is 2.7:1, 2.8:1, and 8.0:1 at the 0-6", 6-12", and 12-24" depths, respectively. These are well below desired ratios meaning that there may be excessive Mg resulting in reduced Ca uptake.

Unlike results in 2020, peanut yield in 2022 was not improved by application of CN-9 alone in-season but with the addition of PhycoTerra there was a general increase in yield (PT + CN with PT) (Table 2). Peanut yield did not response to PhycoTerra applied in-furrow without the addition of nitrogen (GSP1 + PhycoTerra); however, when nitrogen was applied preplant, there was a yield response. After three years of data collection, we have not demonstrated a consistent response to soil-applied calcium regardless of application method/timing.

Table 1. Soil characterization of samples collected at the Lubbock, TX, location prior to fertilizer application and planting in 2022 at three depth increments (0-6”, 6-12”, and 12-24”).

Depth	Soil pH	EC (mmhos/cm)	CEC (meq/100 g)	NO3-N (ppm)	Mehlich P-III (ppm)	K (ppm)	Ca (ppm)	Mg (ppm)	S (ppm)	Zn (ppm)	Fe (ppm)	Mn (ppm)	Cu (ppm)	Na (ppm)
0-6"	7.8	0.49	17	46.7	22	414	1858	706	20	0.23	4.5	13.1	0.7	82
6-12"	8.0	0.37	18	15.1	7	294	2223	715	18	0.10	4.4	4.7	0.8	88
12-24"	8.1	0.36	26	6.4	6	236	3864	683	24	0.07	5.9	4.6	0.8	100
Average	8.0	0.40	20	22.7	12	315	2648	701	20	0.13	4.9	7.4	0.8	90

Table 2. Peanut yield collected from the Lubbock trial conducted in 2022.

Treatment	Yield (lb/A)
Grower standard, no fertility (GSP1)	5505
Grower standard, 3.1 gpa 32-0-0 (GSP2)	5674
GSP1 + PhycoTerra (PT)	5207
GSP2 + PT	5712
PT + CN9	5587
PT + CN with PT	5905
p-value	0.945

MULTI-STATE IN-FURROW FERTILIZER TRIAL

Walter Scott Monfort, Maria Balota, David Jordan, Dan Anco, Emi Kimura, Todd Baughman, Kris Blkcom, Travis Faske, Brendan Zurweller, Naveen Puppala, David Wright, and Mulvaney Michael

INTRODUCTION

Riser and other in-furrow fertilizer products were being recommended at 1-3 gal per acre to improve stand establishment and final yield of peanuts. However, there have been mixed observations on the product performance on peanuts throughout the peanut-belt. The objective of the multi-state in-furrow fertilizer trial was to evaluate an in-furrow fertilizer on stand count, injury, and yield of peanuts.

MATERIALS AND METHODS

The study was conducted in GA, AL, SC, FL, NC, TX, and VT. Treatment included untreated check, riser applied in-furrow at 0.5, 1, 2, and 3 gal/ac. The trial at Texas was conducted at Texas A&M AgriLife Research and Extension Center at Vernon, TX. The trial was planted, dug, and harvested on May 10, October 13, and November 10, 2022, respectively. Runner market-type (GA09B) was planted at 4 seeds/ft into 40 inch spacing. The plot size consisted of 4 rows by 25 ft length. The trial was designed as a randomized complete block design with 4 replications. Data collections were emergence, burn (%), and vigor (1-10) assessed at 8, 10, 12, 14, 16 days after planting.

RESULTS AND DISCUSSION

There was no statistical significance of treatments on all response variables. Average stand count at 6, 8, 10, 14, and 16 DAP were 0.1, 1.6, 1.2, 2.4, and 2.5 plants per ft, respectively (Figure 1). Although the average stand count of untreated check was numerically the highest among all treatments, there was no statistical difference. Average percent burn (avg. 3.8%) and vigor (8.4) were consistent among the measurement dates. Average yields over all treatments were 2964 lb/ac (p>0.5).

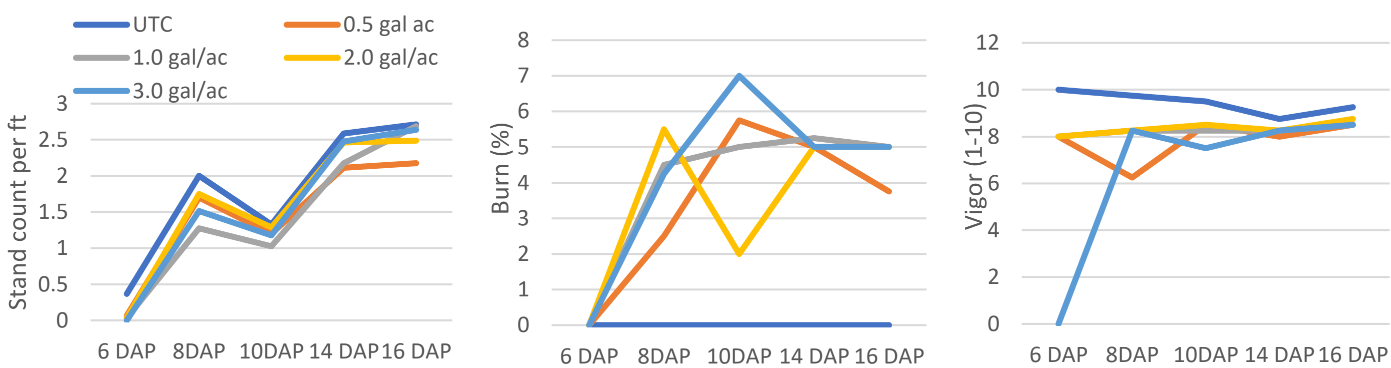

Figure 1. Average stand count (left), burn (middle), and vigor (right) on peanut following an in-furrow application of rizer at 0.5, 1, 2, 3 gal/ac and untreated check (UTC) in Vernon, Texas (p>0.5).

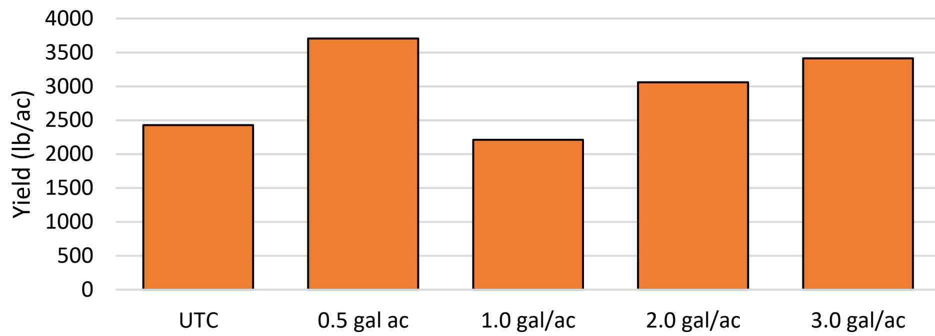

Figure 2. Average yield following an in-furrow application of rizer at 0.5, 1, 2, 3 gal/ac and untreated check (UTC) in Vernon, Texas.

Out of 10 total trials conducted over the peanut-belt, stand and yield loss were reported in 7 trials and 2 trials, respectively. 6 trials out of the 10 trials reported the final yield were statistically the same among all treatments. It indicates that the application of riser may harm the peanut performance by reducing yields and/or increasing the total input cost.

Figure 1. Untreated check (left) and riser applied at 3.0 gal/ac (right). Burned leaves were observed with Riser initially.

EVALUATION OF COVER CROP PRACTICE IN PEANUT PRODUCTION SYSTEM

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Katie Lewis, Soil Chemistry and Fertility Scientist, Texas A&M AgriLife Research, Lubbock, TX

INTRODUCTION

Cover crops have received renewed attention in recent years due to heightened awareness of soil health. Terms such as soil health, regenerative agriculture, resilient agriculture, and sustainability are commonly used across a broad spectrum of public media outlets. Soil health promoting practices often include conservation tillage, crop rotation, and cover crops. Many studies have noted the benefit of such practices over the long-term. However, research has also noted that reverting to conventional tillage can rapidly deplete the benefits captured by soil health promoting practices. Thus, soil health promoting practices within peanut systems is difficult to sustain due to the nature of the system. Producers have expressed interest in implementing conservation tillage and cover crops within peanut systems to improve soil health. As with any other crop, questions exist on the feasibility of reduced tillage and cover crops and subsequent impact on crop performance. The objective of this study was to evaluate the effect of cover crops on peanut stand establishment, yield, and soil health indicators.

MATERIALS AND METHODS

Trials were conducted at the Texas A&M AgriLife Research and Extension Center at Vernon on a Miles sandy loam soil. And the Texas A&M AgriLife Research and Extension Center at Lubbock on an Olton clay loam soil. Due to rotation, studies conducted in 2023 were completed under pivot irrigation at Vernon and furrow irrigation at Lubbock. The site at Vernon had been under no-till wheat from 2001-2018 until ground was tilled for peanut work in 2019. Peanuts were planted in 2023 following cotton at each location. After cotton harvest in 2022, cover crops were planted using a no-till drill in a complete randomized black design with four replications. Cover crop treatments included 1) control (no cover crop); 2) cereal rye planted at 30 lb/ac; 3) radish planted at 10 lb/ac; 4) Rye/hairy vetch mixture (25/5 lb/ac); and 5) rye/hairy vetch/radish (25/3/2 lb/ac). These same treatments were dublicated in Lubbock. In Vernon, cover crops were terminated on April 26 using glyphosate. A roller crimper was used to terminate cover crops, but was not a total success due to reduced residue levels. Peanuts (ACI 236) were planted on May 18th under no-till conditions at Vernon. This planting date was later than planned due to extensive tornado damage at the Center on May 4. Due to lack of power to the pivot, peanuts were planted under drier conditions than ideal. Cover crop herbage mass and plant stands after emergence were quantified. Measurements were taken for microbial biomass and community analysis, soil carbon, soil nutrients, soil moisture, and GHG emissions. Prior to termination, plots were clipped to determine cover crop herbage mass production. Peanuts were dug in Vernon on October 13. After digging, rainfall events became an issue and prevented harvesting until November 16. Many of the peanuts at Vernon had mold damage and were not suitable for grading.

RESULTS AND DISCUSSION

Cover crop herbage mass and yield are provided in Table 1. Rye was the dominant species in mixtures, with all cover crop treatments 100% rye at termination at Vernon as radishes and vetch did not over winter. Thus, radish was a complete failure at Vernon and resulted in significantly less biomass at Lubbock (Table 1). The rye only cover crop resulted in similar biomass as mixed cover crops at each location. Cover crop biomass production was greater at Vernon and thus created more standing residue at planting. Stands were below average at Vernon, which may be partly explained by dry conditions and no capability to irrigate plots due to a loss of power from tornado damage at the Vernon Center (Figure 1). However, the lowest stands were from the control and radish plots (Figure 1 and 2). As both of these treatment provided no residue cover due to either the planting of no cover crop or winter-kill of radishes, cover crop residue did not affect peanut stands in a negative aspect when planted under no-till conditions. Peanut yields were not significantly affected by treatment at either location (Table 1). At Vernon, numerically higher yields were observed with rye and rye/vetch cover crops. At

Lubbock, numerically higher yields were observed for the control and low biomass producing radish. In the past, numerically lower yields at Lubbock have been hypothesized to be linked to incorporation of rye leading to nutrient immobilization and that furrow irrigation is not conducive to conservation tillage approaches. Unlike Lubbock, cover crop residue was not incorporated at Vernon under no-till management under pivot irrigation.

Table 1. Cover crop herbage mass and peanut yield as affected by cover crop treatment at the Texas A&M AgriLife Research and Extension Center at Vernon in 2020.

Treatment	**Cover Crop Herbage Mass (lb/ac)**	**Yield (lb/ac)**
Vernon		
Control	-	3155
Rye	2478	3404
Radish	0	3093
Rye/Vetch	2745	3763
Rye/Vetch/Radish	3065	3136
Lubbock		
Control	-	4793
Rye	906	4378
Radish	254	4774
Rye/Vetch	1094	4130
Rye/Vetch/Radish	1072	4200

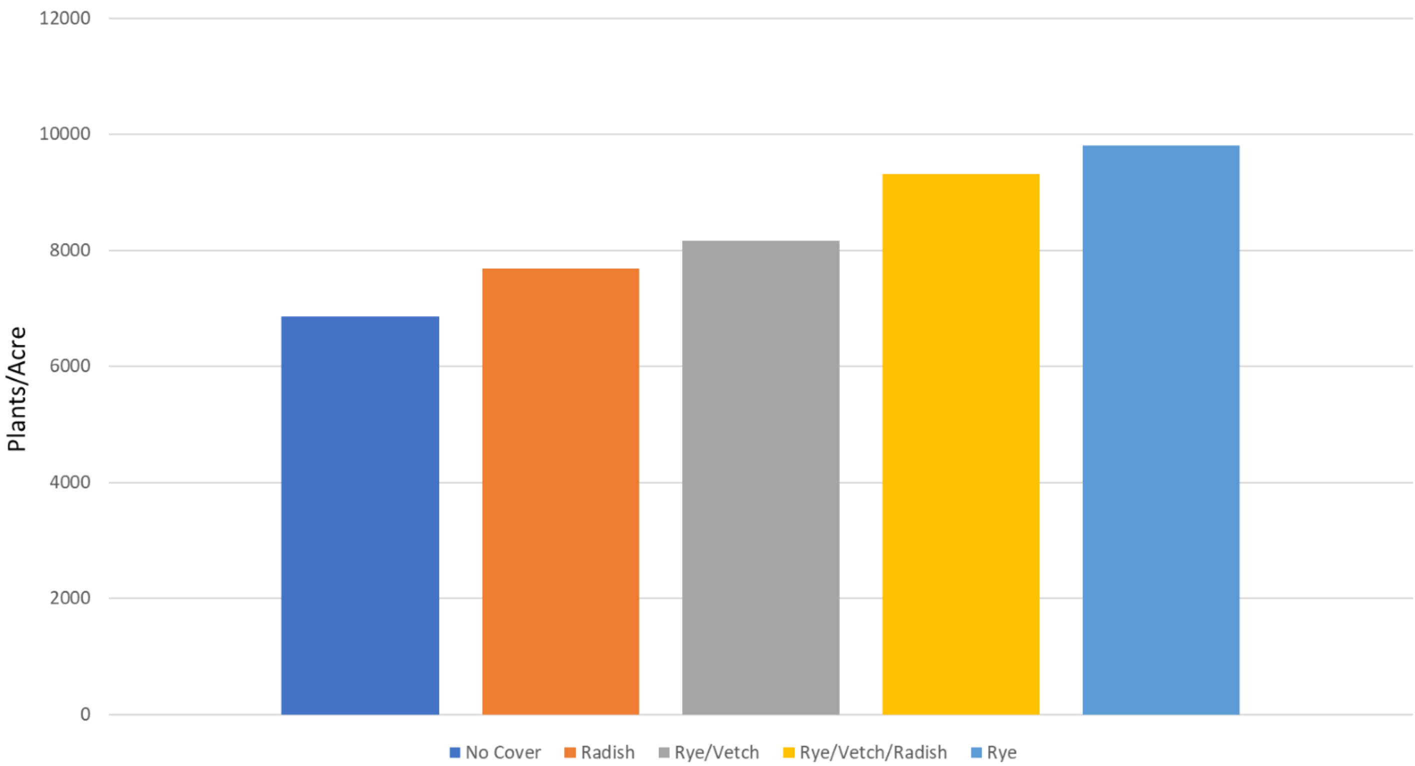


Figure 1. Peanut stands affected by cover crop treatments and residue at the Texas A&M AgriLife Research and Extension Center.

Figure 1. Peanuts in a no-till cotton/peanut rotation without a cover crop (left photo) and with a terminated rye cover crop (right photo) at the Texas A&M AgriLife Research & Extension Center at Vernon.

As noted in past reports, both small and large nodules have been noted on peanut roots at Vernon. In 2022, we conducted 16S-rRNA based nodule microbiome sequencing to characterize microbial communities in small and large sized nodules from the Vernon site. Microbial communities diverged drastically in the two types of peanut nodules (big and small). Core microbial analysis revealed that the big nodules were inhabited by Bradyrhizobium, which dominated composition (>99%) throughout the plant life cycle. Surprisingly, we observed that in addition to Bradyrhizobium, the small nodules harbored a diverse set of bacteria (~31%) that were not present in big nodules. Notably, these initially less dominant bacteria gradually dominated in small nodules during the later plant growth phases, which suggested that native microbial communities competed with the commercial inoculum in the small nodules only. Conversely, negligible or no competition was observed in the big nodules.

CONCLUSION

In summary, cover crops had no significant impact on peanut populations or yields within a no-till pivot system or conventional furrow irrigated system. Radish has not performed well as a cover crop, due to potential to winter kill under adverse conditions. In contrast to a conservation tillage system under pivot irrigation, little to no cover crop residue is retained on the surface under furrow systems due to incorporation. Rye dominated cover crops resulted in like yields compared to no cover crop treatments. Furrow irrigated systems have more obstacles to overcome and economic and logistical concerns should be carefully weighed before cover crop implementation in such systems. At Vernon, microbial communities varied greatly based on the size of the nodules. Based on the prediction of KEGG pathway analysis for N and P cycling genes and the presence of diverse genera in the small nodules, we foresee great potential of future studies of these microbial communities which may be crucial for peanut growth and development and/or protecting host plants from various biotic and abiotic stresses.

PEANUT ECONOMICS AND MARKETING

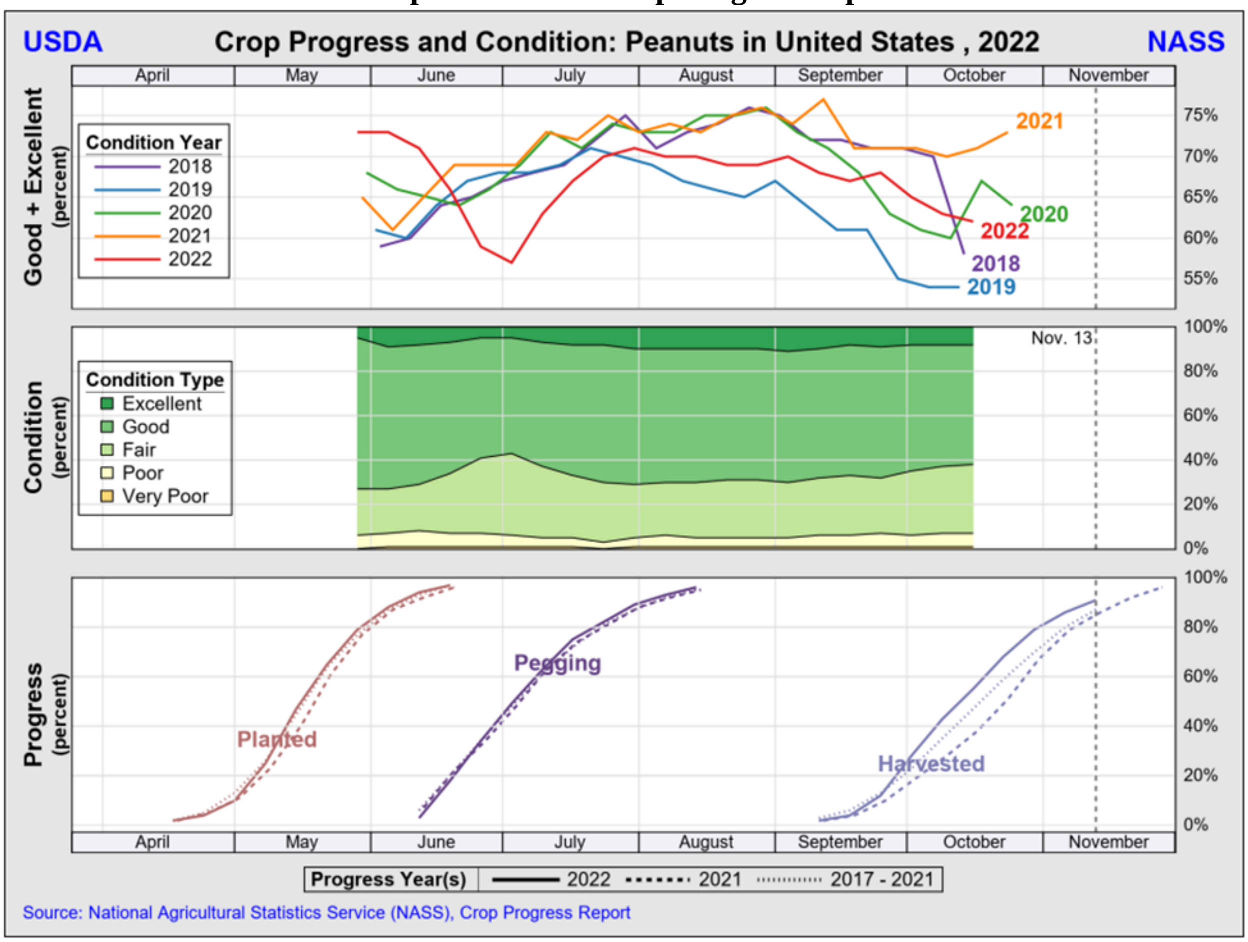
Pancho Abello, Extension Economist, AgriLife Extension Service, Vernon, TX

Peanut Production Report - November 21, 2022. High Plains Weekly blog

Peanuts Market Update

Lower harvested acreage and expected yields will reduce peanut production this season compared to last year. More than 90% of the peanuts area has been harvested so far. Due to the drought, the latest Crop Progress report in Texas showed the worst crop condition in the last five years. However, better production in other states will compensate for the lower expected yields from Texas. Overall, the U.S. Crop conditions were better, with more than 90% rated between fair and excellent (Graph 1).

Graph 1. Peanuts Crop Progress Report



Even with higher contract peanut prices during the beginning of the season, 2022 planted acreage decreased by 2.5%. High cotton and corn prices explain much of the acreage loss. Many farmers chose to grow those two crops which showed higher profitability then.

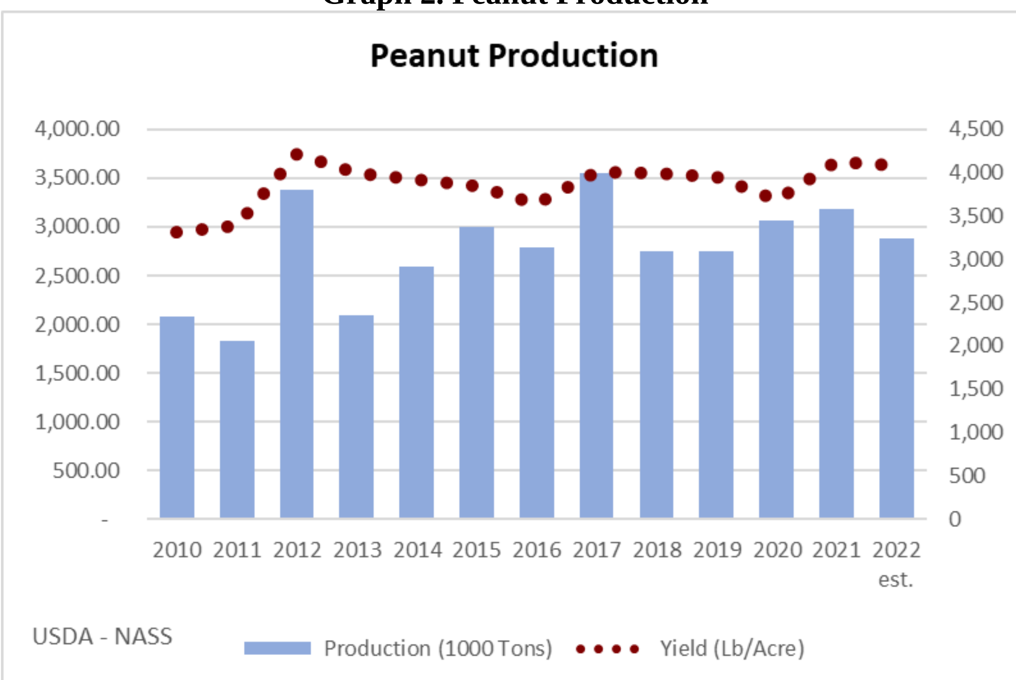
Further, harvested acres decreased substantially compared to last year (Table 1). Expected harvested acres are 8.7% lower this year (1.411 million acres). Due to the severe drought, Texas suffered a decline in harvested acres. Other states that showed fewer significant acres were Georgia, Florida, and Alabama.

Table 1. Peanut Harvested Acres

Peanut Harvested Acres (1000 acres) - USDA - NASS				
State	2021	2022	Change (Acres)	Change (%)
AL	182	163	-19	-10.4%
AR	35	32	-3	-8.6%
FL	158	147	-11	-7.0%
GA	750	680	-70	-9.3%
MS	17	13	-4	-23.5%
NM	11	7	-4	-36.4%
OK	15	17	2	13.3%
TX	162	140	-22	-13.6%
NC	114	116	2	1.8%
SC	66	68	2	3.0%
VA	30	28	-2	-6.7%
TOTAL	1,540	1,411	-129	-8.4%

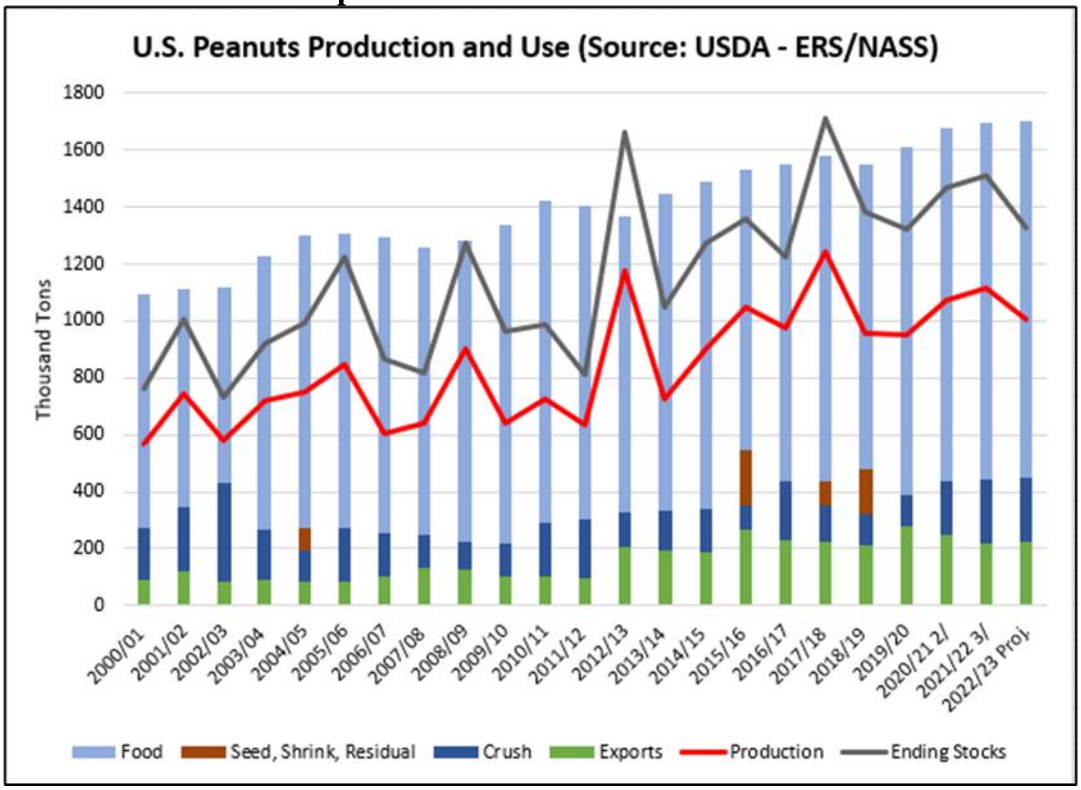
Even though projected yields for the harvested area are high at 4,090 Lb/acre, the lower harvested acreage reduced this season's potential production. USDA estimates production of 2,886 thousand tons for the current season, about 9.7% lower than last year (Graph 2).

Graph 2. Peanut Production



Given this production level, U.S. ending stocks are expected to decrease again to the 2020-21 level (923 thousand tons). Consumption of Shelled Peanuts (Raw Basis) Used in Primary Products and In Shell Peanuts increased by 0.3% for 2021-22, showing another consecutive increase in demand for peanut products. Peanut candy and in-shell peanuts led to U.S. demand growth. However, the U.S. total peanut disappearance decreased this last year due to lower exports to China.

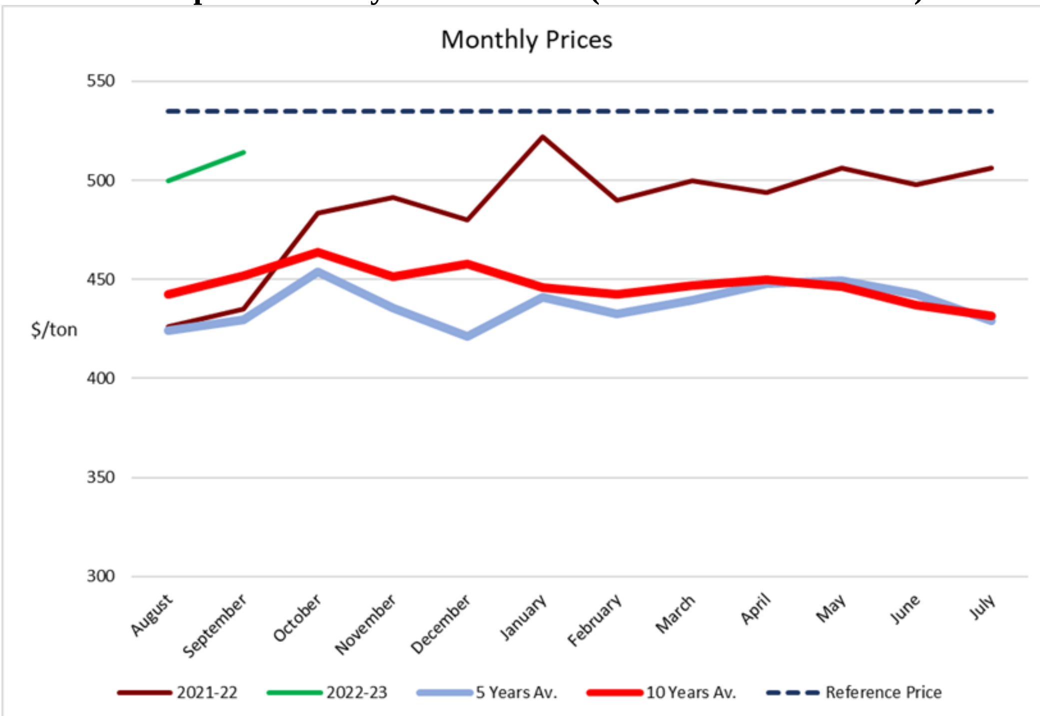
Graph 3. Peanuts Production and Use



Prices

The 2021-22 average price of $486/ton has been significantly higher than last year, the 10-year average price of $447/ton, and the five years average price of $437/ton. These prices reflect the competition in the area that has taken place in recent years, with record prices for cotton and corn (Graph 4).

Graph 4. Monthly Peanut Prices (Source: USDA – NASS)



Projected Production

Projected U.S. ending stocks for the 2022-23 crop can still vary depending on the final yield obtained in the following months and the expected level of U.S. demand and exports. Assuming an average harvested yield of 4.09 Lb/acre and a total consumption like last year, ending stocks will decrease below 1 million tons, like 2020-21 ending stocks (Table 2). The remaining question is whether U.S. consumption demand will stay at the current level and exports will recover. On the other hand, the high-level prices of corn will still compete for acres in many regions and help support peanut prices for next season.

Table 2. Supply and Demand Projections

Supply and Demand Projections							
	2018-19	2019-20	2020-21	Est 2021-22	Low Proj. 2022-23	Av. Proj. 2022-23	High Proj. 2022-23
Planted Acres ('000 acres)	1,408	1,421	1,664	1,582	1,543	1,543	1,543
Harvested Acres ('000 acres)	1,374	1,390	1,616	1,545	1,411	1,411	1,411
Yield (Lb/acre)	4.00	3.93	3.80	4.14	3.90	4.09	4.20
Beginning Stocks ('000 tons)	1,358	1,211	1,060	972	1,129	1,129	1,129
Production ('000 tons) + Imp.	2,748	2,734	3,067	3,194	2,752	2,886	2,963
Imports	59	57	61	58	58	58	58
Crush	324	387	437	445	450	450	450
Exports	600	805	709	625	650	650	650
Food	1,553	1,611	1,679	1,696	1,700	1,700	1,700
Seed, Loss, Shrink and Res.	478	139	392	329	350	350	350
Total Consumption	2,954	2,942	3,215	3,095	3,150	3,150	3,150
Ending Stocks ('000 tons)	1,211	1,060	972	1,129	789	923	1,001

Peanut Production Report - February 21, 2022. High Plains Weekly blog

Peanuts Market Outlook Update

This year, the market is still discovering contract peanut prices and acreage. While we have seen higher prices than last year, competition against corn and cotton prices and inputs costs will be key to defining contract prices and acreage this year.

U.S. Peanut Production

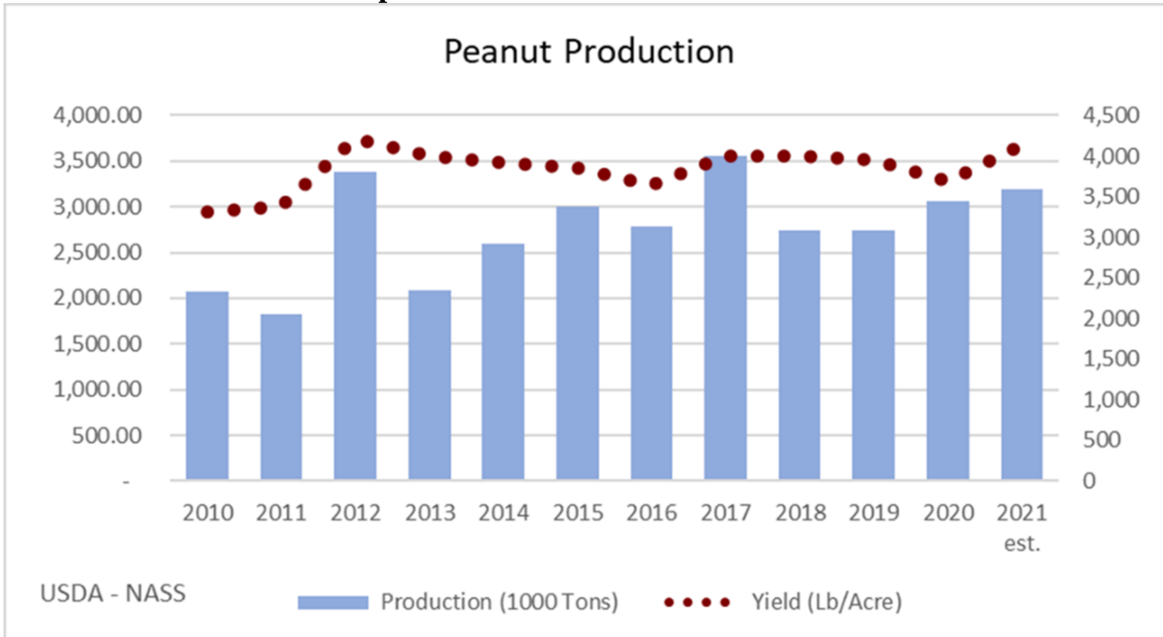
Last year we saw a reduction in planted acres even with higher contract peanut prices. 2021 planted acreage decreased by 4.9% (Table 1). High cotton and corn prices and the need for crop rotation in some areas were the leading cause of this acreage reduction.

Table 1. Planted Peanut acres per State. Source: USDA – FSA

Peanut Acreage per State (1000 acres) - USDA - Farm Service Agency								
State	2015	2016	2017	2018	2019	2020	2021/22	% Change
AL	195.0	172.7	192.8	163.1	156.2	185.0	185.0	0%
AR	16.3	23.1	29.3	25.3	32.9	39.0	38.0	-3%
FL	185.1	152.3	188.6	150.4	161.3	175.0	170.0	-3%
GA	781.8	714.3	830.1	659.5	667.5	810.0	760.0	-6%
MS	42.0	37.3	42.3	23.5	19.3	23.0	18.0	-22%
NM	4.9	8.0	8.5	5.9	5.0	6.2	11.0	77%
OK	8.2	11.4	19.2	14.3	14.1	15.0	16.0	7%
TX	164.2	300.9	271.1	149.4	158.5	190.0	170.0	-11%
NC	89.3	100.4	117.7	100.1	102.7	108.0	115.0	6%
SC	110.5	108.0	120.3	85.2	63.7	85.0	69.0	-19%
VA	18.1	20.2	26.3	23.5	24.2	28.0	30.0	7%
US	1,641.0	1,653.3	1,853.3	1,407.7	1,421.3	1,664.2	1,582.0	-4.9%

Even though acreage was smaller this last season, production was 4.1% higher than last season (3,194 tons). Twelve percent higher yields (4,135 Lb/acre) compensate for the loss of acreage Graph 1). These were the highest yields obtained since 2012. Total world production also increased by 2.2% during this current production year.

Graph 1. Peanut Production and Yields



U.S. Exports

Total Exports from the U.S. during 2021 showed a reduction of 25.7% compared to 2020 (Table 2). This reduction in exports can be mainly attributed to lower In Shell exports destined to China last year. Exports to China decreased by 62.9%.

Table 2. U.S. Peanut Exports.

United States Export Statistcs - January to December (Metric Tons)				
	2019	**2020**	**2021**	**% Change 2021-20**
Total Peanuts	**512,543**	**672,468**	**499,685**	**-25.7%**
Ground Nuts	17,614	18,783	18,388	-2.1%
Peanut Butter	41,026	39,100	42,317	8.2%
Shelled	329,592	292,229	271,361	-7.1%
In shell	100,370	304,097	141,364	-53.5%
Blanched	2,033	15,179	16,031	5.6%

	2019	**2020**	**2021**	**% Change 2021-20**
Exports to China	**67,171**	**328,308**	**121,917**	**-62.9%**

Source: American Peanut Council / US Department of Commerce.

The U.S. exported roughly 19% of total world exports in volume during these last five years. The United States ranks number 3 on world volume exports, below India and Argentina and above China, while producing approximately 6% of total world production. China imports during 2020 increased by more than 100%. These imports were lower during 2021. The main question today remains if China's high current level of imports will continue in the future.

Table 3. China Peanut Imports (2015-2020).

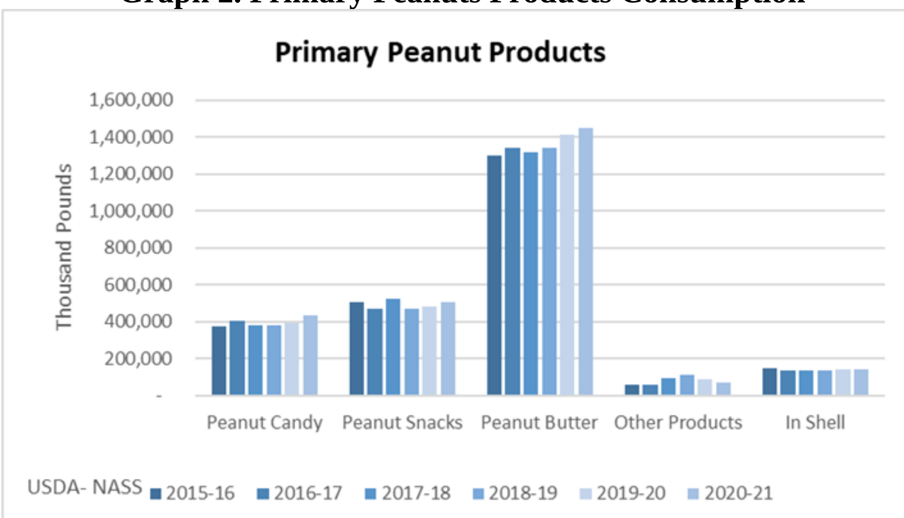
China Imports			
Year	World	US	Market Share (%)
2015	135,024	23,894	18%
2016	458,575	282,815	62%
2017	253,539	108,029	43%
2018	183,555	94,267	51%
2019	480,901	73,707	15%
2020	1,087,137	346,729	32%

Source: American Peanut Council

Domestic Demand

Domestic demand has continued increasing this last year. Shelled Peanuts (Raw Basis) Used in Primary Products and In Shell Peanuts increased by 3.4% for 2020-21, showing another consecutive increase in demand for peanut products. Peanut butter consumption, peanut snacks, peanut candy, and In Shell peanuts lead to this higher demand.

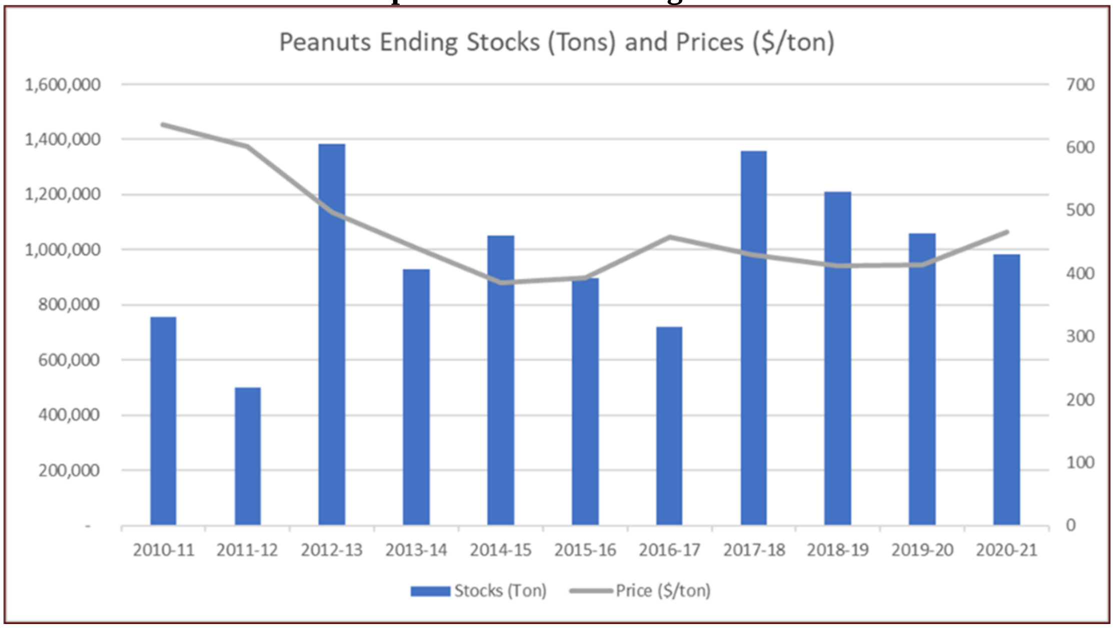
Graph 2. Primary Peanuts Products Consumption



Ending Stocks and Prices

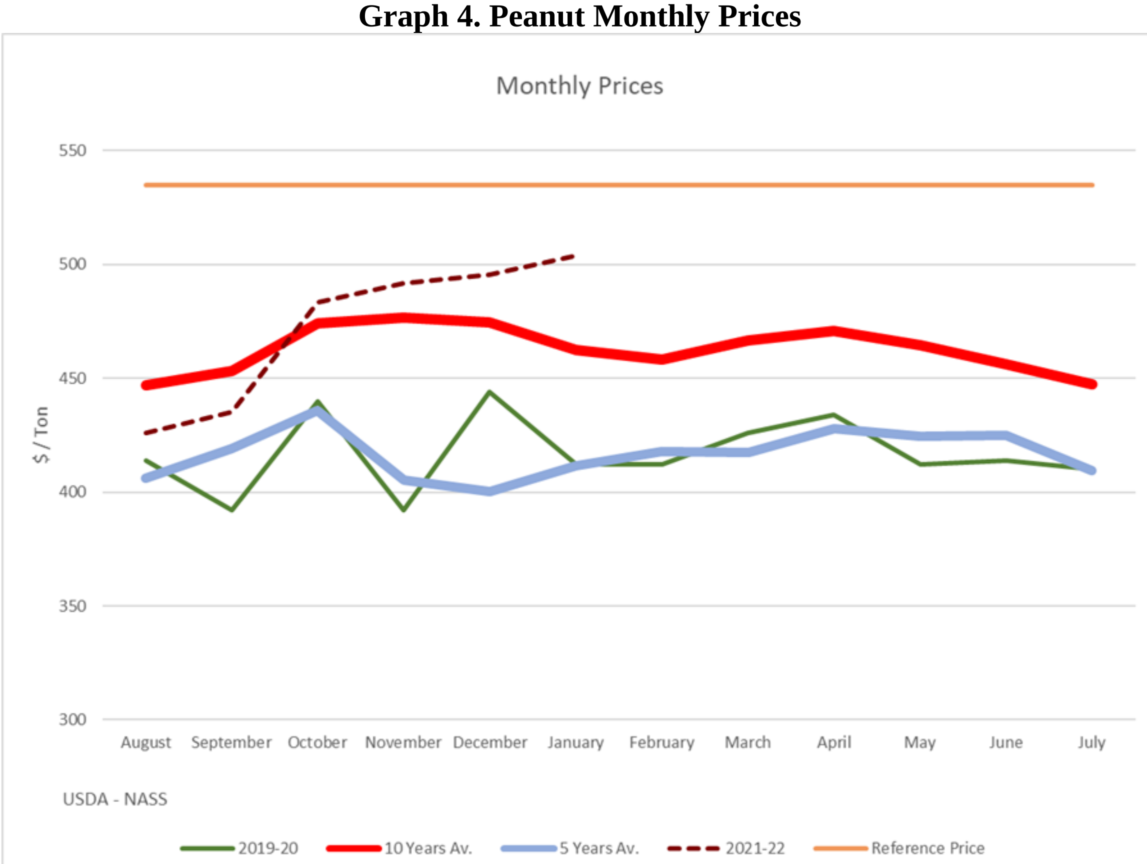
Higher exports and a robust domestic consumption overcame the higher production from the last two years. U.S. ending stocks have slightly decreased over these previous years. Ending stocks by July 2021 were the lowest from the previous four years, 984 thousand tons.

Graph 3. Peanuts Ending Stocks



As expected, 2021-22 prices have increased and are currently above the five and 10-year average. So far, 2021-22 average prices reported by USDA-NASS have an average of $473/ton. These levels of prices have been the highest from 2013-14.

Graph 4. Peanut Monthly Prices



Projected Ending Stocks

Projected U.S. ending stocks for 2022-23 crop showed similar ending stocks assuming little change in the planted and harvested acreage and lower exports (Table 4). Projected future ending stocks used an average yield of 3990 Lbs/acre. A reduction in planted acreage or harvested and lower yields might potentially reduce ending stocks to similar levels as the 2016-17 crop season.

The remaining question is whether U.S. consumption demand will keep at the current level and if exports will recover. The high-level prices of corn and cotton will compete for acres in many regions and help support peanut prices for the next season.

Table 4. Supply and Demand Projections

Supply and Demand Projections					
	2020-21	Est 2021-22	Low Proj. 2022-23	Av. Proj. 2022-23	High Proj. 2022-23
Planted Acres ('000 acres)	1,664	1,582	1,600	1,600	1,600
Harvested Acres ('000 acres)	1,616	1,545	1,536	1,536	1,536
Yield (Lb/acre)	3.80	4.14	3.60	3.99	4.21
Beginning Stocks ('000 tons)	1,059	984	1,037	1,037	1,037
Production ('000 tons)	3,067	3,194	2,761	3,068	3,229
Consumption ('000 tons)	3,142	3,142	3,042	3,042	3,042
Ending Stocks ('000 tons)	**984**	**1,037**	**756**	**1,063**	**1,224**

Production Costs

Breakeven prices have increased compared to last year's budgets. For a 2 ton/acre yield, the estimated District 1 and District 3 budget breakeven prices are $508/acre and $521/ton to cover total costs (Table 5). Total costs calculated in the district's budget included variable costs and fixed costs such as depreciation, equipment investment opportunity costs, and cash rent, which are highly variable between producers.

Overall commodity prices and input prices have increased during this last year. Locking contract prices at higher levels than total costs plus the farmer's expected profit margin is critical to keep farmers investing in new technologies and better production systems in the future.

Table 5. Estimated District Breakeven Prices

Est. Breakeven Prices to Cover Total Costs		
Yield (Tn/acre)	District 1	District 3
1.5	677	695
1.8	564	579
2.0	508	521
2.2	462	474
2.5	406	417

Price Loss Coverage

Peanuts are still one of the few crops where the USDA-FAS projected 2022-23 MYA price is lower than the reference price ($535/ton). USDA 2022-23 projected price of 430 $/ton is below the 2022 Effective reference price of 535 to calculate the Price Loss Coverage payment. Counter-cyclical payment yields per county in Texas vary from a minimum of 819 Lb./acre (0.41 Ton/acre) to a maximum of 5,519 Lb./acre (2.76 ton/acre). Assuming USDA projected price of 430 $/ton and similar base yields, estimated PLC payments per county will vary from 26 $/acre to 176 $/acre average per county (Table 5). This final estimated payment will depend on your farm's actual PLC base yield and the final reference price for the 2022-23 season, which could be higher.

Table 6. Estimated PLC Payment Rate for 2022-23 by County, Texas.

Estimated PLC Payment Rate for 2022/23 by County, Texas.											
County	Yield (Lbs/Ac)*	$/Acre	County	Yield (Lbs/Ac)*	$/Acre	County	Yield (Lbs/Ac)*	$/Acre	County	Yield (Lbs/Ac)*	$/Acre
Andrews	3,970	127	Eastland	2,173	69	Houston	1,283	41	Motley	2,982	95
Atascosa	3,546	113	Erath	2,268	72	Howard	3,986	127	Palo Pinto	912	29
Austin	1,875	60	Fannin	1,099	35	Hudspeth	3,986	127	Parker	819	26
Bailey	3,246	103	Fayette	1,144	36	Johnson	1,101	35	Parmer	3,840	122
Bastrop	1,319	42	Fisher	1,138	36	Jones	2,866	91	Pecos	2,970	95
Baylor	1,997	64	Floyd	2,427	77	Karnes	1,145	37	Randall	2,928	93
Bexar	1,262	40	Foard	3,004	96	Kent	1,633	52	Red River	1,183	38
Borden	4,074	130	Fort Bend	1,747	56	King	3,164	101	Reeves	1,256	40
Briscoe	3,194	102	Frio	3,905	124	Knox	3,276	104	Runnels	1,736	55
Brown	1,951	62	Gaines	4,151	132	Lamar	1,767	56	San Saba	1,076	34
Callahan	1,607	51	Garza	2,845	91	Lamb	3,526	112	Shackelford	3,461	110
Carson	3,750	120	Glasscock	2,846	91	Lampasas	2,978	95	Somervell	1,320	42
Castro	2,346	75	Gonzales	1,818	58	La Salle	3,074	98	Stephens	1,320	42
Cherokee	1,183	38	Grayson	1,149	37	Lavaca	1,085	35	Stonewall	1,320	42
Childress	2,158	69	Guadalupe	1,732	55	Lee	1,212	39	Swisher	1,320	42
Cochran	3,166	101	Hale	2,706	86	Live Oak	1,255	40	Taylor	1,003	32
Coleman	2,788	89	Hall	2,390	76	Llano	3,884	124	Terry	4,027	128
Collingsworth	2,206	70	Hamilton	1,335	43	Lubbock	2,906	93	Throckmort(	2,820	90
Colorado	1,136	36	Hansford	1,753	56	Lynn	3,766	120	Travis	4,272	136
Comanche	1,746	56	Hardeman	2,534	81	McCulloch	3,412	109	Waller	1,666	53
Cooke	1,231	39	Harris	1,682	54	McLennan	1,920	61	Wheeler	2,028	65
Cottle	1,890	60	Hartley	5,519	176	Martin	2,191	70	Wichita	1,342	43
Crosby	3,058	97	Haskell	3,333	106	Mason	4,201	134	Wilbarger	3,374	108
Dawson	4,245	135	Henderson	1,074	34	Medina	2,936	94	Williamson	1,066	34
Denton	1,162	37	Hidalgo	2,095	67	Milam	1,046	33	Wilson	2,497	80
DeWitt	1,506	48	Hill	886	28	Mills	2,054	65	Wise	1,078	34
Dickens	2,969	95	Hockley	3,283	105	Montague	1,312	42	Yoakum	3,846	123
Donley	3,593	115	Hood	1,101	35	Moore	3,569	114	Young	2,625	84
Duval	2,618	83									

* Counter-cyclical Payment Yields by County (Lbs Per Acre)

ARC-CO Max Expected Payment for Districts 1 and 3 average $98.4/acre. 2022-23 MYA prices should be lower than $460/ton to trigger an ARC-CO Peanuts payment. With every percentage price increase, county yield should decrease by the same amount to trigger a payment. If prices increase to $500/ton, average county yields should be reduced by 8%.

Table 7. ARC-CO Estimated District Summary – Peanuts

ARC-CO - Estimated DISTRIC SUMMARY - Peanuts

District	2022 Bench Mark Yield	2022 Benchmark Revenue	2022 Guarantee Revenue	Av. Price to Trigger Price ($/Ton)	Av. Yield to triggerd ARC Payment (bu/acre)						ARC Max Expected Payment ($/acre)
					430		460		500		
					Lb/acre	%	Lb/acre	%	Lb/acre	%	
District 1	3,880.9	1,038.1	892.8	460	4,153	7%	3,882	0%	3,571	-8%	103.8
District 3	3,479.2	930.7	800.4	460	3,723	7%	3,480	0%	3,202	-8%	93.1

The Agricultural & Food Policy Center at Texas A&M University has developed a 2022 ARC-CO/PLC Decision Aid (https://www.afpc.tamu.edu). This decision aid will help you understand the probability of receiving a payment, and how your choices under the 2018 Farm Bill may affect your FSA payment based on your decisions and farm history.

2023 Estimated Costs and Returns per Acre
Irrigated Peanuts
Rolling Plains Extension District - 3

Crop Acres	120				
REVENUE	Quantity	Units	$/Unit	Total	Enterprise Total
Runner Peanuts	2.00	Ton	$575.00	$1,150.00	$138,000.00
Total Revenue				$1,150.00	$138,000.00
VARIABLE COSTS	Quantity	Units	$/Unit	Total	Enterprise Total
Production Costs					
Custom					
Drying - Peanut	2	Ton	$30.00	$60.00	$7,200.00
Fertilizer Application	1	Acre	$5.00	$5.00	$600.00
Fertilizer					
Fertilizer (N)	80	Pound	$0.79	$63.20	$7,584.00
Fertilizer (P)	50	Pound	$0.63	$31.50	$3,780.00
Herbicide					
Prowl	24	Ounces	$0.39	$9.37	$1,124.78
Valor SX	2	Ounce	$0.32	$0.64	$76.50
Cobra	12.5	Ounce	$1.90	$23.71	$2,845.31
Seed					
Peanut Seed	90	Pound	$0.95	$85.50	$10,260.00
Fungicides					
Folicular Fungicide-Abound	24.5	Ounce	$1.48	$36.36	$4,362.91
Fungicide - Bravo	1.5	Pint	$3.56	$5.34	$641.25
Irrigation					
Energy Cost	18.95	AcreInch	$6.75	$127.91	$15,349.50
Irrigation Labor	1.21	Hour	$15.00	$18.12	$2,174.40
Machinery Labor					
Tractors/Self-Propelled	1.85	Hour	$15.00	$27.75	$3,330.00
Other Labor	2.22	Hour	$15.00	$33.30	$3,996.00
Diesel Fuel					
Tractors/Self-Propelled	22.61	Gallon	$3.49	$78.91	$9,469.07
Gasoline					
Pickup/General Use Equipment	1	Acre	$6.38	$6.38	$765.00
Repairs & Maintenance					
Pickup/General Use Equipment	1	Acre	$2.13	$2.13	$255.00
Irrigation Equipment	1	Acre	$16.67	$16.67	$2,000.44
Tractors/Self-Propelled	1	Acre	$39.54	$39.54	$4,744.50
Implements	1	Acre	$13.36	$13.36	$1,603.37
Interest on Credit Line			7.50%	$24.98	$2,997.11
Total Variable Costs				$709.66	$85,159.14
Planned Returns Above Variable Costs:				$440.34	$52,840.86
Breakeven Price to Cover Variable Costs			$354.83	Ton	
FIXED COSTS	Quantity	Units	$/Unit	Total	Enterprise Total
Machinery Depreciation					
Pickup/General Use Equipment	1	Acre	$2.95	$2.95	$354.03
Irrigation Equipment	1	Acre	$24.70	$24.70	$2,964.00
Tractors/Self-Propelled	1	Acre	$116.24	$116.24	$13,948.38
Implements	1	Acre	$16.62	$16.62	$1,994.42
Equipment Investment					
Pickup/General Use Equipment	$20.67	Dollars	6.50%	$1.34	$161.19
Irrigation Equipment	$720.42	Dollars	6.50%	$46.83	$5,619.25
Tractors/Self-Propelled	$870.50	Dollars	6.50%	$56.58	$6,789.86
Implements	$228.11	Dollars	6.50%	$14.83	$1,779.28
Cash Rent - Peanuts	1	Acre	$90.00	$90.00	$10,800.00
Total Fixed Costs				$370.09	$44,410.41
Total Specified Costs				$1,079.75	$129,569.56
Returns Above Specified Costs				$70.25	$8,430.44
Breakeven Price to Cover Total Costs			$539.87	Ton	

Francisco Abelló, Assistant Professor and Extension Specialist, Texas A&M AgriLife Extension, 940-647-3908

Information presented is prepared solely as a general guide and not intended to recognize or predict the costs and returns from any one operation. Brand names are mentioned only as examples and imply no endorsement.

Figure 3. Irrigated peanut enterprise budgets for AgriLife Extension District 3, available at Texas A&M AgriLife Extension Service (netdna-ssl.com)

EXTENSION AND OUTREACH EFFORT TO DELIVER TIMELY INFORMATION TO TEXAS PEANUT GROWERS

Emi Kimura, State Extension Peanut Specialist, Texas A&M AgriLife Extension, Vernon, TX
Pancho Abello, Extension Economist, Vernon, TX
Paul DeLaune, Environmental Soil Scientist, Vernon, TX
Peter Dotray, Weed Scientist, Lubbock, TX
James Grichar, Senior Research Scientist, Corpus Christy, TX
Katie Lewis, Soil Chemistry and Fertility Scientist, Lubbock, TX
Joshua A. McGinty, Extension Agronomist, Corpus Christy, TX

2022 Peanut programs

Date	Location	Program	Number of attendees
4/6	Comanche, TX	Peanut program	30
9/16	Pearsall, TX	Peanut field day	50
9/17	Wellington, TX	Cotton peanut field day	50
2/27	Pearsall, TX	Annual peanut meeting	50

2022-2023 Peer-reviewed/Extension publications
Completed/published

1. Kimura, E., J.M. Cason, K. Lewis, M. Baring, D. Drozd, J, Ramirez, T. Royer, I. Yates, D. Dobitz, D. Kelley, D. Rankin, G. Macias, J. Lopez, K. Patterson, L. Reagan, M. Berry, T. Millican, and G. Cooper. 2023. Texas peanut variety trials 2022. Texas A&M AgriLife Extension Service. SCSC-2022-16.
2. Boogades, N., E. Kimura, W. Keeling, L. E. Stortz, K. Lewis, P. DeLaune, and T. Gentry. **2023**. Conservation management effects on soil function in a transitioning organic cotton – peanut rotation. Southern SARE. Texas A&M AgriLife Extension Service. SCSC-2023-02.
3. Kimura, E., J. Grichar, P. Dotray, and J. McGinty. 2023. Suggestions for weed control in peanuts. Texas A&M AgriLife Extension Service. SCS-2023-01.
4. Monclova, C., J. Shockey, and E. Kimura. 2022. Fungicide timings and combination to control peanut pod rot. 2021 TPPB funded project factsheet.
5. DeLaune, P., K. Lewis, and E. Kimura. 2022. Evaluation of cover crop practice in peanut production system. 2021 TPPB funded project factsheet.
6. McGinty, J., J. Grichar, and E. Kimura. 2022. Herbicide programs for control of Palmer amaranth in south Texas peanut. 2021 TPPB funded project factsheet.
7. Obasa, K. and L. Haynes. 2022. Two new bacterial pathogens of peanut, causing early seedling decline disease. Identified in the Texas Panhandle. Plant dis. 106(2): 0191-2917. Doi: https://doi.org/10.1094/PDIS-07-21-1555-RE.

Under preparation

1. Kimura, E., B. Whitney, P. DeLaune, K. Lewis, and J. Cason. 2023. Quick fertilizer guide for Texas Peanut. Texas A&M AgriLife Extension Service. SCSC-XXX.

2022 Extension Presentations

1- Abello, F. "Peanuts Market Forecasts." Organic Cotton and Peanut Production Seminar. Seminole, Texas. January 26, 2022.

2022 Media/digital engagement

Websites

1. Kimura, E., J. Cason, C. Simpson, P. Dotray, J. McGinty, J. Grichar, P. DeLaune, K. Lewis, C. Monclova, and F. Abello. 2022. Texas Peanut Variety Trial. AgriLife Extension website. 10418 page views.
2. The Vernon Daily Record. Peanut Market Update “Spotlight on Agriculture”. December 1, 2022. William Humphrey. https://www.vernonrecord.com/ (1,200 subscribers)
3. Abello, F. J., J. Benavidez. “Peanut Market Update”. November 21, 2022. High Plains Weekly blog. https://agrilife.org/agecon/high-plains-ag-week-11-21-2022-peanut-market-update/
4. AgriLife Today. “Texas Peanut Production Below Average, Prices Strong”. College Station, Texas. September 13, 2022. Russell Adam. https://agrilifetoday.tamu.edu/2022/09/13/texas-peanut-production-be/
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2022 Popular press articles

Completed/published

1. ***The Peanut Grower*** Balkcom, K., D. Jordan, S. Monfort, and **E. Kimura**. 2022. The Peanut Pointer. Edited by H. Amanda. July issue.
2. Balkcom, K., D. Jordan, S. Monfort, and **E. Kimura**. 2022. The Peanut Pointer. Edited by H. Amanda. June issue.
3. Balkcom, K., D. Jordan, S. Monfort, and **E. Kimura**. 2022. The Peanut Pointer. Edited by H. Amanda. May issue.
4. Balkcom, K., D. Jordan, S. Monfort, and **E. Kimura**. 2022. The Peanut Pointer. Edited by H. Amanda. April issue.
5. Balkcom, K., D. Jordan, S. Monfort, and **E. Kimura**. 2022. The Peanut Pointer. Edited by H. Amanda. March issue.

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1. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #22. November 9, 2022.
2. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #21. October 28, 2022.
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4. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #19. October 1, 2022.
5. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #18. September 17, 2022.
6. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #17. September 6, 2022.
7. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #16. August 19, 2022.

8. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #15. August 5, 2022.
9. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #14. July 22 2022.
10. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #13. July 11, 2022.
11. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #12. June 26, 2022.
12. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #11. June 11, 2022.
13. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #10. May 29, 2022.
14. Mills, F. Jr., Q. Li, D. DeShazo, **E. Kimura**, D. Jordan, and T. Faske. 2022. In a Nutshell. JLA. Vol. 29. #9. May 15, 2022.

Peanut proposals

Funded proposals:
1. Kimura, E., K. Lewis, P.B. De Laune, P. Dotray, J. Grichar, J, McGinty, and M. Baring. 2022. Improving Texas peanut grower profitability. Texas Peanut Producers Board (TPPB). $90,000.
2. Howes et al. 2022. Texas Climate-Smart Initiative. USDA NRCS. $65M.

Proposals submitted:
1. Cason, J., C. Simpson, B. McCutchen, M. Burow, N. Puppala, K. Lewis, C.M. Santana, P. Dotray, T. Gentry, E. Kimura, and P. DeLaune. 2022. Research, Development, and Evaluation of ‘Diesel Nut’ Oil-Crop Feedstocks. Chevron Technical Center. $6,359,339.
2. Cason, J., C. Simpson, B. McCutchen, M. Burow, N. Puppala, K. Lewis, C.M. Santana, P. Dotray, T. Gentry, E. Kimura, and P. DeLaune. 2022. Addressing the Challenges of Organic Peanut Production with Conservation Management Strategies and Breeding. USDA-OREI. $1,497,858.