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ID #66
Project
continues to
next year

TX

**Long-term P, K, & Micronutrient Fertility for
West Texas Peanut-Cotton Cropping System
Gaines and Dawson County, Texas (Year 2)**

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OBJECTIVE:

Response to P and K fertilizer in peanut is often difficult to measure. Soil tests in West Texas report high K, and P is often high as well. One- and two-year fertility projects addressing P and K in peanuts will not provide adequate results. A long-term fertility project is needed whereby peanut, as well as its rotational crop (cotton), is fertilized at a range of nutrient levels, each of which are retained on the same land area over time. Results will assist producers in examining the economic value of P and K for peanut and cotton in a three-year rotation.

The objective of this proposal is to continue the two long-term P&K fertility sites (AGCARES, Lamesa, TX; Western Peanut Growers facility, Gaines Co., TX) to gauge long-term impact and optimum levels of different P and K fertilizer regimes in a three-year peanut-cotton rotation.

METHODS AND PROCEDURES:

Peanuts

	<u>Gaines County</u>	<u>Dawson County</u>
Soil Type:	Brownfield loamy sand	Amarillo fine sandy loam
Peanut variety:	Flavor Runner 458	Flavor Runner 458
Planting:	May 4, 2002, on 36" rows	May 2, 2002 on 40" rows
Previous Crop:	Cotton (2 years)	Cotton (2 years)
Seeding Rate:	~4.5 seeds per row foot	~5 seeds per row foot
Plot Set-up:	RCBD, four reps for each of 6 treatments	Same
Harvest Area:	4 rows X 40'	4 rows X 40'
Inoculant:	LiphaTech Lift liquid	Urbana granular
N Fertilizer:	40 lbs. N/A applied with pivot	None
Herbicide:	Sonolan	Prowl
Insecticide:	None	None
Rainfall:	~5.2" during the growing season	4.9" during growing season
Irrigation level:	~19"	15.5"
Date Dug:	November 4, 2002	October 10, 2002
Date Harvested:	November 13, 2002	October 18, 2002

Cotton

	<u>Gaines County</u>	<u>Dawson County</u>
Soil Type:	Brownfield loamy sand	Amarillo fine sandy loam
Cotton variety:	Paymaster 2326 RR	Paymaster 2326RR/BG
Planting:	May 16, 2002, on 36" rows	May 9, 2002 on 40" rows
Previous Crop:	Set 1, cotton; set 2, peanuts	Set 1 (UNR), cotton; set 2, peanuts
Seeding Rate:	~16 lbs./A	17 lbs./A
Plot Set-up:	RCBD, four reps for each of 6 treatments	Same
Harvest Area:	2 rows X 52.5' (stripper)	6.7' X 13' 1" (hand)
N Fertilizer:	60 lbs. N/A	~60 lbs. N/A
Herbicide:	Prowl, 1.5 pt./A	Treflan, 1.5 pt/A
Rainfall:	~4" during the growing season	4.9" during growing season
Irrigation level:	~13"	11.2"
Date Harvested:	December 2, 2002	October 14, 2002

Each individual plot was marked and the position recorded with a GPS unit so we can come back on the same location in 2003. Soil samples were collected from 0-12" depth.

Texas A&M soil tests on the peanut ground indicated WPG indicated average 23 ppm P (moderate) and potassium, 245 ppm K (high); at AGCARES 25 ppm P (moderate), and potassium, 216 K (high). No particular trends were observed reflecting application (or lack thereof) of P and K in 2001.

Fertilizer application for P used 10-34-0 applied with a rolling coulters leading a knife rig, banded 4" deep. Equivalent amounts of N were applied to each plot to ensure that all plots received the same amount of N. Potash application for K used 0-0-60, which also was incorporated into the surface.

RESULTS AND DISCUSSION:

Peanut

There was no significant yield response to P or K at either location in this second year of fertilizer application. Yields at WPG were excellent. We believe that as this study continues for up to six years that crop response may begin to respond to residual fertility. This information should be valuable in helping West Texas peanut and cotton farmers gauge the value of their particular approach to fertilizer use.

Table 1: Peanut yield response to P and K at Western Peanut Growers, 2002 (second year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Peanut Yield (lbs./A)^	Grade (%SMK+SS)
1	0	0	5590 a	76.5 a
2	30	0	5847 a	76.9 a
3	60	0	5735 a	77.4 a
4	0	80	5363 a	75.9 a
5	30	80	5549 a	76.8 a
6	60	80	5967 a	76.4 a
Trial average			5675	76.7
P-Value:	0.338	0.635		0.403
P-Value interaction (P2O5 X K2O): 0.523				
Least significant difference (LSD), 0.05			N/A	N/A
Trial coefficient of variation (CV)			9.2%	3.5%

^Means in the same column followed by the same letter are not significantly different at the 0.05 significance level.

Table 2: Peanut yield response to P and K at AGCARES, 2002 (second year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Peanut Yield (lbs./A)^	Grade (%SMK+SS)
1	0	0	3608 a	70.0 a
2	30	0	3775 a	68.1 a
3	60	0	3590 a	69.2 a
4	0	80	3541 a	70.5 a
5	30	80	3569 a	69.8 a
6	60	80	3704 a	69.3 a
Trial average			3662	69.6
P-Value:	0.663	0.565		0.837
P-Value interaction (P2O5 X K2O): 0.371				
Least significant difference (LSD), 0.05			N/A	N/A
Trial coefficient of variation (CV)			7.1%	2.8%

^Means in the same column followed by the same letter are not significantly different at the 0.05 significance level.

Cotton

At WPG a strong response to P was indicated in this the second year of the long-term study. No response to K was observed, which is not expected in light of high soil K. Yield response to P was significant at both levels of P application. No statistical response was observed at AGCARES although at one of two sites there we found a trend with P application ($P = 0.135$). No response to K was observed at AGCARES.

Table 3: Cotton yield response to P and K at Western Peanut Growers, 2002 (northwest pie, cotton after cotton after peanut, second year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	811 c
2	30	0	994 a
3	60	0	1007 a
4	0	80	869 bc
5	30	80	984 ab
6	60	80	1040 a
Trial average			951
P-Value:	0.0139	0.5790	124
P-Value interaction (P2O5 X K2O): 0.8471			
Least significant difference (LSD), 0.05			
Trial coefficient of variation (CV), 14.1%			

^Means in the same column followed by the same letter are not significantly different at the 0.05 significance level.

Table 4: Cotton yield response to P and K at Western Peanut Growers, 2002 (northeast pie, cotton after peanut after cotton, second year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	1075 b
2	30	0	1297 a
3	60	0	1251 a
4	0	80	1120 b
5	30	80	1269 a
6	60	80	1300 a
Trial average			1213
P-Value:	0.0198	0.3649	118
P-Value interaction (P2O5 X K2O): 0.7550			
Least significant difference (LSD), 0.05			
Trial coefficient of variation (CV), 10.5%			

^Means in the same column followed by the same letter are not significantly different at the 0.05 significance level.

Table 5: Cotton yield response to P and K at AGCARES, 2002 (south pie, cotton after cotton after peanut, second year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	1078 a
2	30	0	1008 a
3	60	0	984 a
4	0	80	952 a
5	30	80	961 a
6	60	80	1000 a
Trial average			997
P-Value:	0.775	0.168	N/A
P-Value interaction (P2O5 X K2O): 0.302			
Least significant difference (LSD), 0.05			
Trial coefficient of variation (CV), 8.9			

^Means in the same column followed by the same letter are not significantly different at the 0.05 significance level.

Table 6: Cotton yield response to P and K at AGCARES, 2002 (northwest pie, cotton after peanut after cotton, second year of long-term same site study).

Treatment	P2O5 (lbs./A)	K2O (lbs./A)	Lint Yield (lbs./A)^
1	0	0	1195 a
2	30	0	1228 a
3	60	0	1278 a
4	0	80	1174 a
5	30	80	1261 a
6	60	80	1323 a
Trial average			1243
P-Value:	0.135	0.682	N/A
P-Value interaction (P2O5 X K2O): 0.814			
Least significant difference (LSD), 0.05			
Trial coefficient of variation (CV), 8.8			

^Means in the same column followed by the same letter are not significantly different at the 0.05 significance level.

