Peanut Research & Educational Review for

The Texas Peanut Producers' Board

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Report #	Subject	Principal Investigator	Title
1	Agronomy	Todd Baughman	Peanut Management Systems
2	Weed Science	Peter Dotray James Grichar	Weed Control in the High and Rolling Plains and in South Texas Peanut Production
3	Plant Pathology	Chip Lee	Devising and Demonstrating Control Schemes for Peanut Diseases
4	Plant Pathology	Terry Wheeler	Survey of West Texas Peanut Fields for Frequency of Pod Rot Diseases, and Testing of Pythium Pod Rot Fungicides
5	Plant Pathology	A.J. Jaks	Use of Fungicides, Varieties and Spray Program in South Texas Peanut Production
6	Plant Pathology	Justin Tuggle	Development of Pod Rot Risk Index
7	Nematology	James Starr	Development of Peanut Cultivars with High O/L Ratios and Root-Knot Nematode Resistance
8	Breeding	Mark Burow Michael Baring	Peanut Breeding and Testing
9	Marketability	Michael Franke	Technical Support to TPPB for Directing Flavor and Marketability Research in West Texas
10	IPM	Pat Porter	New Peanut Pest Management Resources for the Southern High Plains
11	Irrigation	Dana Porter	Irrigation Water Management: Irrigation Scheduling and Application Methods

Report #	Subject	Principal Investigator	Title
12	Quality	Tim Sanders	A Survey of Peanut Buying Points in West Texas to Assess Harvest Maturity Level and Curing Temperatures
13	Quality	Tim Sanders	Comparison of Flavor Characteristics of High and Normal Sugar Level Peanuts Cured at Various Temperatures
14	Quality	Tim Sanders	Effect of Soil Temperature Modification on Sugar Content and Related Physiology in Peanuts in West Texas
15	Quality	Tim Sanders	Reduction of Pod Temperatures in Windrows with Spray Application of Surround ®, a Kaolin Based Wettable Powder
16	Agronomy	Calvin Trostle	West Texas Peanut Nutrition with Rhizobium and Nitrogen
17	Physiology	Mike Schubert	Peanut Physiology Research in Northwestern Texas
18	Plant Pathology	Mark Black	Peanut Disease Screening Nurseries and Other 2003 Work

Report No. 1

Peanut Management Systems

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Jim Reed, Research Technician; TAES - Vernon R&E Center

Summary

Eight variety trials were conducted this past year to assess new and existing commercial varieties. This included an evaluation of Spanish, runner, and Virginia market-types. There were no differences in yield with the Spanish varieties. When averaged across location Carver, Andru II, Tamrun 96, and FlavorRunner 458 (runner) all yielded more than 4000 lbs/A. NC12C and Gregory (Virginia) averaged over 5000 lbs/A. Two trials were conducted to investigate performance of different market-types within the same field. Runner varieties yielded more than Virginia followed by Spanish. Two row-pattern trials were conducted to evaluate twin-row versus single row plantings. Neither Spanish nor runner market-types were affected by row pattern. Simulated hail damage only affected peanut yields when the peanut were defoliated to a level of 99% during the full bloom peanut growth stage. Participated in numerous state and regional educational programs, including programming about peanut to elementary school children.

Introduction

Growers are faced with numerous production issues each year. New varieties, herbicides, and other products must be continually evaluated to determine their contribution to overall profitability. Several new varieties were released this past year which need to evaluate in Texas to determine their overall feasibility and adaptability. The Extension Agronomy Peanut Team continues to try to address many of these issues and provide answers to grower's questions. In addition, educational efforts were conducted throughout the state at several events. The results of many of the agronomic studies will be discussed in this report while the weed management projects are presented in the separate weed control report.

Discussion

Variety trials were conducted this past year in Collingsworth, Gaines, Lamb, Motley, Terry, and Yoakum counties. Variety trials investigated Spanish, runner, and Virginia market-types. Yields were fair to good across most of the state, with excellent yields in some areas. All market-types were later maturing this year and in some cases grades were lower than normal. The reason for this delay in maturity was most likely due to several factors, cooler than normal June and September which was accompanied by overcast and cloudy weather that resulted in lower than normal solar radiation. While this cooler weather temperature most likely affected yield and quality extremely high temperatures in July and August most likely hampered development as well. Finally a warm October may have allowed for late peanuts to develop enough to actually be harvested and be of lower quality and reduce overall grade. Varieties entered in the Spanish trials included TAMSPAN 90, OLin, AT9899-14, and GA 982502 High O/L. Varieties entered in the Runner trials included TAMRUN 96, TAMRUN OL 01. TAMRUN OL 02, Nematam, FlavorRunner 458, Andru II, Carver, GP-1, Norden, and GA 982502 High O/L. Varieties entered in the Virginia trials included NC7, NC12C, VC2, Gregory, Jupiter, and Perry.

There were no differences in yields between the Spanish varieties at either Collingsworth or Lamb County. Yields were less than 2000 lbs/A with all varieties at Collingsworth County. Yields were higher than 3000 lbs/A with all varieties except AT9899-14 in Lamb County. OLin had a higher grade (75%) than all varieties in Lamb County while there was no difference in grades at Collingsworth County. A third Spanish variety trial was planted in Terry County but was lost due to hail damage. Tamrun OL 02 was the only variety that yielded more than 4000 lbs/A at Collingworth County. Carver, Nematam, Tamrun 96, and FlavorRunner 458 all yielded similar to Tamrun OL 02 at this location. FlavorRunner 458 had a grade of 80 and was similar to Nematam Tamrun 96, and Norden. Andru II and Carver yielded more than 5000 lbs/A at Motley County. Tamrun OL 02, Tamrun 96, and FlavorRunner 458 had similar yields to these varieties. There was no difference in grade between any of the varieties. GP-1 and FlavorRunner 458 each yielded more than 4200 lbs/A at Western Peanut Growers. Norden and Carver had similar yields at Western Peanut Growers. Carver had a higher grade (78%) than any of the other varieties. A runner variety trial was planted in Terry County but was lost to a late season hail storm. NC12C, Gregory, and Perry all yielded more than 3000 lbs/A at the Western Peanut Growers Farm. There was no difference in grades between varieties, and a similar percentage of extra large kernels with the exception of VC2. Perry yielded greater than 7000 lbs/A, while VC2, Gregory, and NC12C all had similar yields at Yoakum County.

Two market-type trials were established at the Ag-Cares Farm in Dawson County and at the Western Peanut Growers Farm in Gaines County to evaluate yields and grades of the various types. The Spanish varieties were dug on September 23 at both locations, followed by the Virginia varieties which were dug on October 1, and the runner varieties which were dug on October 16 at Ag-Cares and on October 8 at Western Peanut Growers. This resulted in a difference in digging dates of 23 and 15 days between Spanish and runners and 15 and 7 days between Virginia and runners. The runner market-types yielded more than the Virginia which yielded more than Spanish market-types at Ag-Cares. There was no difference between the varieties at Ag-Cares within a market-type. The runner market-types had a higher grade than any of the other market-types. FlavorRunner 458 yielded more and had a higher grade than any of the other market-types or varieties at Western Peanut Growers. There was no difference between NC7 and VC2 yields. There was also no difference in yield between Tamspan 90 and OLin whether they were planted in a single or twin row configuration.

Row pattern studies were conducted in Collingsworth and Terry counties. The Collingsworth County trial was planted with Spanish (OLin) in a single row pattern at 4 and 6 seed/ft and in a twin-row pattern at 4, 6, and 8 seed/ft. The Terry County trial included both Spanish (OLin) and runner (FlavorRunner 458) in the same patterns and seeding rates. There was no difference in yield or grade at either of the locations with row patterns or seeding rates. However, yields were quite variable at both locations.

A study was conducted in Wilbarger County to evaluate the effects of hail damage (simulated with a weed eater) on peanut yields. The simulated hail was performed at beginning bloom and full bloom. Peanut were defoliated at levels in which 33, 66, or 99% of the above ground vegetative biomass was removed. The only defoliation treatment that reduced yields was when peanuts were defoliated at full bloom and 99% defoliation level. Grades were not affected by any of the defoliation treatments. This is the first year of this study, and as observed from producers fields latter season hail damage can severely reduce yields.

Acknowledgements

Appreciation is extended to the Texas Peanut Producers Board for assistance in funding this research and the Extension Peanut Agronomy Program. I would also like to thank each of the producers: Dan & Rex Henard, Devin Kieshnick, Billy Shannon, Michael Souder, Andy Timmons, and Jet Wilmeth, who devoted land, time, and equipment for these studies. In addition the support of the Western Peanut Growers Farm near Denver City and the Ag-Cares Farm near Lamesa are appreciated. Without their assistance and interest none of this research would be possible. I would like to thank each of the CEA-Ag agents: Dale Dunlap, Collingsworth; Lonnie Jenske, Motley; and Jerry Warren, Terry Counties for their help and interest. Finally a big thanks to Jim Reed; Trey Carter; Jason Baker; Chip Lee and crew; Peter Dotray, Wayne Keeling, and the weed science crew, and Mike Schubert and crew at Lubbock; the crews at Ag-Cares and Western Peanut Growers, and James Grichar and the South Texas crew for technical assistance.

Table 1. Spanish peanut variety trial, Lamb County (LMC) Andy Timmons Farm and Collingsworth County (CWC) Michael Souder Farm, 2003.

	Yield			Grade		
Variety	LMC	CWC	Mean	LMB	CWC	Mean
	-------------(lb/A)-------------			--------------(%)---------------		
Tamspan 90	3110	1780	2450	73	61	67
OLin	3040	1760	2400	75	61	68
AT9899-14	2900	1660	2280	73	64	69
GA 982502 High O/L	3570			69		
FlavorRunner 458	3840			73		
LSD (10%)	NS	NS		4	NS	
C.V.	17	37		6	7	
Mean	3290	1730		73	62	

Lamb County – planted (5/12/03), dug (11/4/03, 176 days), harvested (11/11/03); Collingsworth County – planted (5/5/03), dug (9/29/03, 147 days), harvested (10/21/03).

Table 2. Runner peanut variety trial, Collingsworth County (CWC) Dan and Rex Henard Farm, Gaines County (GNC) Western Peanut Growers Farm, and Motley County (MOC) Billy Shannon Farm, 2003.

Variety	Yield				Grade			
	CWC	GNC	MOC	Mean	CWC	GNC	MOC	Mean
	--------------(lb/A)--------------				---------------(%)---------------			
Carver	3920	4060	5260	4410	76	78	69	74
Andru II	3350	3550	5450	4120	75	76	70	74
Tamrun 96	3810	3910	4550	4090	78	75	69	74
FlavorRunner 458	3780	4230	4250	4090	80	77	67	75
Tamrun OL 02	4060	3430	4340	3940	76	75	71	74
GP-1	3420	4260	3830	3840	78	76	70	75
Norden	3440	4060	3900	3800	78	75	71	75
Tamrun OL 01	3610	3610	4120	3780	77	75	67	73
Nematam	3870	3480	3430	3590	79	75	69	74
GA 982502 High O/L	3050	3710		3380	77	74		76
LSD (10%)	310	400	1090		2	1	NS	
C.V.	6	9	18		2	1	4	
Mean	3630	3830	4350		77	76	69	

Collingsworth County – planted (5/6/03), dug (10/13/03, 168 days), harvested (10/21/03); Gaines County - planted (4/29/03), dug (10/8/03, 162 days), harvested (10/15/03); Motley County - planted (5/20/03), dug (10/22/03, 155 days), harvested (10/30/03).

Table 3. Virginia peanut variety trial, Gaines County (GNC) Western Peanut Grower Farm and Yoakum County (YKC) Jet Wilmeth Farm, 2003.

Variety	Yield			Grade
	GNC	YKC	Mean	GNC
	--------------------(lb/A)--------------------			------(%)-------
NC12C	3680	6660	5170	73
Gregory	3270	6660	4970	73
Perry	3250	7010	5130	74
NC7	2760	6520	4640	74
Jupiter	2740	6040	4390	74
VC2	2550	6970	4760	74
LSD (10%)	290	410		NS
C.V.	8	5		2
Mean	3040	6640		74

Gaines County – planted (4/29/03), dug (10/1/03, 155 days), harvested (10/15/03); Yoakum County – planted (5/7/03), dug (10/8/03, 154 days), harvested (10/15/03).

Table 4. Market-type trial, Dawson County (DWC) Ag-Cares Farm and Gaines County (GNC) Western Peanut Growers Farm, 2003.

	Yield			Grade		
Variety	DWC	GNC	Mean	DWC	GNC	Mean
	-------------(lb/A)-------------			--------------(%)---------------		
FlavorRunner 458	4580	4540	4560	67	78	73
Tamrun OL 02	4300	3560	3930	66	75	71
VC2	3350	3610	3480	59	73	66
NC7	3030	3270	3150	61	73	67
Tamspan 90 – Single	1610	2810	2210	59	73	66
OLin – Single	1460	2910	2190	63	73	68
Tamspan 90 – Twin		2700			70	
OLin - Twin		2640			71	
LSD (10%)	690	490		3	1	
C.V.	18	12		4	2	
Mean	3060	3260		63	73	

Dawson County – planted (4/28/03), dug (Spanish 9/23, 148; Virginia 10/1, 156; Runners 10/16, 171), harvested (Spanish 10/14, Virginia 10/14, Runners 10/24); Gaines County - planted (4/29/03), dug (Spanish 9/23, 147; Virginia 10/1, 155; Runners 10/8, 162), harvested (Spanish 10/1, Virginia 10/15, Runners 10/15).

Table 5. Spanish row pattern trials, Collingsworth County (CWC) Michael Souder Farm, and Terry County (TYC) Andy Timmons Farm, 2003.

	Yield			Grade		
Variety	CWC	TYC	Mean	CWC	TYC	Mean
	-------------(lb/A)-------------			--------------(%)---------------		
Spanish Twin – 6/ft	2000	1600	1800	55	71	63
Spanish Single – 6/ft	1700	1740	1720	54	72	63
Spanish Single – 4/ft	1810	1390	1600	59	67	63
Spanish Twin – 4/ft	1860	1210	1540	59	73	66
Spanish Twin – 8/ft	1320	1620	1470	56	72	64
LSD (10%)	NS	NS		NS	NS	
C.V.	20	29		7	4	
Mean	1740	1510		57	71	

Collingsworth County – planted (5/5/03), dug (9/29/03, 147), harvested (10/21/03); Terry County - planted (4/30/03), dug (10/20/03, 173), harvested (10/24/03).

Table 6. Runner row pattern trials, Terry County, Andy Timmons Farm, 2003.

Variety	Yield	Grade
	---------(lb/A)---------	----------(%)-----------
Runner Single – 4/ft	3610	76
Runner Single – 6/ft	3640	75
Runner Twin – 4/ft	3800	70
Runner Twin – 6/ft	3230	74
Runner Twin – 8/ft	2570	72
LSD (10%)	NS	NS
C.V.	19	5
Mean	3370	73

Planted (4/30/03), dug (10/20/03, 171), harvested (10/24/03).

Table 7. Effects of simulated hail damage on peanut yield and grade, Wilbarger County, Devin Kieschnick Farm, 2003.

Variety	Yield	Grade
	-----(lb/A)-----	------(%)-------
Beginning Bloom – 33% Defoliation	4600	70
Beginning Bloom – 66% Defoliation	4570	69
Beginning Bloom – 99% Defoliation	4360	67
Full Bloom – 33% Defoliation	4140	69
Full Bloom – 66% Defoliation	3910	71
Full Bloom – 99% Defoliation	2390	66
Untreated	4540	72
LSD (10%)	710	NS
C.V.	14	3
Mean	4070	69

Planted (5/1/03), dug (10/14/03, 166), harvested (10/22/03).

LSD = least significant difference; CV = coefficient of variation; NS = not significant.
Means within a column which differ by more than the LSD are statistically different at the 0.10 level of significance.

Report No. 2

Weed Control in the High and Rolling Plains and in South Texas Peanut Production

Peter A. Dotray, W. James Grichar, Todd A. Baughman, and J. Wayne Keeling[1]

OVERALL SUMMARY OF WEED CONTROL PROGRAMS IN 2003

Forty weed science-related peanut related field experiments were conducted in Texas in the 2003-growing season. These studies addressed the following three main areas: peanut tolerance, peanut weed management systems, and rotational crop response to peanut herbicides applied the previous year. Many of the most troublesome weeds in peanut were studied to determine which herbicide systems are most efficacious. Most of these studies were conducted because of the support of the Texas Peanut Producers Board. Only a few of these studies were funded by private industry. Many of these studies are reported in the following pages of this report. All of the data from the forty experiments is available in the 2003 Weed Research Report-Lubbock and 2003 Research & Extension Agronomy Reports - Vernon. Many of our studies were discussed at local and regional meetings and during field days this past year. This report is split into two parts. Part one will address the weed control projects performed in the Texas High and Rolling Plains and part two will address the projects in south Texas. One continuation request will follow this report.

Part One: WEED CONTROL IN THE HIGH AND ROLLING PLAINS

Seventeen weed science-related field experiments were conducted in the Texas High Plains and eight weed science-related field experiments were conducted in the Texas Rolling Plains in the 2003 growing season (several other studies were conducted in the agronomy area). These studies addressed control of specific troublesome weeds, weed management "systems" to control weeds, reduced rate studies, peanut tolerance studies, and rotational crop response to peanut herbicides. The main funding source to conduct these studies came from the Texas Peanut Producers Board and the National Peanut Board. Private funding from herbicide manufacturers was minimal. Funding from private industry may be zero in the 2004-growing season. Not all of these studies will be addressed below. All data from the Texas High and Rolling Plains is available in either the 2003 Weed Research Report – Lubbock or the 2003 Research & Extension Agronomy Reports - Vernon. Many of our studies have been discussed at local and regional meetings and during field days this past year and we anticipate using much of this data in several early meetings in 2004. The two newest peanut herbicides, Strongarm and Valor, were the focus of several of our field trials. Key weeds investigated included ivyleaf morningglory, yellow nutsedge, Russian thistle, and Palmer amaranth.

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INTRODUCTION

Peanut acreage has increased in Texas over the last 30 years; however acreage planted in 2003 (275,000) was 13% less than that planted in 2002 (315,000) and 35% less than 2001 (425,000). The average yield in the 270,000 harvested acres was 3,000 pounds, which was 100 pounds less and 210 pounds greater than the average yield in 2002 and 2001, respectively. Most of this increased acreage is on productive, irrigated sandy soils that possess little disease incidence. The use of herbicides to control weeds combined with other cultural practices has enabled Texas peanut producers to more than double their yields in the past thirty years. However, weeds continue to be a major pest problem of most of the peanut growing areas of the state. Moreover, in recent years, we have seen peanut injury from our newer soil applied herbicides. Field studies focusing on weed control in peanut and peanut tolerance to soil and foliar applied herbicides was been emphasized over the past several years. This report summarizes some of our latest findings.

MATERIALS AND METHODS

Field experiments were established using traditional small plot techniques. Plot sizes ranged from 2 rows by 50 feet to 4 rows by 30 feet. Herbicides were applied with a CO_2 backpack sprayer or tractor-mounted compressed air sprayer. Carrier water volumes were 10 to 20 gallons per acre. Visual weed control and peanut injury ratings were made at various intervals during the growing season on a scale of 0 = no weed control or peanut injury to 100 = complete control or peanut death. In some experiments, peanuts were dug, combined, cleaned, and weighed for yield determinations.

RESULTS AND DISCUSSION

PEANUT TOLERANCE TO PROWL AND SONALAN APPLIED PREEMERGENCE AND INCORPORATED BY IRRIGATION (Table 1). Prowl (pendimethalin) and Sonalan (ethalfluralin) are two dinitroaniline herbicides registered for use in peanuts. These herbicides control annual grasses and small-seeded broadleaf weeds such as carelessweed (Palmer amaranth), tumbleweed (Russian thistle) and kochia. Herbicide performance has been shown to be dependent on several factors including rate and the incorporation method. Recent interest in conservation tillage raises questions about rates and methods of incorporation when using the dinitroaniline herbicides. In cotton, Prowl and Treflan (trifluralin) may be surface applied followed by water incorporation or they may be used in chemigation. In peanuts, there is an interest to use Prowl and Sonalan in a similar manner. Peanut tolerance to dinitroaniline herbicides mechanically incorporated has been studied in the past; however, no information exists regarding peanut tolerance to these herbicides when applied preemergence and incorporated by irrigation. The objective of this research was to examine peanut tolerance to Prowl and Sonalan at 2, 3, and 4 pints and incorporated immediately with 0.75-inches of irrigation water. All plots were kept weed-free to insure that any visual injury or yield reduction could be attributed to the herbicide treatment and not weed competition.

No visual peanut injury or canopy width reductions were observed throughout the growing season following Prowl or Sonalan applied at any rate when compared to the untreated check. Plots treated with Prowl or Sonalan produced 4041 to 4809 lb/A, and were not reduced when compared to the untreated check, which yielded 4011 lb/A. These results suggest that peanuts are tolerant to Prowl and Sonalan when applied preemergence and incorporated by irrigation. Based on previous work in cotton, weed control using irrigation as the method of incorporation may not be as effective as mechanical incorporation; however, irrigation may be the only method of herbicide incorporation in conservation tillage systems. According to the current label, Sonalan cannot be chemigated and information on the label suggests mechanical incorporation only. On the Prowl label, chemigation and surface applications followed by 0.5 to 0.75-inches of water are suggested. (Table 1).

PEANUT TOLERANCE AND IVYLEAF MORNINGGLORY CONTROL FROM DIFFERENT VALOR FORMULATIONS (Table 2). Valor (flumioxazin) received a Federal label for use in peanut in 2001. Valor can be applied preplant incorporated (PPI) or preemergence (PRE) and controls a variety of annual broadleaf weeds including morningglories. Valor is formulated as a wettable powder and concern over how it mixes with water in the spray tank has lead to the discovery of new formulations. The objectives of this work were to compare peanut tolerance and weed control following Valor applied at 3 and 6 ounces (0.094 and 0.188 lb ai/A). The current Valor label supports the 2 and 3-ounce rate. The design was a randomized complete block with a factorial arrangement and three replications. Factor A was the Valor (flumioxazin) formulation (Valor 1244, 1092, and 1420), while Factor B was Valor rate.

Significant peanut injury was observed following Valor applied at both rates. Injury on May 19 (19 days after planting) ranged from 17 to 25% following Valor at 3 ounces to 17 to 32% following Valor at 6 ounces. Injury on June 2 (33 days after planting) ranged from 35 to 38% following the 3-ounce rate and 55 to 60% following the 6-ounce rate. Injury from the 3-ounce rate was not observed at harvest, but injury following the 6-ounce rate was still apparent. There were no differences among formulations at each rate. Yield following the 3-ounce rate was not different from the untreated control plots, but significant yield loss was observed at the 6-ounce rate in 2 of the 3 formulations. Ivyleaf morningglory control was controlled at least 98% on June 2 and at least 90% on June 30. At the 3-ounce rate, 4 to 6 weeks of weed control is normally expected. After this period, weed flushes may occur (Table 2).

There was no formulation by rate interaction; therefore, rates were pooled within a formulation and the formulations were pooled within a rate. In rates pooled within a formulation, there was no difference in weed control at 4 and 8 weeks after treatment (WAT), injury at 2, 4, and 8 WAT and at harvest, and peanut yield. In formulations pooled within a rate, Valor at 2X caused higher injury at 4 and 8 WAT and at harvest, and provided better weed control at 8 WAT. Peanut yield following Valor at 2X was reduced compared to the untreated control and Valor at 1X.

Peanut injury from Valor was reported in 2001 in Oklahoma, Georgia, and North Carolina. Some injury was even observed in west Texas. The cause was believed to be the result of heavy, driving rains as the peanuts were emerging. Peanut injury was described as the "Caparol-splash" type of injury that we frequently observed in cotton following a heavy rain from emergence to the seedling stage of growth. The injury observed in 2003 looked very different from this injury. Peanuts were slow to emerge and once emerged were slow to grow. It is important to note that the label suggests that Valor applied preemergence must be applied within 48 hours after planting; however, in this study, there was a 5-day lap between planting and application. At application, no soil cracking was observed. This injury was more severe than all other locations where Valor was applied; however, peanuts injury (5 to 10%) was observed at all locations where Valor was used (Table 2).

IVYLEAF MORNINGGLORY CONTROL AND PEANUT TOLERANCE WITH COBRA (Table 3). Currently there is no label for using Cobra in peanuts. Cobra is a diphenyl ether herbicide, like Blazer, and has activity on a number of annual broadleaf weeds. The objective of this experiment was to evaluate peanut tolerance and ivyleaf morningglory control following Cobra applied at different rates alone and with Cadre. Cadre and Strongarm were applied alone for comparison purposes. Cobra alone injured peanuts 4 to 6% 2 weeks after treatment (WAT) and 8 to 10% 6 WAT, but no injury was observed at harvest. The use of Cobra plus Cadre injured peanut more than Cobra alone. Cobra alone controlled ivyleaf morningglory 70 to 77% 2 WAT and 58 to 60% 6 WAT. Cadre alone controlled ivyleaf morningglory 97% 2 WAT, 93% 4 WAT, and 85% 17 WAT and control was not improved when Cobra was added to Cadre. Strongarm applied postemergence controlled ivyleaf morningglory 83 to 88% 2 WAT, 84 to 87% 6 WAT, and 63 to 78% 17 WAT. Peanut yield following these treatments range from 3978 to 4545 pounds per acre (Table 3).

COTTON RECROP TOLERANCE IN 2003 TO STRONGARM APPLIED POST-EMERGENCE IN PEANUTS IN 2002 (Table 4). Strongarm received a full registration label in 2000 for use preemergence in peanuts. In 2000, Strongarm caused stunting, stand loss and chlorosis in peanuts when applied preplant incorporated and preemergence. A supplemental label was issued in 2001 for Texas, Oklahoma, and New Mexico, which restricted applications to soils with a pH of 7.2 or lower. The peanut variety used in 2000 (Flavor Runner 458) is believed to be a part of the reason for the injury observed since studies have shown that this variety is more susceptible to Strongarm injury. Studies in 2001 and 2002 examined peanut tolerance to Strongarm applied postemergence (POST). Currently, there is no POST option for Strongarm, but label changes may occur in the future. The purpose of this study was to observe cotton recrop injury and yield following Strongarm applied POST in peanut in the previous year. The rates of Strongarm used in this study were 0.008 (0.15 oz), 0.016 (0.3 oz), 0.023 (0.45 oz), 0.031 (0.6 oz), and 0.046 (0.9 oz) lb ai/A. The normal soil applied rate of Strongarm preemergence is 0.45 oz, but the proposed rate POST may be 0.3 oz/A. Cadre at 0.063 lb ai/A (1.44 oz) was also applied POST for comparison purposes. All treatments contained a non-ionic surfactant at 0.25% v/v. Plots were maintained weed-free in 2002 and peanuts were dug and harvested. Cotton was planted in May, 2003 and plots were maintained weed-free so any herbicide injury and cotton yield reduction could be attributed to herbicide carryover and not weed competition. No cotton injury was observed on June 23 (12 days after planting). On July 24, injury was observed in the Cadre-treated plot (8%), but none was observed from any Strongarm-treated plot. No injury was observed from any treatment on October 1. No reduction in cotton yield was observed from any treatment, but numerical reductions were apparent as Strongarm rate increased and in the Cadre-treated plot. Cotton lint yield in the untreated plot was 1115 lb/A. Yield ranged from 1040 to 1200 lb/A in Strongarm-treated plots, and 1007 lb/A in the Cadre-treated plots. The plant-back restriction to cotton following a Cadre (and Pursuit) application is 18 months. The proposed Strongarm postemergence label may have a plant-back restriction to cotton of 10 months (Table 4).

Another cotton recrop study was initiated in 2002 at the Western Peanut Growers Research Farm. Strongarm was applied postemergence at 0.063 (2 ounces) and 0.094 (3 ounces) lb ai/A on May 28, 2002. In 2003, cotton was planted on May 12 and replanted on June 5 due to hail. No cotton injury was observed throughout the 2003-growing season.

SPANISH PEANUT RECROP TOLERANCE TO COTTON HERBICIDES APPLIED PREEMERGENCE AFTER COTTON FAILURE (Table 5). Cotton was planted on May 12, 2003 and the following herbicides were applied preemergence: Prowl, Staple, Dual Magnum, Caparol, and Caparol plus Staple. The cotton was terminated using paraquat on June 2 followed by hail and 0.75-inches on June 3. The Spanish variety Olin was planted on June 5 to beds that were either reworked or planted directly into stale seedbeds. Initial peanut injury (10%) was observed in the Dual Magnum-treated plots 2 weeks after planting. At 4 weeks after planting, injury was also observed in the Caparol plus Staple-treated plots, but no injury exceeded 10%. Plots were harvested on October 20. Within each tillage system, yield was not reduced relative to the untreated control, which indicates that any early season peanut injury did not correlate with yield reductions at the end of the season. Cotton was also replanted at the same time that the peanuts were planted. Overall economics indicated that replanting cotton was more profitable than replanting peanuts; however, the unusual late fall may not represent the normal cotton yield that is normally experienced in late-planted cotton. Furthermore, this late fall weather pattern may have affected peanut yields as well. Additional years for this study will help to determine which crop is better suited in a crop failure (replant) situation. (Table 5).

CONTROL OF VOLUNTEER SPANISH PEANUT (Table 6). Roundup WeatherMax was most effective treatment at controlling volunteer 'Olin' Spanish peanut. Initially, both rates of Roundup WeatherMax controlled peanut at least 87% 3 weeks after treatment (WAT) when applications were made early in the season. On July 21 and October 6, Roundup WeatherMax at 32 ounces controlled peanut at least 81% and 55%, respectively. Best control at the end of the season was observed following Roundup WeatherMax applied late (June 18) regardless of rate (at least 77% control). End of season control following MSMA (47%), Buctril (5%), Liberty (30%), or Staple (10%) was less than 50% (Table 6).

CONTROL OF RUSSIAN THISTLE PREPLANT IN PEANUT (Table 7). Gramoxone Max (paraquat) controlled Russian thistle (tumbleweed) 75 to 82% 7 days after treatment (DAT), 95% 18 DAT, and 87 to 90% 27 DAT. This control was more effective than control provided by Roundup WeatherMax, Valor, 2,4-D, and 2,4-DB. These other herbicides have strengths as well, but one of the strengths of Gramoxone Max is Russian thistle (Table 7).

IVYLEAF MORNINGGLORY CONTROL FOLLOWING REDUCED RATES OF CADRE OR PURSUIT IN COMBINATION WITH OTHER HERBICIDES (Table 8). End of season ivyleaf morningglory control was improved when Cadre was mixed with 2,4-DB compared to Cadre alone. When the reduced rate of Cadre was mixed with 2,4-DB or Ultra Blazer, control was reduced compared to the full rate of Cadre mixed with these herbicides. Although statistically similar, the reduced rate of Cadre plus Storm may also provide less weed control than the full rate of Cadre plus Storm. With Pursuit, the opposite effect was observed. Similar weed control was observed with the reduced rate of Pursuit was mixed with 2,4-DB or Ultra Blazer compared to the full rate of Pursuit plus these herbicides. However, when the reduced rate of Pursuit was mixed with Storm, less weed control was observed compared to the full rate of Pursuit mixed with Storm. Future studies examining the efficacy of reduced rates of Cadre or Pursuit may allow for label changes to reduce the 18-month plant back restriction to cotton to no more than 12 months (Table 8).

DIFFERENTIAL VARIETAL TOLERANCE TO VALOR APPLIED PREEMERGENCE AND STRONGARM AND CADRE APPLIED POSTEMERGENCE (Table 9). In light of the differences we observed in peanut tolerance to Strongarm applied preemergence, additional studies are needed. In fact, we believe that all new varieties and all new herbicides should be examined for differential varietal tolerance to each herbicide labeled for use in peanut. At the Western Peanut Growers Research Farm, three studies were initiated in 2003 to examine peanut tolerance to Valor applied preemergence and Strongarm and Cadre applied early postemergence. In this study, a randomized block design with split-plot arrangement and three replications was used. The main plot factor was the variety and included Tamrun 96, OL01, OL02, Florunner, Flavor Runner 458, Tamspan 90, and OLIN. The subplot factor was the treatment and included Valor (flumioxazin) PRE at 0.094 (3 oz) and 0.188 lb ai/A (6 oz), Strongarm (diclosulam) early postemergence (EPOST) at 0.016 (0.3 oz) and 0.032 lb ai/A (0.6 oz), Cadre (imazapic) EPOST at 0.063 (1.44 oz) and 0.126 lb ai/A (2.88 oz), and an untreated control. Subplots were 2 rows by 30 feet. We tried to examine the newer high oleic acid line and its parent (non-high O/L line). Early season injury was observed following Valor preemergence and Cadre Postemergence. Peanut injury following Valor at 3 ounces never exceeded 7%, and injury following Valor at 6 ounces was as high as 43%. Cadre at 1.44 ounces (1X) reached as high as 10 to 13%, but injury following Cadre at 2X reached 26%. Injury never exceeded 2% and 12% following Strongarm at 1X and 2X (Table 9).

No variety by rate interaction was observed; therefore, treatments were pooled within a variety and varieties were pooled within a treatment. There was no difference in variety injury early-, mid-, and late-season; however, injury was observed following Valor at 2X and following both rates of Cadre at all observation dates. The only reduction in peanut yield was observed following Cadre at 2X

In two other varietal tolerance studies, Valor, Strongarm, and Cadre were applied at 1X to ten runner varieties (Tamrun 96, Tamrun OL01, Tamrun OL02, Nematam, Flavor Runner 458, Andru II, Norden, Carver, GP-1, GA 982502) and six Virginia varieties (NC7, NC 12C, Gregory, Perry, VC2, Jupiter). Injury following Valor, Strongarm, and Cadre was as great as 12%, 3%, and 9% in the runner varieties and 9%, 2%, and 9% in the Virginia varieties. No major differences were observed among the runner or Virginia varieties following each herbicide.

YELLOW NUTSEDGE CONTROL FOLLOWING REDUCED RATE COMBINATIONS OF CADRE PLUS DUAL MAGNUM OR STRONGARM (Table 10). Peanut injury following reduced rates of Cadre ranged from 2 to 11%. No injury was observed at harvest. Overall weed control was less in this test when compared to other Cadre tests, due perhaps to the use of non-ionic surfactant (NIS) and not crop oil concentrate (COC). End of season yellow nutsedge control was similar when the Cadre alone treatment was compared to reduced-rates of Cadre plus either Dual Magnum or Strongarm. The reduced rates of Cadre plus Dual Magnum appeared to be more successful when compared to the reduced rates of Cadre plus Strongarm, although these differences were not always “statistical” differences. The combination of reduced rates of Cadre plus Dual Magnum may help reduced peanut injury and rotational crop injury without a cost in yellow nutsedge control (Table 10).

YELLOW NUTSEDGE CONTROL FOLLOWING DUAL MAGNUM OR OUTLOOK IN PEANUTS (Table 11). Early season injury was observed with Dual Magnum (up to 5%) and Outlook (up to 9%) but no injury was observed mid- and late-season. Dual Magnum at 1.27 lb ai/A (21 oz) controlled yellow nutsedge better than Outlook at 0.84 lb ai/A (18 oz) early season. By the end of the season, no treatment controlled yellow nutsedge more than 62% (Table 11).

SHINING TICKSEED CONTROL FOLLOWING POSTEMERGENCE HERBICIDES IN PEANUT (Table 12). Shining tickseed is becoming a problematic weed in many of the areas south and southwest of Lubbock. The dinitroanilines have poor activity on this weed. The objectives of this study were to compare the efficacy of a variety of herbicides labeled for use in peanut. Shining tickseed control 16 days after treatment (DAT) was at least 90% following Cadre, Pursuit, 2,4-DB, and paraquat. By 31 DAT, only the Cadre and Pursuit controlled this weed greater than 95%. The next most successful treatment was observed following the 2,4-DB application, which may be the best option in a peanut and cotton rotation (Table 12).

REDUCED RATES OF CADRE AND STRONGARM FOR IVYLEAF MORNINGGLORY CONTROL (Table 13). Cadre and Strongarm were used at their full rates (1.44 and 0.3 ounces, respectively) and at the following ratios: 75:25, 50:50, and 25:75. The objective of this study was to determine differences in peanut tolerance and ivyleaf morningglory when reduced rate combinations were compared to full rates of either Cadre or Strongarm applied postemergence. Peanut injury was greatest with the full, 75%, 50%, and 25% rates of Cadre early season (Jun 18). Injury decreased by mid-season and no injury was noted at harvest. Ivyleaf morningglory control was similar for all treatments on June 18 (2 weeks after treatment (WAT)) and July 14 (6 WAT). On October 3, Cadre plus Strongarm at a ratio of 75:25 controlled ivyleaf morningglory better than the Cadre plus Strongarm ratio of 100:0 and 50:50, although all treatments controlled this weed between 72 to 78%. Yield was not different across treatments, although numerically plots that yielded the lowest were from the untreated control plot, which was full of morningglories by the end of the season (Table 13).

REDUCED RATES OF CADRE AND PURSUIT WITH AND WITHOUT TANK-MIX PARTNERS (Table 14). Peanut injury did not exceed 5% with Cadre or Pursuit alone or in combination with other herbicides. End of season control of ivyleaf morningglory did not decrease when Cadre or Pursuit were reduced to half-rates and combined with other herbicides compared to Cadre or Pursuit applied at the full rate (1.44 oz). End of season control of ivyleaf morningglory did not increase when full rates of Cadre or Pursuit were mixed with other herbicides. Control of Palmer amaranth did improve when Cadre was mixed with Storm or 2,4-DB compared to Cadre applied alone at 1.44 ounces. Tank-mix combination of half-rates of Pursuit plus other herbicides did not improve Palmer amaranth control over Pursuit applied alone at 1.44 ounces (Table 14).

EVALUATION OF CADRE RATES AND COMBINATIONS IN PEANUT (Table 15). Similar control of ivyleaf morningglory, Palmer amaranth, and yellow nutsedge were observed following various rate-combinations of Cadre and Strongarm. End of season control of ivyleaf morningglory, Palmer amaranth, and yellow nutsedge following sequential applications of Cadre applied alone was 90%, 98%, and 89%, respectively (Table 15).

WEED CONTROL IN PEANUT WITH VALOR (Table 16). Valor applied preemergence alone injured peanut 17% early-season while Valor plus Dual Magnum caused 18 to 23% injury. All early-season injury decreased to 3% or less by the end of the season. Valor alone controlled Palmer amaranth between 63 to 65% during the season. Early- and mid-season Palmer amaranth controlled improved when Dual Magnum and Pursuit were used in a Valor-system, but injury was similar at the end of the season. End of season barnyardgrass control was at least 85% Valor was used in combination with Dual Magnum plus Pursuit or Dual Magnum plus Gramoxone Extra. Cadre at 1.44 ounces also controlled barnyardgrass at least 80% (Table 16).

REDUCED RATES OF CADRE AND PURSUIT WITH AND WITHOUT TANK-MIX PARTNERS AT LOCKETT (Table 17). Peanut injury was observed following Storm (13 to 14%), a reduced rate of Cadre plus Storm (14 to 18%), the full rate of Cadre plus Storm (19 to 21%), a reduced rate of Pursuit plus Storm (10 to 14%), the full rate of Pursuit plus Storm (10 to 13%), and the full rate of Pursuit plus Ultra Blaxer (5 to 10%). Most of the injury appeared to be the result of the Basagran component of Storm. No other treatment caused injury as great as 10%. 2,4-DB, the reduced and full rate of Cadre or Pursuit plus 2,4-DB, the full rate of Cadre or Pursuit, and Pursuit plus Ultra Blazer all controlled Palmer amaranth at least 90%. Other reduced rate combinations of Cadre or Pursuit were less effective (Table 17).

EVALUATION OF CADRE RATES AND COMBINATIONS IN PEANUT (Table 18). No peanut injury exceeded 6% from any Cadre combination. Yellow nutsedge control from Cadre (1/4X) plus Dual Magnum was greater than Cadre (1X) at the end of the season. All other Cadre combinations controlled yellow nutsedge similar to the full rate of Cadre alone (Table 18).

REDUCED RATES OF CADRE AND PURSUIT WITH AND WITHOUT TANK-MIX PARTNERS (Table 19). No peanut stunting or injury exceeded 5%. At the end of the season, yellow nutsedge was controlled 72 and 63% by full rates of Cadre or Pursuit, respectively. Reduced rates of Cadre plus Dual Magnum or Strongarm and reduced rates of Pursuit plus Dual Magnum or Strongarm provided similar control (Table 19).

EVALUATION OF CADRE RATES AND COMBINATIONS (Table 20). Cadre plus Dual Magnum or Strongarm stunted and injured peanut up to 13 and 15%, respectively. Yellow nutsedge was controlled 60% by Cadre alone at the end of the season. With the exception of Cadre at 3/4X plus Dual Magnum at 0.33 pints, all other treatments provided similar control (Table 20).

REDUCED RATES OF CADRE AND PURSUIT WITH AND WITHOUT TANK-MIX PARTNERS (Table 21). Cadre or Pursuit combinations stunted and injured peanut up to 15 and 17%, respectively. No stunting or injury exceeded 7% on July 29. End of season yellow nutsedge was controlled 20 to 33% following by the full rates of Cadre and Pursuit, respectively. Half rates of Cadre plus either a half rate of Strongarm or a full rate of Dual Magnum increased control over the full rate of Cadre alone. No Pursuit combination improved control over Pursuit alone. However, this test and several others in this report do suggest that reduced rates of Cadre or Pursuit plus other herbicide have the potential to provide similar weed control with the likelihood of reduced carryover (from the Cadre or Pursuit). These reduced rate combinations will be studies again in 2004. Future label changes to permit these reduced rates are unknown.

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Table 1. Peanut injury and yield as affected by Prowl and Sonalan applied preemergence and activated by 0.75-inch of irrigation immediately after application at AG-CARES, Lamesa, TX.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)				Canopy Width (in.)		Yield (lb/A)
			May 29	Jun 23	Jul 21	Oct 1	May 29	Jun 23	
Non-treated	---	---	0	0	0	0	11	24	4011
Prowl 3.3 EC	0.825	2 pints	0	0	0	0	11	25	4374
Prowl 3.3 EC	1.24	3 pints	0	0	0	0	11	24	4599
Prowl 3.3 EC	1.65	4 pints	0	0	0	0	11	23	4270
Sonalan 3 EC	0.75	2 pints	0	0	0	0	11	25	4266
Sonalan 3 EC	1.125	3 pints	0	0	0	0	11	24	4041
Sonalan 3 EC	1.5	4 pints	0	0	0	0	11	25	4809
CV									8.92
LSD $_{(0.05)}$			NS	NS	NS	NS	NS	NS	NS

Table 2. Peanut injury and weed control following different Valor formulations at Mark Boardman's farm. Lamesa, TX.

Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)				Ivyleaf Morningglory Control		Yield (lb/A)
			May 19	Jun 2	Jun 30 21	Oct 1	Jun 2	Jun 30	
Non-treated	---	---	0	0	0	0	0	0	3717
Valor 50 WP - 1244	0.094	3 oz	25	35	32	2	98	91	3485
Valor 50 WP - 1092	0.094	3 oz	23	38	32	0	100	91	3804
Valor 50 WP - 1420	0.094	3 oz	17	38	28	3	100	90	3964
Valor 50 WP - 1244	0.188	6 oz	32	60	53	8	100	93	2730
Valor 50 WP - 1092	0.188	6 oz	23	60	60	8	100	93	3398
Valor 50 WP - 1420	0.188	6 oz	17	55	48	10	100	93	2802
CV									13.41
LSD $_{(0.05)}$			17	15	10	4	2	3	815

Table 3. Ivyleaf morningglory and peanut tolerance to Cobra, Cadre, Cobra + Cadre, and Strongarm applied postemergence at Mark Boardman's farm, Lamesa, TX.									
Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)			Ivyleaf Morningglory Control			Yield (lb/A)
			Jun 18	Jul 14	Oct 1	Jun 18	Jul 14	Oct 1	
Non-treated	---	---	0	0	0	0	0	0	4066
Cobra + COC	0.195 + 1 qt	12.5 oz	4	8	0	70	58	0	4131
Cobra + COC	0.25 + 1 qt	1 pt	6	10	0	77	60	25	3978
Cobra + Cadre + COC	0.195 + 0.063 + 1 qt	12.5 + 1.44 oz	7	17	3	98	92	78	4283
Cadre + COC	0.063 + 1 qt	1.44 oz	5	10	0	97	93	85	4472
Strongarm + COC	0.016 + 1 qt	0.3 oz	0	0	0	83	87	78	4545
Strongarm + COC	0.012 + 1 qt	0.23 oz	0	2	0	88	84	63	4283
LSD $_{(0.05)}$			2	3	2	3	8	16	NS

Table 4. Cotton injury and yield in 2003 as affected by Strongarm and Cadre applied postemergence to peanut in 2002 at AG-CARES in Lamesa, TX.						
Herbicide Treatment	Rate (lb ai/A)	Rate (oz prod./A)	Cotton Injury (%)			Lint Yield (lb/A)
			June 23	July 24	October 1	
Strongarm + NIS	0.008	0.15	0	0	0	1200
Strongarm + NIS	0.016	0.30	0	0	0	1185
Strongarm + NIS	0.024	0.45	0	0	0	1097
Strongarm + NIS	0.032	0.60	0	0	0	1017
Strongarm + NIS	0.046	0.90	0	0	0	1040
Cadre + NIS	0.063	1.44	0	8	0	1007
Untreated	-----	-----	0	0	0	1115
CV						14.33
LSD $_{(0.05)}$		---	NS	2	NS	263

Table 5. Peanut recrop tolerance and yield following cotton herbicides applied preemergence before crop failure at the Western Peanut Growers Research Farm near Denver City, TX.									
Treatment	Tillage	Rate (lb/A)	Rate (prod./A)	Peanut Injury (%)					Yield (lb/A)
				Jun 18	Jul 03	Jul 16	Aug 6	Oct 6	
Untreated	none	---	---	0	0	3	0	0	2982
Prowl	none	0.5	1.2 pt	0	0	0	0	0	3591
Staple	none	0.063	1.2 oz	0	7	7	10	3	3921
Dual Magnum	none	1.0	1 pt	5	7	3	12	3	3078
Caparol	none	0.8	1.6 pt	0	0	0	0	0	3543
Caparol + Staple	none	0.8 + 0.063	1.6 pt + 1.2 oz	0	8	10	6	5	3504
Untreated	yes	---	---	0	0	0	0	0	2720
Prowl	yes	0.5	1.2 pt	0	0	0	0	0	2633
Staple	yes	0.063	1.2 oz	0	7	5	6	3	2933
Dual Magnum	yes	1.0	1 pt	4	7	7	6	7	2846
Caparol	yes	0.8	1.6 pt	0	0	0	0	0	3591
Caparol + Staple	yes	0.8 + 0.063	1.6 pt + 1.2 oz	0	7	8	2	3	2933
LSD $_{(0.05)}$				3	4	6	4	NS	NS

Table 6. Control of volunteer Spanish with cotton herbicides that may be applied preplant, postemergence in transgenic crops, or postemergence-directed at the Western Peanut Growers Research Farm near Denver City, TX..						
Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Control (%)			
			Jun 18	Jul 03	Jul 16	Oct 6
Non-treated	---	---	0	0	0	0
MSMA 6L	2.0	1.33qt	78	65	68	47
Roundup WeatherMax	0.75 ae	21 oz	87	63	75	33
Roundup WeatherMax	1.125 ae	32 oz	88	77	81	55
Roundup WeatherMax	0.75 ae	21 oz	NA	70	88	77
Roundup WeatherMax	1.125 ae	32 oz	NA	93	98	83
Buctril	0.5	1 pt	48	28	20	5
Liberty	0.52	40 oz	80	63	55	30
Staple + COC	0.063	1.2 oz	57	38	52	10
LSD $_{(0.05)}$			5	10	13	11

Table 7. Control of Russian thistle preplant in peanut at the Western Peanut Growers Research Farm near Denver City, TX.					
Treatment	Rate (lb ai/A)	Rate (prod./A)	Russian thistle control(%)		
			May 8 (7 DAT)	May 19 (18 DAT)	May 28 (27 DAT)
Non-treated	---	---	0	0	0
Gramoxone Max + NIS	0.25 + 0.25% v/v	11 oz	75	95	90
Roundup WeatherMax	0.75 ae	21 oz	65	80	72
Valor – 1420	0.063	2 oz	20	3	10
Gramoxone Max + NIS	0.375 + 0.25% v/v	16 oz	82	95	87
2,4-D + NIS	0.25 + 0.25% v/v	8 oz	62	73	58
2,4-DB + COC	0.25 + 1 qt	1 pt	55	60	37
LSD $_{(0.05)}$			13	9	21

Table 8. Ivyleaf morningglory control following reduced rates of Cadre or Pursuit plus other herbicides at Mark Boardman's farm near Lamesa, TX.									
Treatment	Rate (lb/A)	Rate (prod./A)	Peanut Injury (%)			Ivyleaf morningglory control (%)			Yield (lb/A)
			Jun 18	Jul 14	Oct 1	Jun 18	Jul 14	Oct 1	
Untreated	---	---	0	0	0	0	0	0	4211
Cadre + COC	0.063	1.44 oz	8	8	2	96	91	77	4588
Cadre + 2,4-DB + COC	0.063 + 0.25	1.44 oz + 1 pt	6	8	0	99	95	87	4443
Cadre + Storm + COC	0.063 + 0.75	1.44 oz + 1.5 pt	6	12	2	99	92	78	3935
Cadre + Ultra Blazer + COC	0.063 + 0.375	1.44 oz + 1.5 pt	10	18	0	99	94	83	4385
Cadre + COC	0.032	0.72 oz	4	4	0	89	87	60	4632
Cadre + 2,4-DB + COC	0.032 + 0.25	0.72 oz + 1 pt	4	1	0	100	91	70	4530
Cadre + Storm + COC	0.032 + 0.75	0.72 oz + 1.5 pt	6	5	0	97	92	69	4138
Cadre + Ultra Blazer + COC	0.032 + 0.375	0.72 + 1.5 pt	6	8	0	98	91	64	4211
Pursuit + COC + AMS	0.063	1.44 oz	4	0	0	89	92	73	4051
Pursuit + 2,4-DB + COC + AMS	0.063 + 0.25	1.44 oz + 1 pt	5	3	0	99	91	68	4254
Pursuit + Storm + COC + AMS	0.063 + 0.75	1.44 oz + 1.5 pt	6	13	0	100	93	78	4487
Pursuit + Ultra Blazer + COC + AMS	0.063 + 0.375	1.44 oz + 1.5 pt	11	10	0	99	90	69	4617
Pursuit + COC + AMS	0.032	0.72 oz	2	2	0	89	88	65	4298
Pursuit + 2,4-DB + COC + AMS	0.032 + 0.25	0.72 oz + 1 pt	4	0	0	99	93	63	4284
Pursuit + Storm + COC + AMS	0.032 + 0.75	0.72 oz + 1.5 pt	7	6	0	99	86	60	4022
Pursuit + Ultra Blazer + COC + AMS	0.032 + 0.375	0.72 + 1.5 pt	6	9	0	99	90	67	3819
2,4-DB + COC	0.25	1 pt	3	0	0	94	88	66	4153
Storm + COC	0.75	1.5 pt	4	3	0	68	67	23	3557
Ultra Blazer + COC	0.375	1.5 pt	5	8	0	90	73	25	3485
CV									9.36
LSD $_{(0.05)}$			3	4	NS	5	6	11	649

Table 9. Peanut varietal tolerance to Valor applied preemergence and Strongarm and Cadre applied postemergence at the Western Peanut Growers Research Farm near Denver City, TX.									
Variety	Herbicide	Rate (lb/A)	Rate (prod./A)	Peanut Injury (%)					Yield (lb/A)
				May 21	Jun 5	Jun 19	Jul 16	Oct 3	
Tamrun 96	none	---	---	0	0	0	0	0	4292
Tamrun 96	Valor	0.094	3 oz	0	2	4	3	2	4308
Tamrun 96	Valor	0.188	6 oz	12	35	43	12	3	4259
Tamrun 96	Strongarm	0.016	0.3 oz	0	0	0	0	0	3775
Tamrun 96	Strongarm	0.032	0.6 oz	0	0	2	2	2	4179
Tamrun 96	Cadre	0.063	1.44 oz	0	3	13	8	5	4130
Tamrun 96	Cadre	0.126	2.88 oz	0	8	26	18	10	3550

Table 9 (continued).									
Tamrun OLO1	none	---	---	1	0	0	0	0	4791
Tamrun OLO1	Valor	0.094	3 oz	1	0	2	2	0	4194
Tamrun OLO1	Valor	0.188	6 oz	5	30	26	13	3	4533
Tamrun OLO1	Strongarm	0.016	0.3 oz	1	0	2	2	0	4356
Tamrun OLO1	Strongarm	0.032	0.6 oz	1	0	0	3	0	4211
Tamrun OLO1	Cadre	0.063	1.44 oz	1	5	7	10	3	4098
Tamrun OLO1	Cadre	0.126	2.88 oz	1	11	22	18	11	3501
Tamrun OLO2	none	---	---	0	0	0	0	0	4195
Tamrun OLO2	Valor	0.094	3 oz	3	7	5	2	3	4275
Tamrun OLO2	Valor	0.188	6 oz	13	30	22	12	6	4534
Tamrun OLO2	Strongarm	0.016	0.3 oz	0	2	2	0	0	4469
Tamrun OLO2	Strongarm	0.032	0.6 oz	0	0	0	0	0	4453
Tamrun OLO2	Cadre	0.063	1.44 oz	0	2	4	5	3	4421
Tamrun OLO2	Cadre	0.126	2.88 oz	0	8	20	15	9	3775
Florunner	none	---	---	1	0	0	0	0	4598
Florunner	Valor	0.094	3 oz	3	7	5	5	0	3888
Florunner	Valor	0.188	6 oz	5	30	22	8	2	4162
Florunner	Strongarm	0.016	0.3 oz	0	2	0	2	0	4388
Florunner	Strongarm	0.032	0.6 oz	1	0	0	2	0	4259
Florunner	Cadre	0.063	1.44 oz	1	2	5	3	3	4178
Florunner	Cadre	0.126	2.88 oz	1	12	23	17	12	3646
Favor Runner 458	none	---	---	0	0	0	0	0	4179
Favor Runner 458	Valor	0.094	3 oz	5	7	7	3	0	4501
Favor Runner 458	Valor	0.188	6 oz	7	35	27	13	5	3678
Favor Runner 458	Strongarm	0.016	0.3 oz	0	0	0	0	0	4453
Favor Runner 458	Strongarm	0.032	0.6 oz	0	2	0	12	0	4372
Favor Runner 458	Cadre	0.063	1.44 oz	0	5	7	10	5	3904
Favor Runner 458	Cadre	0.126	2.88 oz	0	12	17	15	8	3453
Tamspan 90	none	---	---	0	0	0	0	0	4291
Tamspan 90	Valor	0.094	3 oz	5	3	2	3	2	3824
Tamspan 90	Valor	0.188	6 oz	7	38	20	13	3	3743
Tamspan 90	Strongarm	0.016	0.3 oz	0	0	2	0	0	4146
Tamspan 90	Strongarm	0.032	0.6 oz	0	3	3	3	0	3808
Tamspan 90	Cadre	0.063	1.44 oz	0	3	7	12	0	3646
Tamspan 90	Cadre	0.126	2.88 oz	0	10	17	18	8	3791
OLIN	none	---	---	1	0	0	0	0	3791
OLIN	Valor	0.094	3 oz	2	2	0	5	2	3759
OLIN	Valor	0.188	6 oz	7	32	18	10	4	3694
OLIN	Strongarm	0.016	0.3 oz	1	0	0	0	0	3953
OLIN	Strongarm	0.032	0.6 oz	1	0	0	2	0	3662
OLIN	Cadre	0.063	1.44 oz	1	7	7	10	0	4275
OLIN	Cadre	0.126	2.88 oz	1	13	22	20	8	3646
LSD $_{(0.05)}$				4	6	9	7	4	683

Table 10. Yellow nutsedge control following reduced rate combinations of Cadre plus Dual Magnum or Strongarm at Shelby Elam's farm near Seminole, TX.											
Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)				Yellow Nutsedge Control (%)				Yield (lb/A)
			Jun 3	Jun 19	Jul 16	Oct 3	Jun 3	Jun 19	Jul 14	Oct 1	
Non-treated	---	---	3	0	0	0	0	0	0	0	2802
Cadre + Dual Magnum + NIS	0.01575 + 0.95 + 0.25% v/v	0.4 oz + 1 pt	8	7	5	0	27	60	60	60	3020
Cadre + Strongarm 84WG + NIS	0.01575 + 0.0118 + 0.25% v/v	0.4 oz + 0.22 oz	8	7	5	0	28	53	20	52	2889
Cadre + Dual Magnum + NIS	0.0315 + 0.633 + 0.25% v/v	0.72 oz + 11 oz	7	8	2	0	40	85	72	77	3601
Cadre + Strongarm 84WG + NIS	0.0315 + 0.0078 + 0.25% v/v	0.72 oz + 0.15 oz	9	8	7	0	50	76	38	57	3020
Cadre + Dual Magnum + NIS	0.04725 + 0.317 + 0.25% v/v	1.1 oz + 5.3 oz	6	8	10	0	50	82	55	53	2730
Cadre + Strongarm 84WG + NIS	0.04725 + 0.0039 + 0.25% v/v	1.1 oz + 0.07 oz	9	7	8	0	47	75	42	43	2483
Cadre + NIS	0.063 + 0.25% v/v	1.44 oz	11	10	8	0	53	84	62	52	2875
LSD $_{(0.05)}$			NS	3	NS	NS	11	11	13	16	NS

Table 11. Yellow nutsedge control following Dual Magnum and Outlook in peanuts grown on Shelby Elam's farm near Seminole, TX.											
Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)				Y. Nutsedge Control (%)				Yield (lb/A)
			Jun5	Jun19	Jul 16	Oct3	Jun5	Jun19	Jul 16	Oct 3	
Non-treated	---	---	0	0	0	0	0	0	0	0	4371
Dual Magnum	1.0	1 pt	3	2	0	0	25	52	32	55	3601
Dual Magnum	1.27	21 oz	5	5	0	0	30	60	50	62	3891
Outlook	0.84	18 oz	9	7	0	0	25	50	25	52	3877
LSD $_{(0.05)}$			4	3	NS	NS	8	8	22	14	NS

Table 12. Shining tickseed control with postemergence herbicides in peanut at the Western Peanut Growers research farm near Denver City, TX.				
Treatment	Rate (lb ai/A)	Rate (prod./A)	Shining Tickseed Control (%)	
			Jun 18 (16 DAT)	Jul 3 (31 DAT)
Non-treated	---	---	0	0
Cadre + COC	0.063 + 1 qt	1.44 oz	100	97
Pursuit + COC	0.063 + 1 qt	1.44 oz	97	97
Basagran + COC	0.75 + 1qt	1.5 pt	75	70
Blazer + COC	0.375 + 1qt	1.5 pt	28	18
Storm + COC	0.75 + 1qt	1.5 pt	86	72
Strongarm + COC	0.016 + 1qt	0.3 oz	37	43
2,4-DB + COC	0.20 + 1qt	13 oz	100	88
Paraquat + NIS	0.25 + 0.25% v/v	11 oz	93	73
LSD $_{(0.05)}$			10	9

Table 13. Ivyleaf morningglory control with reduced rates of Cadre and Strongarm applied postemergence herbicides in peanut at Mark Boardman's farm near Lamesa, TX.									
Treatment	Rate (lb ai/A)	Rate (prod./A)	Peanut Injury (%)			Ivyleaf Morningglory Control (%)			Yield (lb/A)
			Jun 18	Jul 14	Oct 3	Jun 18	Jul 14	Oct 3	
Non-treated	---	---	0	0	0	0	0	0	3543
Cadre + COC	0.063 + 1 qt	1.44 oz	6	6	0	95	90	72	4225
Cadre + Strongarm + COC	0.047 + 0.004 + 1 qt	1.08 oz + 0.08 oz	5	3	0	95	91	78	4530
Cadre + Strongarm + COC	0.032 + 0.008 + 1qt	0.72 oz + 0.15 oz	4	3	0	95	91	72	4399
Cadre + Strongarm + COC	0.016 + 0.012 + 1qt	0.36 oz + 0.225 oz	4	1	0	95	93	74	4080
Strongarm + COC	0.016 + 1qt	0.3 oz	1	1	0	93	92	75	4022
LSD $_{(0.05)}$			2	3	NS	3	5	5	NS

Table 14. Reduced Rates of Cadre and Pursuit with and without tank-mix partners at Dan and Max Meyer's farm at Quitaque, TX.											
#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut injury		Ivyleaf morningglory control			Palmer amaranth control	
					------------------------ % ------------------------						
					7/16	8/20	7/16	8/20	9/11	8/20	9/11
1	Untreated				0	0	0	0	0	0	0
2	2,4-DB	1.00	pt pr/A	POST	0	0	94	89	82	68	57
3	Storm	1.50	pt pr/A	POST	0	0	50	57	50	78	60
4	Ultra Blazer	1.50	pt pr/A	POST	0	2	78	80	80	78	80
5	Cadre 1/2X	0.72	oz pr/A	POST	0	0	75	77	63	83	70
6	Cadre 1/2X + 2,4-DB	0.72 + 1.0 pt	oz pr/A	POST	0	2	87	83	75	89	78
7	Cadre 1/2X + Storm	0.72 + 1.5 pt	oz pr/A	POST	0	2	83	85	80	83	85

Table 14 (continued).

8	Cadre 1/2X	0.72	oz pr/A	POST	0	2	73	70	62	61	60
	Ultra Blazer	1.50	pt pr/A	POST							
9	Cadre 1X	1.44	oz pr/A	POST	0	5	85	82	72	63	43
10	Cadre 1X	1.44	oz pr/A	POST	0	2	88	82	63	78	65
	2,4-DB	1.00	pt pr/A	POST							
11	Cadre 1X	1.44	oz pr/A	POST	0	2	83	75	78	82	75
	Storm	1.50	pt pr/A	POST							
12	Cadre 1X	1.44	oz pr/A	POST	2	2	78	65	47	71	62
	Ultra Blazer	1.50	pt pr/A	POST							
13	Pursuit 1/2X	0.72	oz pr/A	POST	0	0	43	37	43	74	67
14	Pursuit 1/2X	0.72	oz pr/A	POST	0	3	83	67	47	82	73
	2,4-DB	1.00	pt pr/A	POST							
15	Pursuit 1/2X	0.72	oz pr/A	POST	0	0	85	72	72	73	58
	Storm	1.50	pt pr/A	POST							
16	Pursuit 1/2X	0.72	oz pr/A	POST	0	2	80	67	53	73	73
	Ultra Blazer	1.50	pt pr/A	POST							
17	Pursuit 1X	1.44	oz pr/A	POST	0	2	85	78	60	98	93
18	Pursuit 1X	1.44	oz pr/A	POST	0	2	90	68	70	94	87
	2,4-DB	1.00	pt pr/A	POST							
19	Pursuit 1X	1.44	oz pr/A	POST	0	0	92	78	73	81	72
	Storm	1.50	pt pr/A	POST							
20	Pursuit 1X	1.44	oz pr/A	POST	0	3	82	72	55	94	78
	Ultra Blazer	1.50	pt pr/A	POST							
LSD (P=.10)					NS	NS	17	20	22	28	31

All treatments applied with 1 qt/A of crop oil concentrate.

Table 15. Evaluation of Cadre rates and combinations in peanut at Dan and Max Meyer’s farm near Quitaque, TX.

#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut Injury		Ivyleaf morningglory control			Palmer amaranth control		Yellow nutsedge control	
					------------------------------- %								--------------------------------
					7/16	8/20	7/16	8/20	9/11	8/20	9/11	8/20	9/11
1	Cadre 1/4X	0.36	oz pr/A	POST1	0	2	87	82	77	84	78	73	71
	Strongarm 3/4X	0.23	oz pr/A	POST1									
2	Cadre 1/2X	0.72	oz pr/A	POST1	0	2	85	75	68	90	83	78	70
	Strongarm 1/2X	0.15	oz pr/A	POST1									
3	Cadre 3/4X	1.08	oz pr/A	POST1	0	2	90	82	67	95	80	74	78
	Strongarm 1/4X	0.08	oz pr/A	POST1									
4	Cadre 1/2X	0.72	oz pr/A	POST1	0	3	80	95	90	98	98	93	89
	Cadre 1/2X	0.72	oz pr/A	POST2									
LSD (P=.10)					NS	NS	NS	NS	NS	NS	NS	NS	NS

All treatments applied with 1 qt/A of crop oil concentrate.

Table 16. Weed control in peanut with Valor at Lockett, TX.

#	Treatment Name	Rate	Rate Unit (prod)	Grow Stg	Peanut injury			Palmer amaranth control			Barnyardgrass control		
					------------------------------ % ------------------------------								
					6/16	7/6	8/28	6/16	7/6	8/28	6/16	7/6	8/28
1	Untreated				0	0	0	0	0	0	0	0	0
2	Valor	3.00	ozA	PRE	17	3	2	65	65	65	57	52	65
	Select	6.00	floz/A	POT									
	Agridex	1.00	pt/A	POT									
3	Valor	3.00	oz/A	PRE	20	7	3	78	70	75	60	60	67
	Dual Magnum	1.00	pt/A	PRE									
	Select	6.00	floz/A	POT									
	Agridex	1.00	pt/A	POT									
4	Valor	3.00	oz/A	PRE	18	2	0	83	80	78	67	53	68
	Dual Magnum	1.00	pt/A	PRE									
	Pursuit	0.72	oz/A	POT									
	Agridex	2.00	pt/A	POT									
	Liquid Nitrogen	2.00	qt/A	POT									
5	Valor	3.00	oz/A	PRE	18	5	2	82	82	87	80	73	87
	Dual Magnum	1.00	pt/A	PRE									
	Pursuit	1.44	oz/A	POT									
	Agridex	2.00	pt/A	POT									
	Liquid Nitrogen	2.00	qt/A	POT									
6	Valor	3.00	oz/A	PRE	23	12	2	70	67	70	70	53	80
	Dual Magnum	1.00	pt/A	PRE									
	Gramoxone Extra	5.30	floz/A	POT									
	Basagran	1.00	pt/A	POT									
	Induce	0.25	% v/v	POT									
7	Cadre	1.44	oz/A	POT	0	0	0	0	72	77	0	62	83
	Agridex	2.00	pt/A	POT									
8	Cadre	1.00	oz/A	POT	0	3	0	0	58	53	0	40	37
	Agridex	2.00	pt/A	POT									
LSD (P=.10)					6	6	NS	18	26	30	17	22	31

Table 17. Reduced rates of Cadre and Pursuit with and without tank-mix partners at Lockett, TX.

#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut injury		Palmer amaranth control		
					------------------------------% ------------------------------				
					7/25	8/13	7/25	8/13	9/2
1	Untreated				0	0	0	0	0
2	2,4-DB	1.00	pt pr/A	POST	1	0	88	96	96
3	Storm	1.50	pt pr/A	POST	14	13	65	61	65
4	Ultra Blazer	1.50	pt pr/A	POST	9	6	38	64	61
5	Cadre 1/2X	0.72	oz pr/A	POST	3	0	73	84	80
6	Cadre 1/2X	0.72	oz pr/A	POST	0	0	91	99	98
	2,4-DB	1.00	pt pr/A	POST					
7	Cadre 1/2X	0.72	oz pr/A	POST	18	14	58	73	64
	Storm	1.50	pt pr/A	POST					
8	Cadre 1/2X	0.72	oz pr/A	POST	9	4	68	76	62
	Ultra Blazer	1.50	pt pr/A	POST					
9	Cadre 1X	1.44	oz pr/A	POST	1	0	85	92	90
10	Cadre 1X	1.44	oz pr/A	POST	1	0	95	99	98
	2,4-DB	1.00	pt pr/A	POST					
11	Cadre 1X	1.44	oz pr/A	POST	21	19	70	78	71
	Storm	1.50	pt pr/A	POST					
12	Cadre 1X	1.44	oz pr/A	POST	4	0	83	87	86
	Ultra Blazer	1.50	pt pr/A	POST					
13	Pursuit 1/2X	0.72	oz pr/A	POST	0	0	68	78	73
14	Pursuit 1/2X	0.72	oz pr/A	POST	3	0	79	93	92
	2,4-DB	1.00	pt pr/A	POST					
15	Pursuit 1/2X	0.72	oz pr/A	POST	14	10	74	85	66
	Storm	1.50	pt pr/A	POST					
16	Pursuit 1/2X	0.72	oz pr/A	POST	10	6	70	81	76
	Ultra Blazer	1.50	pt pr/A	POST					
17	Pursuit 1X	1.44	oz pr/A	POST	0	0	58	63	55
18	Pursuit 1X	1.44	oz pr/A	POST	0	0	79	98	93
	2,4-DB	1.00	pt pr/A	POST					
19	Pursuit 1X	1.44	oz pr/A	POST	13	10	71	73	59
	Storm	1.50	pt pr/A	POST					
20	Pursuit 1X	1.44	oz pr/A	POST	10	5	90	95	95
	Ultra Blazer	1.50	pt pr/A	POST					
LSD (P=.10)					3	4	22	18	23

Table 18. Evaluation of Cadre rates and combinations in peanut at Larry Helms' farm near Lelia Lake, TX.											
#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut stunting		Peanut injury		Yellow nutsedge control		
					--------------------------- % ---------------------------						
					6/19	7/29	6/19	7/29	6/19	7/29	9/23
1	Cadre 1/4X	0.36	oz pr/A	POST	0	0	0	0	43	71	70
	Dual Magnum	1.0	pt pr/A	POST							
2	Cadre 1/4X	0.36	oz pr/A	POST	0	0	0	0	35	56	65
	Strongarm	0.225	oz pr/A	POST							
3	Cadre 1/2X	0.72	oz pr/A	POST	0	0	0	0	40	45	48
	Dual Magnum	0.665	pt pr/A	POST							
4	Cadre 1/2X	0.72	oz pr/A	POST	0	1	0	1	38	60	68
	Strongarm	0.15	oz pr/A	POST							
5	Cadre 3/4X	1.08	oz pr/A	POST	0	0	0	0	40	61	66
	Dual Magnum	0.33	pt pr/A	POST							
6	Cadre 3/4X	1.08	oz pr/A	POST	0	3	0	3	35	50	53
	Strongarm	0.075	oz pr/A	POST							
7	Cadre 1X	1.44	oz pr/A	POST	0	4	0	4	38	53	51
8	Untreated				0	0	0	0	0	0	0
LSD (P=.10)					NS	2	NS	2	8	19	19
All treatments applied with 1 qt/A of crop oil concentrate.											

Table 19. Reduced rates of Cadre and Pursuit with and without tank-mix partners at Larry Helms' farm at Lelia Lake, TX.											
#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut stunting		Peanut Injury		Yellow nutsedge control		
					------------------------ % ------------------------						
					6/19	7/29	6/19	7/29	6/19	7/29	9/23
1	Cadre 1/2X	0.72	oz pr/A	POST	0	3	0	3	37	65	63
	Strongarm 1/2X	0.225	oz pr/A	POST							
2	Cadre 1/2X	0.72	oz pr/A	POST	0	0	0	0	47	80	83
	Strongarm 1X	0.45	oz pr/A	POST							
3	Cadre 1/2X	0.72	oz pr/A	POST	0	2	0	2	40	75	77
	Dual Magnum 1/2X	0.665	pt pr/A	POST							
4	Cadre 1/2X	0.72	oz pr/A	POST	0	0	0	0	30	58	57
	Dual Magnum 1X	1.33	pt pr/A	POST							
5	Pursuit 1/2X	0.72	oz pr/A	POST	0	2	0	2	37	50	55
	Strongarm 1/2X	0.225	oz pr/A	POST							
6	Pursuit 1/2X	0.72	oz pr/A	POST	0	0	0	0	30	70	78
	Strongarm 1X	0.45	oz pr/A	POST							
7	Pursuit 1/2X	0.72	oz pr/A	POST	0	2	0	3	27	43	48
	Dual Magnum 1/2X	0.665	pt pr/A	POST							

Table 19. (continued)

8	Pursuit 1/2X	0.72	oz pr/A	POST	0	2	0	2	37	72	77
	Dual Magnum 1X	1.33	pt pr/A	POST							
9	Cadre	1.44	oz pr/A	POST	0	2	0	3	40	73	72
10	Pursuit	1.44	oz pr/A	POST	0	3	0	3	37	60	63
11	Cadre	0.48	oz pr/A	POST	0	3	0	5	40	60	62
	Stongarm	0.15	oz pr/A	POST							
	Dual Magnum	0.44	pt pr/A	POST							
12	Untreated				0	0	0	0	0	0	0
LSD (P=.10)					NS	NS	NS	NS	10	32	31

Table 20. Evaluation of Cadre rates and combinations in peanut at Dan Langford's farm near Quail, TX.

#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut stunting		Peanut injury		Yellow nutsedge control			
					------------------------------ % ------------------------------							
					6/19	7/29	6/19	7/29	6/19	7/16	7/29	9/23
1	Cadre 1/4X	0.36	oz pr/A	POST	8	0	10	2	37	75	62	57
	Dual Magnum	1.00	pt pr/A	POST								
2	Cadre 1/4X	0.36	oz pr/A	POST	7	3	7	5	33	60	63	60
	Strongarm	0.23	oz pr/A	POST								
3	Cadre 1/2X	0.72	oz pr/A	POST	3	2	7	2	37	63	65	65
	Dual Magnum	0.67	pt pr/A	POST								
4	Cadre 1/2X	0.72	oz pr/A	POST	7	3	7	3	33	47	47	52
	Strongarm	0.15	oz pr/A	POST								
5	Cadre 3/4X	1.08	oz pr/A	POST	13	5	15	7	43	60	43	38
	Dual Magnum	0.33	pt pr/A	POST								
6	Cadre 3/4X	1.08	oz pr/A	POST	8	2	10	2	40	77	77	67
	Strongarm	0.08	oz pr/A	POST								
7	Cadre 1X	1.44	oz pr/A	POST	7	3	7	3	27	63	58	60
8	Untreated				0	0	0	0	0	0	0	0
LSD (P=.10)					NS	NS	NS	NS	11	23	21	22

Table 21. Reduced rates of Cadre and Pursuit with and without tank-mix partners at Dan Langford's farm near Quail, TX.

#	Treatment Name	Rate	Rate Unit	Grow Stg	Peanut stunting		Peanut Injury		Yellow nutsedge control		
					---------------------- % ----------------------						
					6/19	7/29	6/19	7/29	6/19	7/29	9/23
1	Cadre 1/2X	0.72	oz pr/A	POST	10	2	10	3	37	67	67
	Strongarm 1/2X	0.225	oz pr/A	POST							
2	Cadre 1/2X	0.72	oz pr/A	POST	15	5	17	8	40	32	30
	Strongarm 1X	0.45	oz pr/A	POST							
3	Cadre 1/2X	0.72	oz pr/A	POST	10	3	12	3	30	57	45
	Dual Magnum 1/2X	0.665	pt pr/A	POST							
4	Cadre 1/2X	0.72	oz pr/A	POST	7	5	7	7	33	68	72
	Dual Magnum 1X	1.33	pt pr/A	POST							
5	Pursuit 1/2X	0.72	oz pr/A	POST	7	3	7	3	33	50	53
	Strongarm 1/2X	0.225	oz pr/A	POST							
6	Pursuit 1/2X	0.72	oz pr/A	POST	10	5	10	7	37	53	50
	Strongarm 1X	0.45	oz pr/A	POST							
7	Pursuit 1/2X	0.72	oz pr/A	POST	8	5	8	7	30	40	45
	Dual Magnum 1/2X	0.665	pt pr/A	POST							
8	Pursuit 1/2X	0.72	oz pr/A	POST	12	5	12	7	37	47	52
	Dual Magnum 1X	1.33	pt pr/A	POST							
9	Cadre	1.44	oz pr/A	POST	12	5	12	5	37	37	33
10	Pursuit	1.44	oz pr/A	POST	15	7	15	7	33	18	20
11	Cadre	0.48	oz pr/A	POST	13	5	13	5	30	35	30
	Stongarm	0.15	oz pr/A	POST							
	Dual Magnum	0.44	pt pr/A	POST							
12	Untreated				0	0	0	0	0	0	0
LSD (P=.10)					6	NS	6	NS	9	25	30

Part Two: WEED CONTROL IN SOUTH TEXAS

SUMMARY

Fifteen different peanut herbicide studies were conducted in various areas of south Texas. The results of several of the herbicide studies are reported herein. Under light to moderate weed pressure, Prowl applied preplant incorporated (PPI) followed by Pursuit applied preemergence (PRE) and Prowl + Strongarm applied PPI controlled horse purslane 100% season-long. Prowl applied PPI followed by Cadre applied postemergence (POST) controlled 98% horse purslane. When only POST herbicides were evaluated, Cobra applied early postemergence (EPOST) or late postemergence (LPOST) controlled greater than 90% horse purslane. Aim provided excellent Palmer amaranth control but poor grass control. A generic clethodim (Arrow) provided Texas panicum and southern crabgrass control comparable to Select. A reduced rate study to evaluate Cadre and Pursuit at ½ and 1X rates in combination with either Blazer, Storm, or 2,4-DB showed that Cadre or Pursuit at either rate in combination with 2,4-DB controlled greater than 90% and 80% Palmer amaranth,respectively. Cadre, Bravo, or Storm in combination with Select did not reduce broadleaf signalgrass, southern crabgrass, Texas panicum control compared to Select alone. When seven peanut varieties (Tamrun 96, OL 01, OL 02, FR 458, Florunner, Tamspan 90, and Olin) were evaluated for injury from Cadre, Strongarm, and Valor no adverse effects were noted.

INTRODUCTION

The incidence of weeds is high in the subtropical climate of some of the peanut-growing areas of Texas. Weeds can greatly reduce peanut yield and quality , especially when allowed to compete during stand establishment and early growth. Late season weeds can also interfere with digging, causing further loss of yield. Therefore, efficient weed control is essential for the profitable production of peanuts. It has been estimated that weed losses in peanut exceed $50 million in the three southwestern states of Texas, Oklahoma, and New Mexico. Estimated total income losses from control procedures for weeds, yield, and quality reductions, increased cultural inputs, and reduced harvesting efficiency are about $53/A for Texas peanut producers.

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MATERIALS AND METHODS

Field studies were conducted in Atascosa, Frio, and Lavaca Counties using small-plot techniques. Herbicides were applied using a small plot, 2-row CO_2 backpack sprayer equipped with three SS-11002 flat fan nozzles per 2 rows. Nozzles were spaced approximately 18” apart and operated at 28 psi to deliver 20 gpa. Visual weed control and crop injury ratings were made at various intervals during the growing season, on a scale of 0=no control or injury to 100=complete control or plant death.

RESULTS AND DISCUSSION

Horse Purslane Control with Various Herbicide Systems. Horse purslane has become more of a weed problem in the south Texas area over the past few years. It is similar to common purslane but is taller and competes better with peanuts than common purslane. In a study to evaluate herbicide systems for horse purslane control, under moderate weed pressure, Prowl applied PPI followed by Pursuit applied PRE or Prowl in combination with Strongarm applied PPI controlled 100% horse purslane season-long(Table 1). Valor applied PRE at 2.0 oz/A did not control purslane (less than 78%); however, when the rate was increased to 3.0 oz/A control was greater than 90% season-long. Prowl alone, under the moderate weed pressure, did provide at least 90% control season-long while Dual alone controlled no greater than 75% horse purslane.

Horse Purslane Control With Postemergence Herbicides. POST herbicides were evaluated alone for control of horse purslane. Herbicides were applied when purslane was less than 3" tall (early postemergence, EP) or when purslane was 6 to 8" tall (late postemergence, LP). Basagran, Cadre, Pursuit, Strongarm, or 2,4-DB applied either EP or LP failed to control horse purslane (no greater than 73%) (Table 2). Ultra Blazer applied EP controlled 82% horse purslane when rated 2 weeks after treatment (WAT) and 77% control, 4 WAT. However, when Ultra Blazer was applied LP, horse purslane control was no greater than 17% at either rating. Cobra applied either EP or LP controlled at least 92% horse purslane at either rating date.

Weed Control With Aim. Aim is a contact herbicide similar to paraquat and herbicide studies were conducted at two locations in south Texas. Aim, alone or in combination, was evaluated when applied either at peanut cracking (CRACK) or EP. Aim applied alone at CRACK controlled Palmer amaranth greater than 90% at Pearsall but no greater than 63% at Yoakum (Table 3). Aim + Dual applied at CRACK controlled at least 99% Palmer amaranth at both locations and 85% broadleaf signalgrass at Yoakum. Texas panicum control was less than 60% with Aim + Dual but Dual does not control Texas panicum. Aim + Basagran applied EP controlled Palmer amaranth at least 95% at both locations but annual grass control was less than 25%. Cadre alone controlled annual grasses at least 82% and Palmer amaranth greater than 70%.

Comparison of Arrow With Select For Annual Grass Control. In the fall of 2003, a generic clethodim (Arrow) was cleared for use on peanuts. A comparison study between Select and Arrow was initiated during the 2003 growing season at two locations to compare the two herbicides for annual grass control in peanuts. Arrow and Select both controlled Texas panicum and southern crabgrass 99 to 100% at Yoakum (Table 4). At Pearsall, both herbicides controlled Texas panicum at least 86% with rates from 6.0 oz/A to 16.0 oz/A.

Late Postemergence Palmer Amaranth Control With Various Herbicide Combinations. Cadre and Pursuit applied at 0.72 oz/A (1/2X) and 1.44 oz/A (1X) were compared alone or in combination with Storm, Ultra Blazer, or 2,4-DB for weed control when applied to Palmer amaranth greater than 12" tall. Cadre alone at the 1/2X or 1X rate controlled Palmer amaranth 68 to 78% while the same rates of Pursuit controlled no better than 60% Palmer amaranth (Table 5). Storm or Ultra Blazer, when added to either Cadre or Pursuit, did not improve weed control over Cadre or Pursuit alone. However, when 2,4-DB was added to either Cadre or Pursuit, Palmer amaranth control was greater than 80% when rated 8 WAP.

Annual Grass Control With Select Combinations. Many growers are concerned about reduced weed control when tank-mixing another herbicide or a fungicide with Select to save application trips through the field. Select was evaluated at two locations, for annual grass control, when tank-mixed with Bravo, Cadre, and Storm. Select alone or in combination with Bravo, Cadre, or Storm controlled at least 98% broadleaf signalgrass and southern crabgrass (Table 6). Texas panicum control with Select alone was 72% while tank-mix combinations of Select and Bravo, Cadre, or Storm controlled 80 to 97% Texas panicum.

Peanut Variety Response to Cadre, Strongarm, or Valor . Peanut variety response to various herbicides is a concern to many in the peanut industry due to issues with Strongarm and Valor in recent years. Under weed-free conditions, Cadre, Strongarm, and Valor at 1X and 2X the labeled rate, were evaluated on 7 different peanut varieties for yield and grade response. No difference in peanut yield or grade was noted when Valor was applied PRE or Cadre and Strongarm were applied POST. (Table 7). Varieties responded differently as expected (Table 8). Tamrun OL 01 produced the lowest yield but the highest percent SMK+SS. Tamrun 96 and FR 458 produced the highest yield.

ACKNOWLEDGMENTS

The authors wish to express thanks to the Texas Peanut Producers Board for their continued interest and financial support of this program. We would also like to thank our cooperators of which they contributed not only interest and effort but in many instances time as well: Brett Stacy, LDS Farm, Frio County and Chuck and Quinton Marsch , Atascosa County. A special thanks to Dwayne Drozd and Bill Klesel for their help in herbicide application, plot maintenance, and peanut harvest.

TABLE 1. Horse Purslane Control With Various Herbicide Systems.

Herbicide	Rate Product/A	Application timing[1,2]	% Control[3] 6 WAP	9 WAP	13 WAP
Check	-	-	0	0	0
Prowl	1.2 qt	PPI	99	90	92
Valor	2.0 oz	PRE	66	77	63
Valor	3.0 oz	PRE	99	97	92
Prowl/Valor	1.2 qt/ 3.0 oz	PPI/PRE	87	95	93
Pursuit	1.44 oz	PRE	95	96	90
Prowl/Pursuit	1.2 qt/ 1.44 oz	PPI/PRE	100	100	100
Prowl+Strongarm	1.2 qt+0.44 oz	PPI	100	100	100
Dual Magnum	1.3 pt	PRE	73	73	75
Outlook	1.3 pt	PRE	96	92	87
Prowl/Dual Magnum	1.2 qt/ 1.3 pt	PPI/PRE	100	91	97

Table 1. (continued)

Prowl/Outlook	1.2 qt/ 1.3 pt	PPI/PRE	65	67	68
Prowl/ 2,4-DB	1.2 qt/ 1.2 pt	PPI/POST	60	72	77
Prowl/ Pursuit	1.2 qt/ 1.44 oz	PPI/POST	94	97	88
Prowl/ Cadre	1.2 qt/ 1.44 oz	PPI/POST	98	98	98
Prowl/ Cadre	1.2 qt/ 0.77 oz	PPI/POST	77	78	82
Prowl/ Ultra Blazer	1.2 qt/ 1.5 pt	PPI/POST	93	83	89
Prowl/ Basagran	1.2 qt/ 1.0 qt	PPI/POST	87	93	85
Prowl/ Cobra	1.2 qt/ 0.8 pt	PPI/POST	89	78	90
Prowl/ Strongarm	1.2 qt/ 0.3 oz	PPI/POST	88	91	97
LSD (0.05)			23	20	24

[1] POST applications of Cadre, Strongarm, and Pursuit included X-77 added at 0.25% v/v while POST applications of 2,4-DB, Ultra Blazer, Basagran, and Cobra included Agridex at 1.0 qt/A.
[2] Abbreviations: PPI, preplant incorporated; PRE, preemergence; POST, postemergence; WAP, weeks after planting.
[3] Rating index: 0=no control, 100=complete control or plant death.

TABLE 2. Horse Purslane Control With Postemergence Herbicides.

Herbicides	Rate Product/A[1]	Application timing[2]	% Control[3]	
			2 WAT	4 WAT
Strongarm	0.44 oz	EP	48	73
		LP	7	7
2,4-DB	1.2 pt	EP	47	40
		LP	23	13
Pursuit	1.44 oz	EP	30	27
		LP	13	7
Cadre	1.44 oz	EP	58	62
		LP	17	17
Cobra	0.8 pt	EP	99	99
		LP	92	96
Basagran	1.0 qt	EP	23	20
		LP	13	17
Ultra Blazer	1.5 pt	EP	82	77
		LP	10	17
LSD (0.05)			18	23

[1] POST applications of Cadre and Pursuit included X-77 at 0.25% v/v while POST applications of Strongarm, 2,4-DB, Cobra, Basagran, and Ultra Blazer included Agridex at 1.0 qt/A.
[2] Abbreviations: EP, early postemergence, purslane less than 3” tall; LP, late postemergence, purslane 6 to 8” tall; WAT, weeks after treatment.
[3] Rating index: 0=control, 100=complete control or plant death.

TABLE 3. Weed Control with Aim When Rated Six Weeks After Planting.

			% Weed control[1]			
			Yoakum		Pearsall	
Herbicide	Rate Product/A	Application timing[2]	Signalgrass[3]	Pigweed	Panicum	Pigweed
Check	-	-	0	0	0	0
Aim	0.65 pt	CRACK	13	63	43	92
	1.0 pt	CRACK	10	27	40	100
	1.25 pt	CRACK	0	60	55	97
Aim+Basagran	1.0 + 0.5 pt	CRACK	10	37	27	96
Aim+Dual	1.0 + 1.6 pt	CRACK	85	100	53	99
Storm	1.5 pt	CRACK	0	88	22	97
Gramoxone	0.4 pt	CRACK	22	0	30	45
Aim+Basagran	0.65+0.5 pt	EP	0	98	23	95
	1.0+0.5 pt	EP	0	100	20	100
	1.25+0.5 pt	EP	0	100	7	95
Cadre	1.44 oz	EP	82	73	87	93
LSD (0.05)			10	21	42	22

[1]Rating index: 0=no control, 100=complete control or plant death.
[2]CRACK, peanut cracking; EP, early postmemergence, weeds at the three-leaf stage.
[3] Pigweed=Palmer amaranth; signalgrass=broadleaf signalgrass; panicum=Texas panicum.

TABLE 4. Comparison of Arrow with Select for Postemergence Annual Grass Control in peanuts.

		% Annual grass control[1,2]		
		Yoakum		Pearsall
Herbicide	Rate Product/A	TX panicum	S. crabgrass	TX panicum
Check	-	0	0	0
Arrow	6.0 oz	100	99	93
	8.0 oz	99	100	87
	12.0 oz	100	100	99
	16.0 oz	100	100	99
Select	6.0 oz	100	99	96
	8.0 oz	100	99	86
	12.0 oz	100	100	86
	16.0 oz	100	100	99
LSD (0.05)		1	1	17

[1] Rating index: 0=no control, 100=complete control or plant death.
[2] TX panicum=Texas panicum; S. crabgrass=southern crabgrass

TABLE 5. Late Postemergence Palmer Amaranth Control With Various Herbicide Combinations.

Herbicide[1]	Rate Product/A	% Control[3] 2 WAP[2]	4 WAP	8 WAP
Check	-	0	0	0
Cadre	0.72 oz	78	72	75
Cadre + 2,4-DB	0.72 oz + 1.2 pt	60	67	91
Cadre + Storm	0.72 oz + 1.5 pt	57	62	55
Cadre + Ultra Blazer	0.72 oz + 1.5 pt	60	70	73
Cadre	1.44 oz	68	73	86
Cadre + 2,4-DB	1.44 oz + 1.2 pt	67	70	93
Cadre + Storm	1.44 oz + 1.5 pt	63	80	91
Cadre + Ultra Blazer	1.44 oz + 1.5 pt	60	72	75
Pursuit	0.72 oz	47	53	43
Pursuit + 2,4-DB	0.72 + 1.2 pt	48	75	83
Pursuit + Storm	0.72 + 1.5 pt	63	63	53
Pursuit + Ultra Blazer	0.72 + 1.5 pt	45	38	23
Pursuit	1.44 oz	60	53	40
Pursuit + 2,4-DB	1.44 oz + 1.2 pt	48	67	85
Pursuit + Storm	1.44 oz + 1.5 pt	42	52	27
Pursuit + Ultra Blazer	1.44 oz + 1.5 pt	45	58	55
2,4-DB	1.2 pt	53	53	57
Storm	1.5 pt	40	42	27
Ultra Blazer	1.5 pt	42	25	18
LSD (0.05)		18	15	22

[1] All POST applications included Agridex at 1.0 qt/A.
[2] Abbreviation: WAP, weeks after planting.
[3] Rating index: 0=no control, 100=complete control or plant death

TABLE 6. Annual Grass Control With Select Combinations.

		% Annual grass control[1]		
		Yoakum		Pearsall
Herbicide	Rate Product/A	Bdlf signalgrass[2]	S. crabgrass	TX panicum
Check	-	0	0	0
Select	8.0 oz	100	99	72
Select + Cadre	8.0 oz + 1.44 oz	100	100	97
Select + Bravo	8.0 oz + 1.5 pt	100	98	80
Select + Storm	8.0 oz + 1.5 pt	100	99	90
LSD (0.05)		NS	NS	22

[1] Rating index: 0=no control, 100=complete control or plant death.
[2]Bdlf signalgrass=broadleaf signalgrass; S. crabgrass=southern crabgrass; TX panicum=Texas panicum.

TABLE 7. Peanut Yield With Cadre, Strongarm, or Valor When Averaged Over Peanut Varieties.

Herbicide	Rate Product/A	Application timing[1]	Yield Lbs/A	Grade SMK+SS
Check -	-		3368	68
Valor	3.0 oz (1X)	PRE	3883	67
Valor	6.0 oz (2X)	PRE	3654	68
Strongarm	0.3 oz (1X)	POST	3667	68
Strongarm	0.6 oz (2X)	POST	3927	68
Cadre	1.44 oz (1X)	POST	3560	67
Cadre	2.88 oz (2X)	POST	3518	67
LSD (0.05)			NS	NS

[1]Abbreviations: PRE, preemergence; POST,postemergence; SMK=sound mature kernels; SS=sound splits.

TABLE 8. Peanut Variety Yield When Averaged Over Herbicides.

Peanut Variety	Yield Lbs/A	Grade (%)[1]		
		SMK+SS	OK	DK
Tamrun 96	4365	68	8.5	0
OL 01	2798	71	5.8	0
OL 02	4091	68	8.1	0
Flavor Runner 458	4397	68	9.1	0
Florunner	3212	68	9.1	0
Tamspan 90	3474	64	9.6	0
Olin	3240	66	7.5	0
LSD (0.05)	1000	2	1.2	NS

[1]Abbreviations: SMK=sound mature kernels; SS=sound splits; OK=other kernels; DK=damaged kernels.

Report No. 3

PROGRESS REPORT 2004
Plant Pathology

1. Subject Area:

   Plant Pathology

2. Title:

   Devising and Demonstrating Control Schemes for Peanut Diseases

3. Personnel and Agency:

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4. Introduction:

   Peanut disease continues to be one of the primary problems associated with profitable production. Significant changes in production areas within Texas make continued work to develop new peanut disease control schemes and then demonstrate them to growers just as important as it has ever been. This project continues to be the only comprehensive evaluation of peanut fungicides in Texas.

5. Summary:

As the accompanying data sheets will show, numerous fungicides and rates were tested in 2003. Some worked well while others performed poorly. This data has all been submitted to the various companies in support for new and improved labels. Two new fungicides was cleared in 2003, and others are close hopefully. As new chemicals are cleared, market share competition should drive down the price as was the case with Stratego from Syngenta in 2002 and hopefully Endura from BASF in 2003.

6. Materials and Methods:

   Plots were established in Terry, Gaines, Collingsworth and Motley counties and the Experiment Station in Stephenville, to compare numerous fungicides and combinations. All plots were replicated three times and each plot was 2 rows x 100 feet. All chemicals were hand sprayed with a CO_2 backpack sprayer. Seed treatment plots were planted with pre treated seed. Chemigation plots were strip plots applied through the sprinkler system.

7. Results and Discussion:

See accompanying data for specific results on specific farms. The 2003 projects displayed profitability from some fungicides while others displayed no profitability. Seed treatments continued to show a good return. Sclerotinia control plots in Motley and Collingsworth counties resulted in good Sclerotinia blight development and significant yield increases.

One new peanut fungicide was registered in the fall of 2003 from BASF. “Endura” previously tested as BAS 510 is similar to Omega in effect but not similar in chemistry. We continue to look at several other new chemistries that should be labeled soon. Right now it appears that about 1 new peanut fungicide is being registered each year and we are testing several others at this time.

2003 Peanut Seedling Disease
Erath County

Syngenta (Seed Treatment)

Treatment	Chemical	Rate/A
1 A	Check	
2 A	Dynasty PD .12 DS	10.5 g./ 100 Kg Seed
3 A	Dynasty PD .12 DS	14 g./ 100 Kg Seed
4 a	Vitavax PC	175g./ 100 Kg Seed

Variety: Ga Green

Gustafson (Seed Treatment)

Treatment	Chemical	Rate/ A
1 B	Check	
2 B	Vitavax PC	4 oz. /CWT
3 B	L-1292-A1	4 oz./CWT
4 B	L-1293-A1	4 oz./CWT
5 B	L-1294-A1	4 oz./CWT
6 B	RTU PCNB GUS 42S LO283-A1	3 oz./CWT 3 oz./CWT 3 oz./CWT
7 B	L1305-A1	4 oz./CWT

Variety: Tamrun 96

Gowan (Infurrow)

Treatment	Chemical	Rate/ A
1 C	Moncut 70 DF	9.38 g
2 C	Moncut 70 DF	13.4 g
3 C	Moncut 70 DF	20 g
4 C	Moncut 70 DF	26.8 g
5 C	Check	
6 C	Abound	22 mls

Variety: Tamrun 96

Syngenta Peanut Emergence Count
Texas A&M Extension Center – Stephenville, Tx
2003 Seed Treatment

Treatment 1 (Check)				
	Rep 1	Rep 2	Rep 3	Average
5/30	1	1	1	1
6/6	1	3	8	4
6/13	1	3	7	3.66
Treatment 2 (Dynasty PD .12 DS @ 10.5g/100Kg)				
	Rep 1	Rep 2	Rep 3	Average
5/30	0	16	12	9.33
6/6	11	34	43	29.33
6/13	13	29	44	28.66
Treatment 3 (Dynasty PD .12 DS @ 14g/100Kg)				
	Rep 1	Rep 2	Rep 3	Average
5/30	0	10	4	4.66
6/6	34	39	23	32
6/13	27	37	23	29
Treatment 4 (Vitavax PC @175g/100Kg)				
	Rep 1	Rep 2	Rep 3	Average
5/30	1	2	5	2.66
6/6	30	24	26	26.66
6/13	27	23	25	25

Variety: Georgia Green
Plant Date: 5/16
Primary Disease Organism: Rhizoctonia sp
Numbers represent plants/20 row feet

Gustafson Peanut Emergence Count
Texas A&M Extension Center – Stephenville, Tx
2003 Seed Treatment

Treatment 1 (Check)				
	Rep 1	Rep 2	Rep 3	Average
5/30	3	4	1	2.66
6/6	13	13	11	12.33
6/13	12	12	10	11.33
Treatment 2 (Vitavax PC @ 4 oz./CWT)				
	Rep 1	Rep 2	Rep 3	Average
5/30	0	24	9	11
6/6	24	35	29	29.33
6/13	28	34	28	30
Treatment 3 (L-1292-A1 @ 4oz/CWT)				
	Rep 1	Rep 2	Rep 3	Average
5/30	0	10	9	6.33
6/6	36	34	24	31.33
6/13	37	29	27	31
Treatment 4 (L-1293-A1 @ 4oz/CWT)				
	Rep 1	Rep 2	Rep 3	Average
5/30	0	8	4	4
6/6	40	29	24	31
6/13	40	30	23	31
Treatment 5 (L-1294-A1 @ 4oz/CWT)				
	Rep 1	Rep 2	Rep 3	Average
5/30	28	4	18	16.66
6/6	40	25	28	31
6/13	41	27	29	32.33
Treatment 6 (RTU PCNB @ 3oz/CWT, GUS 42S @ 3oz/CWT, LO283-A1 @ 3oz/CWT)				
	Rep 1	Rep 2	Rep 3	Average
5/30	13	4	0	5.66
6/6	13	15	7	11.66
6/13	14	16	8	12.66
Treatment 7 (L1305-A1 @ 4oz/CWT)				
	Rep 1	Rep 2	Rep 3	Average
5/30	9	17	16	14
6/6	25	33	30	29.33
6/13	21	31	28	26.66

Variety: Tamrun 96
Plant Date: 5/16
Primary Disease Organism: Rhizoctonia sp
Numbers represent plants/20 row feet

Gowan Peanut Emergence Count
Texas A&M Extension Center – Stephenville, Tx
2003 Infurrow

Treatment 1 (Moncut 70 DF @ .35# AI/A)				
	Rep 1	Rep 2	Rep 3	Average
5/30	2	1	5	2.66
6/6	5	5	10	6.66
6/13	4	7	11	7.33
Treatment 2 (Moncut 70 DF @ .5# AI/A)				
	Rep 1	Rep 2	Rep 3	Average
5/30	5	2	6	4.33
6/6	8	8	14	10
6/13	8	8	14	10
Treatment 3 (Moncut 70 DF @ .75# AI/A)				
	Rep 1	Rep 2	Rep 3	Average
5/30	3	2	1	2
6/6	6	10	1	5.66
6/13	4	11	2	5.66
Treatment 4 (Moncut 70 DF @ 1# AI/A)				
	Rep 1	Rep 2	Rep 3	Average
5/30	5	1	1	2.33
6/6	5	6	3	4.66
6/13	5	8	4	5.66
Treatment 5 (Check)				
	Rep 1	Rep 2	Rep 3	Average
5/30	1	0	2	1
6/6	8	8	8	8
6/13	8	7	6	7
Treatment 6 (Abound @ 18.4oz AI/A)				
	Rep 1	Rep 2	Rep 3	Average
5/30	1	1	3	1.66
6/6	6	9	8	7.66
6/13	5	8	9	7.33

Variety: Tamrun 96
Plant Date: 5/16
Primary Disease Organism: Rhizoctonia sp
Numbers represent plants/20 row feet

Syngenta Seedling Disease
Harvested October 22, 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Immature	$ Value /Acre	Avg $/Acre
1	1	145	73%	0%	4%	26	75
	2	290	75%	0%	5%	54	
	3	871	66%	0%	8%	145	
2	1	2033	75%	0%	4%	377	288
	2	1452	69%	0%	6%	250	
	3	1452	65%	0%	8%	238	
3	1	1742	76%	0%	3%	275	265
	2	1742	71%	0%	4%	306	
	3	1162	75%	0%	4%	215	
4	1	2323	75%	0%	3%	429	388
	2	1742	75%	0%	4%	323	
	3	2323	71%	0%	6%	411	

Gustafson Seeding Disease
Harvested October 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Inmature	$ Value /Acre	Avg $/Acre
1	1	1278	63%	0%	7%	203	252
	2	1801	65%	0%	8%	295	
	3	1684	64%	0%	5%	257	
2	1	2439	62%	1%	7%	356	522
	2	3950	71%	0%	4%	693	
	3	3543	62%	0%	7%	517	
3	1	2730	68%	0%	4%	460	547
	2	3601	71%	0%	4%	632	
	3	3369	65%	0%	7%	549	
4	1	2846	71%	0%	4%	499	603
	2	3775	67%	0%	7%	634	
	3	3950	61%	0%	8%	675	
5	1	2962	61%	0%	4%	520	566
	2	3543	70%	0%	4%	613	
	3	3426	69%	0%	5%	564	
6	1	1626	72%	0%	4%	289	332
	2	2382	66%	0%	7%	394	
	3	1974	63%	0%	7%	313	
7	1	2439	68%	0%	6%	413	563
	2	3834	67%	0%	7%	644	
	3	3775	67%	0%	6%	632	

Gowan Seedling Disease
Harvested October 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Inmature	$ Value /Acre	Avg $/Acre
1	1	1016	64%	0%	7%	163	181
	2	944	58%	0%	11%	141	
	3	1634	56%	0%	14%	239	
2	1	1379	62%	0%	8%	216	194
	2	980	56%	0%	13%	143	
	3	1416	63%	0%	7%	224	
3	1	762	63%	0%	7%	121	127
	2	944	54%	0%	15%	134	
	3	799	62%	0%	10%	126	
4	1	944	60%	0%	10%	144	167
	2	1234	57%	0%	13%	182	
	3	1161	58%	0%	12%	174	
5	1	581	61%	0%	9%	90	117
	2	980	52%	0%	16%	135	
	3	799	62%	0%	8%	125	
6	1	1234	59%	0%	10%	186	194
	2	1285	62%	0%	8%	201	
	3	1234	63%	0%	8%	196	

Peanut Chemigation Plot (S2)
Harvested October 2003

Treatment	Rep	#/Acre	Grade	% Damaged	% Inmature	$ Value/Acre	Avg $/Acre
Check	1	1206	67%	0%	5%	201	213
	2	1397	64%	0%	7%	225	
Folicur 7.2 oz/acre	1	2323	67%	0%	4%	385	358
	2	1742	66%	0%	6%	273	
	3	2468	68%	0%	4%	416	
Moncut 2#/acre	1	1162	66%	0%	6%	192	221
	2	1452	64%	0%	8%	234	
	3	1452	65%	0%	7%	237	

Treatment Dates = 60 & 90 DAP
60 DAP = July 29, 2003
One check discarded due to wildlife damage
Variety = Tamrun 96 - runner type

2003 Peanut Sclerotinia
Motley & Collingsworth County

Treatment	Chemical	Rate Per Acre	Timing DAP
1	Check		
2	Headline 2.09 SC BAS 51004 (Endura)	9 fl. oz. 9 oz.	A, C B, D
3	Bravo 720 Omega 500 F	1.5 pt 1.5 pt	A, C B, D

A- 45 DAP
B-60 DAP
C-75 DAP
D-90 DAP

Runner type – Tamrun 96

Collingsworth Sclerotinia
Harvested October 20, 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Inmature	$ Value/Acre	Avg $/Acre
1	1	4574	70%	1%	4%	792	779
	2	3920	70%	0%	5%	682	
	3	4864	73%	0%	3%	864	
2	1	5518	70%	0%	5%	960	965
	2	5227	72%	1%	4%	931	
	3	5881	68%	0%	6%	1004	
3	1	5445	71%	0%	4%	956	918
	2	4792	71%	0%	4%	842	
	3	5445	71%	0%	4%	956	

Motley Sclerotinia
Harvested October 20, 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Inmature	$ Value/Acre	Avg $/Acre
1	1	1525	66%	0%	6%	251	371
	2	2323	63%	0%	7%	368	
	3	3122	67%	0%	7%	494	
2	1	3557	67%	0%	5%	593	622
	2	3775	63%	1%	7%	597	
	3	4138	65%	0%	7%	675	
3	1	2977	65%	0%	6%	484	483
	2	2251	67%	0%	4%	373	
	3	3630	68%	0%	4%	591	

2003 Peanut Rhizoctonia
Terry County

Treatment	Chemical	Rate/3 Liters	Rate Per Acre	Timing DAP	Rows (Rep 1,2,3)
1	Check				1,16,20
2	Headline Folicur	14 mls 9mls	12 fl oz 7.2 fl oz	A,G C,E	2,19,22
3	Moncut 70 DF Headline	20.1 g 14 mls	119.46 oz 12 fl oz	A C,F	3,18,10
4	Abound	15 mls	12.3 fl oz	B,D	4,9,6
5	Abound	22 mls	18.4 fl oz	B,D	5,13,18
6	Moncut 70 DF	9.38 g	.5 #	A,B,C,D	6,3,1
7	Moncut 70 DF	18.76 g	1 #	B,C,D	7,5,14
8	Moncut 70 DF	27.52 g	1.428 #	B,D	8,20,7
9	Moncut 70 DF	37.52 g	2 #	B,D	9,15,19
10	Folicur	9 mls	7.2 fl oz	B,D	10,6,16
11	Artisan 3.6 SE	39 mls	32 fl oz	B,D	11,14,9
12	Artisan 3.6 SE	32 mls	26 fl oz	B,D	12,4,2
13	NAI-008 3.6 SE	39 mls	32 fl oz	B,D	13,21,5
14	NAI-301 480g/l SE	55 mls	45 fl oz	B,C,D	14,2,12
15	JAU 476 Bravo	6.682 mls 28.07 mls	5.48 fl oz 1.5 pt	C,D,E,F A,B,G	15,7,3
16	Folicur 43 SC Bravo 720	8.466 mls 28.07 mls	7.2 fl oz 1.5 pt	C,D,E,F A,B,G	16,22,17
17	Folicur 43 SC USF 2010 Bravo 720	8.466 mls 4.106 mls 28.07 mls	7.2 fl oz 3.28 fl oz 1.5 pt	C,D,E,F A,B G	17,1,13
18	Folicur 43 SC	8.46 mls 8.21 mls	7.2 oz 6.73 fl oz	C,D,E,F A,B	18,12,15

	Stratego Bravo 720	28.07 mls	1.5 pt	G	
19	Abound Bravo 720	21.49 mls 28.07	12.3 fl oz 1.5 pt	C,E A,B,D,F,G	19,8,21
20	Headline Headline Folicur 43 SC Bravo	7.057 mls 10.52 mls 8.46 mls 28.07 mls	6 fl oz 9 fl oz 7.2 fl oz 1.5 pt	B D E,F A,C,G	20,11,8
21	Headline Headline Folicur 43 SC Bravo	7.057 mls 14.11 mls 8.46 mls 28.07 mls	6 fl oz 12 fl oz 7.2 fl oz 1.5 pt	B D C,E,F A,G	21,17,11
22	Bravo 720	28.07 mls	1.5 pt	A,B,C,D,E,F,G	22,10,4

Spray Dates:
June 23
July 8
July 23
Aug 7
Aug 21
Sept 4
Sept 18

Plot size = 2 rows X 100 ft.
Variety/Type Tamspan 90/Spanish
All weights are in pounds/acre

Terry County Rhizoctonia
Harvested on October 23, 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Immature	$/Ton	$ Value/Acre	Avg $/Acre
1	1	4646	75%	0%	2%	336.18	851	814
	2	4283	75%	0%	1%	364.78	781	
	3	4501	74%	0%	1%	359.93	810	
2	1	4937	75%	0%	1%	364.78	900	870
	2	4646	74%	0%	2%	361.33	839	
	3	X						
3	1	4719	75%	0%	2%	366.18	864	899
	2	4864	76%	0%	1%	369.62	899	
	3	4864	79%	0%	1%	384.16	934	
4	1	4864	76%	0%	1%	369.62	899	880
	2	4429	77%	0%	1%	374.47	829	
	3	4864	77%	0%	1%	374.47	911	
5	1	4792	76%	0%	1%	369.62	886	921
	2	4719	76%	0%	1%	369.62	872	
	3	5445	76%	0%	1%	369.62	1006	
6	1	4719	76%	0%	1%	369.62	872	818
	2	4429	75%	0%	1%	364.78	808	
	3	4138	77%	0%	1%	374.47	775	
7	1	3848	76%	0%	1%	369.62	711	850
	2	5009	75%	0%	1%	364.78	914	
	3	4937	77%	0%	1%	374.47	924	
8	1	4138	77%	0%	0%	373.07	772	752
	2	4211	74%	0%	1%	359.93	758	
	3	3920	76%	0%	2%	371.02	727	
9	1	3993	75%	0%	2%	366.18	731	781
	2	4719	75%	0%	1%	364.78	861	
	3	4066	76%	0%	1%	369.62	751	
10	1	4719	77%	0%	1%	374.47	884	826
	2	4501	75%	0%	1%	364.78	821	
	3	4283	74%	0%	2%	361.33	774	
11	1	3848	76%	0%	1%	369.62	711	807
	2	4719	75%	0%	1%	364.78	861	
	3	4574	76%	0%	2%	371.02	849	

12	1	3485	76%	0%	1%	369.62	644	743
	2	4211	75%	0%	1%	364.78	768	
	3	4356	77%	0%	1%	374.47	816	
13	1	3267	75%	0%	2%	366.18	598	731
	2	X						
	3	4719	75%	0%	2%	366.18	864	
14	1	4429	76%	0%	1%	369.62	819	871
	2	5022	74%	0%	2%	361.33	907	
	3	4792	76%	0%	1%	369.62	886	
15	1	3993	76%	0%	1%	369.62	738	777
	2	4429	76%	0%	1%	369.62	819	
	3	4138	77%	0%	1%	374.47	775	
16	1	3993	75%	0%	1%	364.78	728	820
	2	X						
	3	4937	76%	0%	1%	369.62	912	
17	1	4356	75%	0%	2%	366.18	798	876
	2	5590	75%	0%	2%	366.18	1023	
	3	4356	76%	0%	2%	371.02	808	
18	1	4792	76%	0%	1%	369.62	886	844
	2	4138	76%	0%	0%	368.22	762	
	3	4719	77%	0%	1%	374.47	884	
19	1	4138	76%	0%	1%	369.62	765	853
	2	5009	77%	0%	2%	375.87	941	
	3	X						
20	1	4719	73%	0%	2%	356.49	841	868
	2	4501	76%	0%	1%	369.62	832	
	3	5022	76%	0%	2%	371.02	932	
21	1	X						828
	2	4574	74%	0%	1%	359.93	823	
	3	4501	76%	0%	1%	369.62	832	
22	1	X						836
	2	4501	77%	0%	1%	374.47	843	
	3	4429	77%	0%	1%	374.47	829	

All plots with X = harvested in error by custom harvestor.

2003 Peanut Rhizoctonia
Gaines County

Treatment	Chemical	Rate/3 Liters	Rate Per Acre	Timing DAP	Rows (Rep 1,2,3)
1	Check				1,16,20
2	Headline Folicur	14 mls 9mls	12 fl oz 7.2 fl oz	A,G C,E	2,19,22
3	Moncut 70 DF Headline	20.1 g 14 mls	119.46 oz 12 fl oz	A C,F	3,18,10
4	Abound	15 mls	12.3 fl oz	B,D	4,9,6
5	Abound	22 mls	18.4 fl oz	B,D	5,13,18
6	Moncut 70 DF	9.38 g	.5 #	A,B,C,D	6,3,1
7	Moncut 70 DF	18.76 g	1 #	B,C,D	7,5,14
8	Moncut 70 DF	27.52 g	1.428 #	B,D	8,20,7
9	Moncut 70 DF	37.52 g	2 #	B,D	9,15,19
10	Folicur	9 mls	7.2 fl oz	B,D	10,6,16
11	Artisan 3.6 SE	39 mls	32 fl oz	B,D	11,14,9
12	Artisan 3.6 SE	32 mls	26 fl oz	B,D	12,4,2
13	NAI-008 3.6 SE	39 mls	32 fl oz	B,D	13,21,5
14	NAI-301 480g/l SE	55 mls	45 fl oz	B,C,D	14,2,12
15	JAU 476 Bravo	6.682 mls 28.07 mls	5.48 fl oz 1.5 pt	C,D,E,F A,B,G	15,7,3
16	Folicur 43 SC Bravo 720	8.466 mls 28.07 mls	7.2 fl oz 1.5 pt	C,D,E,F A,B,G	16,22,17
17	Folicur 43 SC USF 2010 Bravo 720	8.466 mls 4.106 mls 28.07 mls	7.2 fl oz 3.28 fl oz 1.5 pt	C,D,E,F A,B G	17,1,13
18	Folicur 43 SC Stratego Bravo 720	8.46 mls 8.21 mls 28.07 mls	7.2 oz 6.73 fl oz 1.5 pt	C,D,E,F A,B G	18,12,15
19	Abound Bravo 720	21.49 mls 28.07	12.3 fl oz 1.5 pt	C,E A,B,D,F,G	19,8,21
20	Headline Headline	7.057 mls 10.52 mls	6 fl oz 9 fl oz	B D	20,11,8

	Folicur 43 SC Bravo	8.46 mls 28.07 mls	7.2 fl oz 1.5 pt	E,F A,C,G	
21	Headline Headline Folicur 43 SC Bravo	7.057 mls 14.11 mls 8.46 mls 28.07 mls	6 fl oz 12 fl oz 7.2 fl oz 1.5 pt	B D C,E,F A,G	21,17,11
22	Bravo 720	28.07 mls	1.5 pt	A,B,C,D,E,F,G	22,10,4

Spray Dates:
June 23
July 8
July 23
Aug 7
Aug 21
Sept 4
Sept 18

Plot size = 2 rows X 100 ft.
Variety/Type NC2/Virginia
All weights = pounds/acre

Gaines County Rhizoctonia
Harvested on October 16, 2003

Treatment	Rep	Yield /Acre	Grade	% Damaged	% Immature	% ELK	$/Ton	$ Value /Acre	Avg $/Acre
1	1	3903	71%	2%	2%	18%	358.29	699	714
	2	3842	74%	0%	2%	25%	379.03	728	
	3	3781	74%	1%	2%	25%	379.03	716	
2	1	3781	72%	1%	2%	23%	368.40	713	685
	2	3842	73%	0%	2%	28%	375.10	721	
	3	3354	73%	2%	2%	23%	369.97	620	
3	1	3903	73%	0%	2%	23%	373.37	729	752
	2	4147	75%	0%	1%	25%	382.60	793	
	3	3964	73%	2%	1%	24%	369.92	733	
4	1	3720	70%	2%	2%	17%	352.97	657	663
	2	3720	74%	0%	1%	20%	375.88	699	
	3	3476	72%	2%	2%	23%	365.00	634	
5	1	4025	74%	0%	2%	21%	377.63	760	730
	2	3842	73%	0%	1%	23%	371.97	715	
	3	3965	71%	1%	1%	20%	360.99	716	
6	1	3964	75%	0%	1%	21%	381.20	756	647
	2	3537	72%	0%	2%	15%	365.20	646	
	3	2866	74%	1%	2%	17%	376.23	539	
7	1	4025	74%	1%	1%	22%	376.58	758	684
	2	3354	72%	1%	2%	21%	367.30	616	
	3	3598	74%	0%	2%	17%	376.23	677	
8	1	3781	73%	1%	1%	27%	373.37	706	703
	2	3598	73%	1%	1%	25%	372.67	670	
	3	3903	74%	1%	1%	21%	376.23	734	
9	1	3476	73%	1%	2%	20%	372.32	647	707
	2	4147	74%	0%	2%	27%	379.73	787	
	3	3659	74%	1%	1%	20%	375.88	688	
10	1	3781	73%	1%	1%	26%	373.02	705	668
	2	3354	73%	0%	3%	18%	373.02	626	
	3	3598	73%	0%	2%	26%	374.40	674	

	1	3476	72%	1%	2%	22%	368.05	640	
11	2	4391	72%	0%	2%	22%	368.05	808	716
	3	3781	73%	1%	1%	20%	370.92	701	
	1	3537	72%	0%	2%	20%	367.35	650	
12	2	3476	73%	0%	2%	18%	371.62	646	632
	3	3354	71%	3%	3%	22%	357.69	600	
	1	3720	73%	0%	2%	19%	371.97	692	
13	2	3476	74%	0%	2%	22%	377.98	657	669
	3	3659	71%	2%	2%	21%	359.34	657	
	1	3598	73%	0%	3%	20%	373.72	672	
14	2	3476	74%	0%	1%	25%	377.63	656	680
	3	3781	74%	1%	1%	22%	376.58	712	
	1	3842	72%	1%	2%	23%	368.40	708	
15	2	3659	74%	0%	1%	19%	375.53	687	688
	3	3659	72%	1%	1%	19%	365.60	669	
	1	3659	71%	1%	3%	25%	365.19	668	
16	2	3537	74%	1%	1%	23%	376.93	667	641
	3	3171	73%	1%	1%	21%	371.27	589	
	1	3531	73%	0%	2%	26%	374.02	660	
17	2	3293	72%	0%	2%	22%	367.65	605	671
	3	3842	76%	0%	1%	30%	389.32	748	
	1	3415	73%	0%	2%	18%	371.62	635	
18	2	3903	73%	1%	1%	24%	372.32	727	645
	3	3110	72%	1%	2%	22%	368.05	572	
	1	3293	75%	0%	2%	16%	380.85	627	
19	2	3232	73%	0%	1%	24%	372.32	602	632
	3	3476	75%	0%	1%	26%	382.95	666	
	1	3720	71%	1%	2%	22%	363.09	675	
20	2	3781	73%	1%	1%	22%	371.62	703	709
	3	3964	74%	1%	1%	24%	377.28	748	
	1	3659	74%	0%	1%	24%	377.28	690	
21	2	3354	74%	0%	2%	26%	379.38	636	679
	3	3964	71%	1%	2%	20%	358.99	712	
	1	3171	74%	0%	2%	21%	377.63	599	
22	2	3903	75%	0%	1%	23%	381.90	745	665
	3	3415	75%	1%	1%	24%	381.55	651	

Report No. 4

2003 Project Report for the Texas Peanut Producers Board

Title: Survey of West Texas Peanut Fields for Frequency of Pod Rot Diseases, and Testing of *Pythium* Pod Rot Fungicides.

Participants: Terry Wheeler, Dana Porter, and Charles Howell

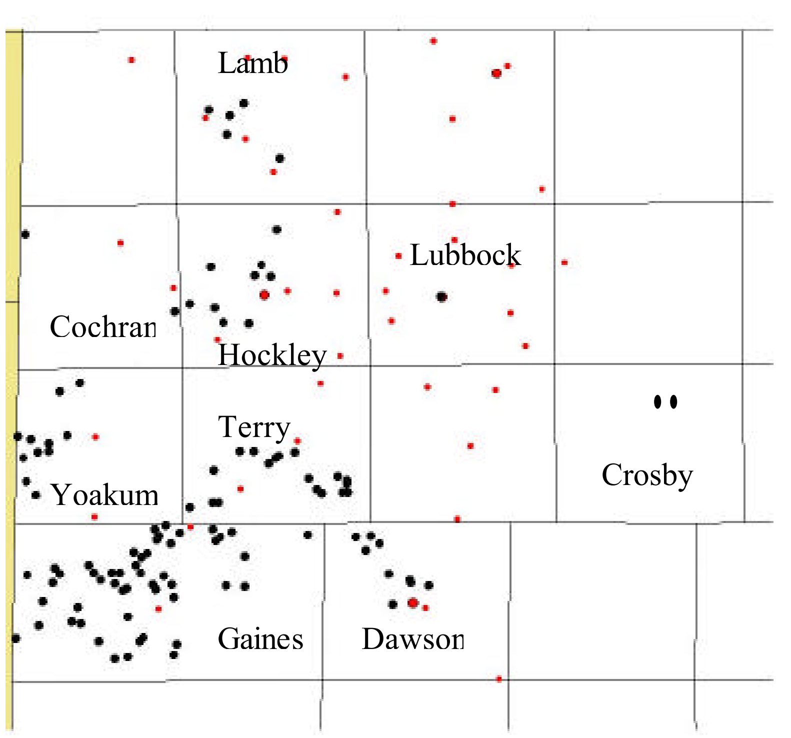
Employer: Texas Agricultural Experiment Station (Lubbock) and USDA-ARS (College Station).

Project Objectives:

1) Determine the frequency of pod rot pathogens in west Texas
2) Identify the most common species of *Pythium* causing pod rot in west Texas
3) Test the activity of Abound FL and Ridomil Gold EC on different *Pythium* species
4) Test combinations of Ridomil Gold EC and Abound FL at reduced rates, which may provide acceptable activity against *Pythium* spp. and other pod rot pathogens.

The black dots in Figure 1. represent the 108 locations surveyed for peanut diseases.

Fig. 1. Peanut survey locations in 2003. ● represents a sampling site, ● represents a town or city.



The pod rot information was divided into four classes:1. where either no pod rot was found or if pod rot was present, then neither *Rhizoctonia solani* nor *Pythium* were isolated from necrotic pods (R-, P-); 2. where *R. solani* was isolated from rotted pods, but *Pythium* was not (R+, P-); 3.

where *Pythium* was isolated from rotted pods, but *R. solani* was not (R-, P+); 4. where both *R. solani* and *Pythium* were isolated from rotted pods (R+, P+). Classes 1, 2, 3, and 4, represented 42%, 19%, 23%, and 16% of the fields surveyed. *Rhizoctonia* was isolated from pods in 35% of the fields, and *Pythium* from pods in 39% of the fields. *Sclerotium rolfsii* (southern blight) was isolated from pods in 4% of the fields, all from Gaines county. In the survey, 40 locations in each field were dug, regardless of field size, and all pods with disease from those 40 locations were taken back to the laboratory and weighed. The average weight of rotted pods from classes 1, 2, 3, and 4 was 54, 48, 86, and 128 g. The frequency of pathogens isolated from diseased pods, combined with the severity of disease in fields with *Pythium* are a strong indicator that *Pythium* pod rot is as important or more important than *Rhizoctonia* pod rot.

Isolates thought to be *Pythium* were sent to Dr. Charles Howell (USDA-ARS, College Station) for species identification. *Pythium* must form a sexual spore before it can be identified to species. It is not always possible to get *Pythium* to form this stage, so not all isolates could be identified to species. A number of the earliest isolates sent to Dr. Howell were of a species of *Pythium* (*P. oligandrum)* that feeds on pathogenic species of *Pythium*. Once we could recognize *P. oligandrum*, we did not send him any more of that species. Of the pathogenic isolates of *Pythium* identified by Dr. Howell (29 total), 41% were *P. myriotylum*, 34% were *P. ultimum*, and 21% were *P. irregulare*. One isolate may have been *P. heterothallicum* (3%). The typical "peanut" *Pythium* is *P. myriotylum*, while the cotton seedling disease species is *P. ultimum*. *Pythium irregulare* has a wide host range, though it is not typically thought of as a pathogen of peanut.

Isolate sensitivity of *Pythium* to Abound FL and Ridomil Gold EC are still on going, so the information in Table 1 is not a complete list of all the isolates being tested. There were 3, 6, and 6 isolates of *P. ultimum*, *P. myriotylum*, and *P. irregulare* tested against Abound FL in Table 1. The three species required an average of 0.0413, 0.0778, and 0.501 mg ai/L of Abound FL to restrict 50% of the mycelial growth for *P. ultimum*, *P. myriotylum*, and *P. irregulare,* respectively. The three species required an average of 4.67, 2.70, and 11.7 mg ai/L of Abound FL to restrict 90% of the mycelial growth for *P. ultimum*, *P. myriotylum*, and *P. irregulare,* respectively. This means that *P. irregulare* is much less sensitive to Abound FL than *P. ultimum* and *P. myriotylum*. There were 3, 7, and 6 isolates of *P. ultimum*, *P. myriotylum*, and *P. irregulare* tested against Ridomil Gold EC in Table 1. The three species required an average of 0.000397, 0.000407, and 0.000502 mg ai/L of Ridomil Gold EC to reduce growth by 50% for *P. ultimum*, *P. myriotylum*, and *P. irregulare*, respectively. The average concentration required to reduce growth by 90% is not presented because some of the isolates for these three species required higher concentrations than were actually tested (i.e. the 90% growth reduction was not achieved at tested concentrations). For *P. irregulare*, all isolates tested required > 0.02 mg ai of Ridomil Gold EC/L to reduce growth by 90%.

Objective 4 was to develop a chemigation system to test fungicides like Ridomil Gold EC. The fungicide was applied with a broadcast hand held CO_2 driven sprayer and the water was applied soon after the fungicide application. The water was applied to a four-row, 12' long plot, which takes 4 minutes for one plot, or 5 minutes if two plots are irrigated. This applies ¼" of water to the two middle rows of the four row plots, and slightly lower amounts to the outer two rows. The water is applied through the PVC pipe, which is easily moved to the next plot when it is empty of water (Fig. 2). The rate of irrigation is slow enough that no water runs out of the plot. This system was tested at two sites in 2003. Both sites had very little pod rot, but the system worked well, especially when plots were located near the turn row, where a nurse tank could be driven down the turn row to refill the tank of the test system.

Table 1. Fungicide sensitivity of *Pythium* isolates to Abound FL and Ridomil Gold EC.

County	Isolate[a]	Species[b]	Abound FL (mg ai/L) GR50%[c]	GR90%	Ridomil Gold EC (mg ai/L) GR50%	GR90%
Crosby	1a	U	0.0270	6.19	0.0000261	0.000833
Dawson	22c		0.0578	2.10	0.000242	0.0112
Dawson	24b	M	0.0780	3.73	0.000329	0.0180
Lamb	3a		0.0430	0.96	0.0000302	0.00295
Lamb	6a				0.0000151	0.000214
Lamb	6b		0.248	11.49	0.0000662	0.00316
Lamb	6c		0.055	4.09	0.00113	> 0.02
Gaines	14a	I	0.728	15.9	0.000856	> 0.02
Gaines	15a		0.0648	2.704	0.000298	0.0163
Gaines	18a		0.0700	> 20	0.0000289	0.00389
Gaines	18b		0.118	7.45	0.0000623	0.00928
Gaines	19b	M	0.058	2.50	0.00108	> 0.02
Gaines	tw14	M	0.0711	2.83	0.0000355	0.00760
Gaines	tw18c				0.000200	0.00796
Gaines	tw19a		0.217	5.30	0.000480	> 0.02
Gaines	tw19b				0.0000778	> 0.02
Gaines	2				0.0000166	0.000289
Gaines	26a	M			0.0000449	0.00576
Gaines	27a	I	0.277	11.0	0.000796	> 0.02
Gaines	27c	I	0.310	10.8	0.000590	> 0.02
Gaines	30a				0.000260	> 0.02
Gaines	30b		0.129	4.70	0.0000538	0.00490
Gaines	30c		0.0591	2.15	0.000112	0.0174
Gaines	31b		0.027	3.19	0.0000148	0.000190
Gaines	32a				0.0000214	0.000502
Gaines	32b	O	0.058	1.71	0.0000200	0.000662
Gaines	32c	H			0.0000282	0.00162
Gaines	32d		0.0190	2.10	0.0000372	0.00209
Gaines	6b		0.0780	8.75	0.0000120	0.000107
Gaines	8a	I	0.771	11.4	0.000536	> 0.02
Gaines	8b	I	0.284	8.62	0.000162	> 0.02
Gaines	8c	I	0.634	12.4	0.0000693	> 0.02
Gaines	9b		0.013	0.552	0.0000158	0.000224
Gaines	prob.	U	0.0419	3.73	0.0000343	> 0.02
Hockley	2	O	0.241	5.65	0.000399	> 0.02
Yoakum	6c	U	0.0550	4.09	0.00113	> 0.02
Yoakum	8a	M	0.0760	3.52	0.000833	0.02
Yoakum	8b	M	0.0438	1.18	0.000416	0.02
Yoakum	8c	M	0.140	2.41	0.000109	0.0124

[a]Isolates with the same number designation, but letters (a,b,c,d) are from the same field.
[b]Species are as follows: H=heterothallicum, I=irregulare, M=myriotylum, O=oligandrum, U=ultimum. Prob. was an isolate collected from a problem field (a field where Abound FL failed), but was not part of the survey.
[c]GR50% is the concentration necessary to reduce mycelial growth by 50%. GR90% is the concentration necessary to reduce growth by 90%.

Fig. 2. Small plot chemigation system

Table 2. Results from a small plot chemigation test at Jerry Hartman's site in Yoakum County

Treatment	60 day appl. rate (oz/a) and method	90 day appl. rate (oz/a) and method	# of rotted pods per plot	% of diseased kernals	lbs of peanuts per acre	$ value of peanut per acre
None (N)	0	0	19.8	1.0	5,786	1,128
N + Abound (A)	0	24.6 Br	32.8	0.7	5,807	1,127
N + A	0	24.6 C	31.2	0.8	5,841	1,132
A + A	12.3 Ba	24.6 Br	50.4	1.6	6,533	1,255
A + A	24.6 C	24.6 C	38.6	1.0	6,414	1,252
N + Ridomil (R)	0	8 C	8.0	0.7	5,790	1,126
R + R	8 C	8 C	12.6	1.3	6,051	1,157
R + A	8 C	24.6 C	7.8	0.7	6,501	1,276
A + R	12.3 Ba	8 C	6.8	0.6	6,257	1,212
N + (A+R)	0	A=16 R=4C	7.2	0.6	6,279	1,229
(A+R) + (A+R)	A=16 R=4C	A=16 R=4C	3.4	0.1	6,429	1,269
LSD			41.9			

Abbreviations: N = None, A = Abound FL, R = Ridomil Gold EC, Br is broadcast, Ba is banded, C is chemigated at ¼" per acre. On the treatment list, the first letter(s) are for the 60 day application and the second letter(s) are for the 90 day application.

Since there was little pod rot at the Hartman site, yield differences were not significant. The only significant treatment affect was counting the number of diseased pods that were present on top when the peanuts were dug. This represents a much larger subsample than was used for calculation of % diseased kernals (250 g sample in that case). The lowest number of diseased pods/plot was found when Ridomil Gold EC was chemigated with Abound FL, either as separate applications (one at 60 days and the other at 90 days) or as a tank mixture. The highest amount of disease was found when Abound FL was applied at 60 and 90 days in banded and broadcast applications.

Report No. 5

Use of Fungicides, Varieties and Spray Program in South Texas Peanut Production

A. J. Jaks, B.A. Besler, W. J. Grichar and M. R. Baring

SUMMARY

Dollar value per acre was numerically higher for five of the six peanut varieties tested when sprayed four times or three times by the AU-Pnut advisory. These varieties included FlavorRunner 458, Tamrun-96, Georgia Green, Tamrun OLO1, and Tamrun OLO2. The four spray Nematam variety had higher $/A over the untreated control of this variety but the three spray advisory values were lower than the untreated control. Numerically higher yield were obtained from all varieties sprayed either four times or three times by advisory except that Nematam yield sprayed by advisory had less yield than this variety unsprayed. All sprayed varieties had numerically less leaf spot than respective unsprayed varieties. FlavorRunner 458 sprayed by advisory had less southern blight than either the four spray or untreated of this variety. Tamrun OLO1 sprayed four times and three times by advisory had less southern blight than the unsprayed of this variety. Grades were similar for all varieties regardless of treatment.

INTRODUCTION

Grower use of peanut varieties, fungicides and spray programs must result in effectiveness, efficiency and profit in today's market. Growers face decisions in selection of peanut varieties, fungicides and applications. Peanut varieties, fungicides and spray programs need to be evaluated to help growers/consultants make these choices as part of a continued monitoring program.

MATERIALS AND METHODS

Six peanut varieties were selected for use in this study. These varieties included FlavorRunner 458, Tamrun-96, Georgia Green, Tamrun OLO1, Tamrun OLO2 and Nematam. The varieties were planted in a split-plot design with four replications. Plots for each variety were two rows spaced 36-inches apart, each 20 feet long. Varieties were planted (101 lb/A) using a Monosem precision vacuum planter. In this test blocks of each of the varieties in each replicate were unsprayed, sprayed four times, and sprayed according to the AU-Pnut advisory. Variety blocks sprayed four times were done at random times instead of by calendar schedule. Variety blocks sprayed by AU-Pnut advisory resulted in three sprays being applied. The AU-Pnut advisory uses "rain events" (0.1 inch or greater) from natural rainfall or irrigation to count up these events which leads to advised sprays. As part of the four-spray program, Echo 720 (1.5 pt./A) was applied in a band application at 48 days after planting and as a broadcast spray at 105 days after planting. Folicur 3.6F (7.2 fl. oz./A) was broadcast sprayed at 70 and 90 days after planting. The AU-Pnut advisory first and third spray was an Echo 720 (1.5 pt./A) band spray at 48 days after planting and a broadcast spray at 105 days after planting. Folicur 3.6F (7.2 fl. oz./A) was broadcast sprayed at 84 days after planting for the second AU-Pnut advisory spray. Fungicides were sprayed with a CO_2 pressurized

(56 psi) belt-pack sprayer equipped with a two row hand-held boom with three nozzles (D2 tips, #23 cores and slotted strainers) per row. Water rate was 15 gallons per acre at 3.0 mph walking speed. Standard grower practices were followed for land preparation, fertility and weed control. Circle pivot unit provided supplemental water during the growing season. Assessment of leaf spot disease was made using the Florida leaf spot scale where 1= no disease, and 10= plants dead, completely defoliated from leaf spot. Soil borne disease (Southern blight) was evaluated by counting disease target sites per plot (40 feet of linear row with a diseased area on pods/stems which was equal to 1 ft. or less of affected row following digging). Plots were dug, inverted, dried in the field and combined. Plot samples were then forced air dried to 10% moisture, cleaned and weighed to determine yield per acre. Samples were removed from plots to determine grade and economic value. Disease ratings, yield, grade and dollar value per acre values were analyzed statistically.

RESULTS AND DISCUSSION

Rainfall almost immediately following the initial application of fungicide no doubt decreased the effectiveness of leaf spot control. Subsequent applications did not provide the usually expected level of control of leaf spot. This fact no doubt influenced the resulting dollar value per acre similarities between treatments and the untreated control. Overall, dollar values per acre were numerically higher for FlavorRunner 458, Tamrun-96, Georgia Green, Tamrun OLO1, and Tamrun OLO2 when sprayed four times or three times as advised by the AU-Pnut program (Table 1). The four spray Nematam had higher $/A over the untreated control of the variety but the three spray advisory value was lower than the untreated control. Higher numerical yields were obtained from all varieties whether sprayed four times or three times by advisory except that Nematam sprayed three times by advisory had less numerical yield than this variety unsprayed. All sprayed varieties by either program had numerically less leaf spot then respective varieties, which were unsprayed. FlavorRunner 458, sprayed by advisory, had less southern blight than either of the four spray or untreated of this variety. Tamrun OLO1, sprayed four times and three times by advisory, had less southern blight than the unsprayed of this variety. All varieties regardless of treatment or spray program had similar grades.

ACKNOWLEDGEMENTS

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Table 1. Variety/Fungicide Test Data from Atascosa County, 2003.

Variety/Schedule	Leaf spot [2] 9-22-03	Target sites[3] 10-06-03	Yield Lbs/A	Grade	$/Acre
FlavorRunner 458 (NO SPRAY)	6.9 b [1]	8.3 a	1756 g	77 ab	311.29 g
FlavorRunner 458 (4 SPRAY)	4.9 d-g	8.0 ab	3517 a-d	78 ab	642.89 a-d
FavorRunner 458 (AU-Pnut)	5.5 cde	4.0 de	2895 c-f	77 ab	526.79 c-f
Tamrun-96 (NO SPRAY)	7.3 ab	4.7 de	2845 c-f	75 ab	506.16 c-f
Tamrun-96 (4 SPRAY)	4.4 fg	3.3 de	3371 a-e	75 ab	598.49 b-e
Tamrun-96 (AU-Pnut)	5.6 cd	2.5 e	3757 abc	75 ab	667.38 abc
Georgia Green (NO SPRAY)	6.8 b	3.5 de	2106 fg	77 ab	373.46 fg
Georgia Green (4 SPRAY)	4.5 fg	4.3 de	3317 a-e	78 ab	601.14 a-e
Georgia Green (AU-Pnut)	5.3 def	2.8 de	2514 efg	77 ab	456.87 efg
Tamrun OLO1 (NO SPRAY)	7.9 a	7.8 abc	2591 d-g	77 ab	468.99 d-g
Tamrun OLO1 (4 SPRAY)	4.6 efg	4.5 de	3925 ab	77 ab	713.00 ab
Tamrun OLO1 (AU-Pnut)	5.6 cd	4.8 de	3240 b-e	76 ab	583.87 b-e
Tamrun OLO2 (NO SPRAY)	7.0 b	5.3 cde	3190 b-e	76 ab	580.12 b-e
Tamrun OLO2 (4 SPRAY)	4.9 d-g	4.5 de	4224 a	77 ab	770.97 a
Tamrun OLO2 (AU-Pnut)	5.6 cd	5.3 cde	3952 ab	75 ab	705.28 ab
Nematam (NO SPRAY)	6.4 bc	3.8 de	2614 d-g	78 a	477.35 d-g
Nematam (4 SPRAY)	4.3 g	5.5 bcd	3335 a-e	77 ab	602.39 a-e
Nematam (AU-Pnut)	5.1 d-g	3.8 de	2482 efg	75 ab	438.42 efg

[1]Means in a column followed by the same letter(s) indicate Duncan's Multiple Range groupings of treatments which do not differ significantly (P=0.05).

[2] Leaf spot disease rating based on Florida leaf spot assessment scale where 1= no disease; 10= plants dead, completely defoliated from leaf spot.

[3] Target sites are the number of infection sites less than or equal to 1.0 ft. in the 40 ft. of plot row.

Report No. 6

Title: Development of Pod Rot Risk Index

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Summary

In 2002, Rhizoctonia (*Rhizoctonia solani*) and or pythium (*Pythium spp.*) disease incidence occurred in less than 25% of the fields sampled. With fluctuations in temperature and rainfall in 2003, that number exceeded 75%. Throughout the course of the 2003 growing season, 216 peanut fields were soil sampled to determine pH, calcium (ppm), potassium (ppm), magnesium (ppm), calcium/potassium ratio and percent calcium and magnesium saturation.

Through the use of a logistic regression model, these parameters were used to determine the probability that rhizoctonia and or pythium would develop. Based on this analysis, as the Ca/K ratio increased, the probability of pod rot occurring was less.

Other factors including variety, rotation index, and a rotation system index were also used to determine pod rot occurrence.

Disease was evident in only 16% of the fields planted in Tamspan 90 whereas, fields planted with Flavor runner 458, VC 2, NC 7 and Val A had disease in over 65% of the fields sampled.

Growers that had a rotation index of 3 (good rotation) had less occurrence of pod rot than growers that had an index rating of 1 (poor rotation) and 2 (slightly out of rotation). Fields that had the rotation system of cotton/grass/grain/peanut had less pod rot occur compared to fields that were in a peanut/cotton 4 year rotation.

Introduction

Pod rot caused by *Rhizoctonia solani* and *Pythium spp.* is increasing across the South Plains production region. The pod rot complex caused by these pathogens is due to a combination of events; weather, irrigation, improper rotation and potentially improper calcium nutrition. Previous studies have documented the importance of proper calcium nutrition and crop rotation in reducing pod rot and increasing yields. With these practices in mind, among others, our objective was to survey grower fields and construct a pod rot disease index that would clearly identify which factors would lead to possibly reducing the occurrence of pod rot.

Material and Methods

Soil samples were randomly collected from the top 3 to 4 inches of the soil surface throughout the field composited and sent to a soil analysis firm to determine pH, calcium (ppm), potassium (ppm), magnesium (ppm), ca/k ratio and percent calcium and magnesium saturation.

Field surveys included variety planted, rotation index and rotation system index.

The rotation index was:

1= out of rotation;

2= slightly out of rotation
3= good rotation.

The rotation system index ranged from A-F where:
A= small grain/peanut in a 2 year rotation
B= cotton/grass/grain/ peanut
C= peanut/cotton in a 3 year rotation
D= peanut/cotton in a 4 year rotation
E= peanut/cotton in a 2 year rotation
F= peanut

Rhizoctonia and or pythium pod rot assessments were made throughout the growing season by sampling plants within several areas of each field.

Results and Discussion

Soil Analysis

Through the use of logistic regression, Ca/K ratio was the only parameter that influenced the probability of pod rot disease occurrence. Based on the fields we sampled in 2003, the analysis revealed that as the Ca/K ratio increased the probability of pod rot disease occurrence declined. Of the 216 fields surveyed, 46 fields had a Ca/K ratio greater than 9 with 43% of those fields having pod rot (Figure 1). Most fields (104) fell into the Ca/K ratio of 3.1-6 of which 57% of those fields had pod rot.

Varieties

Disease was evident in only 16% of the fields planted in Tamspan 90 whereas, fields planted with Flavor runner 458, VC 2, NC 7 and Val A had pod rot in over 65% of the fields sampled (Figure 2).

Rotation Index

117 fields fell into the 2 category of which 62% of those fields had pod rot. Only 12 fields fell into the 1 category but 88% of those fields had disease. Field considered to have a good rotation (81 fields), less than 45% of those fields had pod rot (Figure 3).

Rotation system index

Most fields (65 fields) were in the Rotation system B followed closely with rotation system D (62 fields) of which 54% and 61% of those fields respectively, had pod rot occurrence. Rotation system C and E was used in 46 and 34 fields respectively, with 48 and 44% of those fields having pod rot. However, in these rotation systems, the variety Tamspan 90 which has shown tolerance to pod rot was planted in most fields. Only 8 fields were in the rotation system F of which 75% of those fields had disease occurrence (Figure 4).

Figure 1. Calcium/Potassium ratios across 216 fields and varieties.

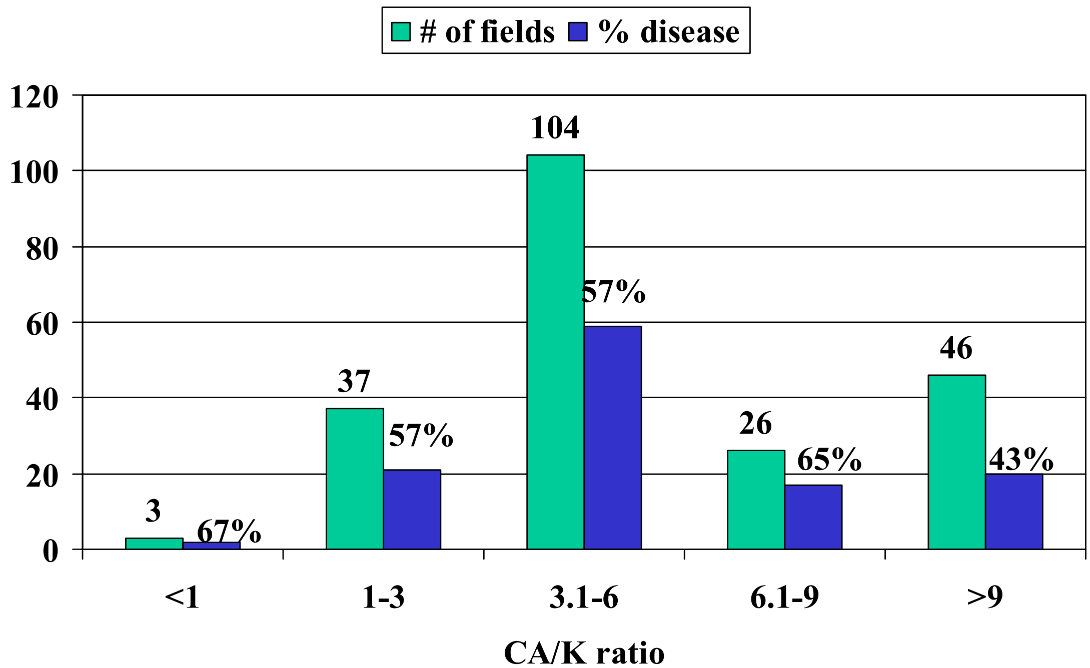


Figure 2. Pod rod occurrence among widely used varieties in survey.

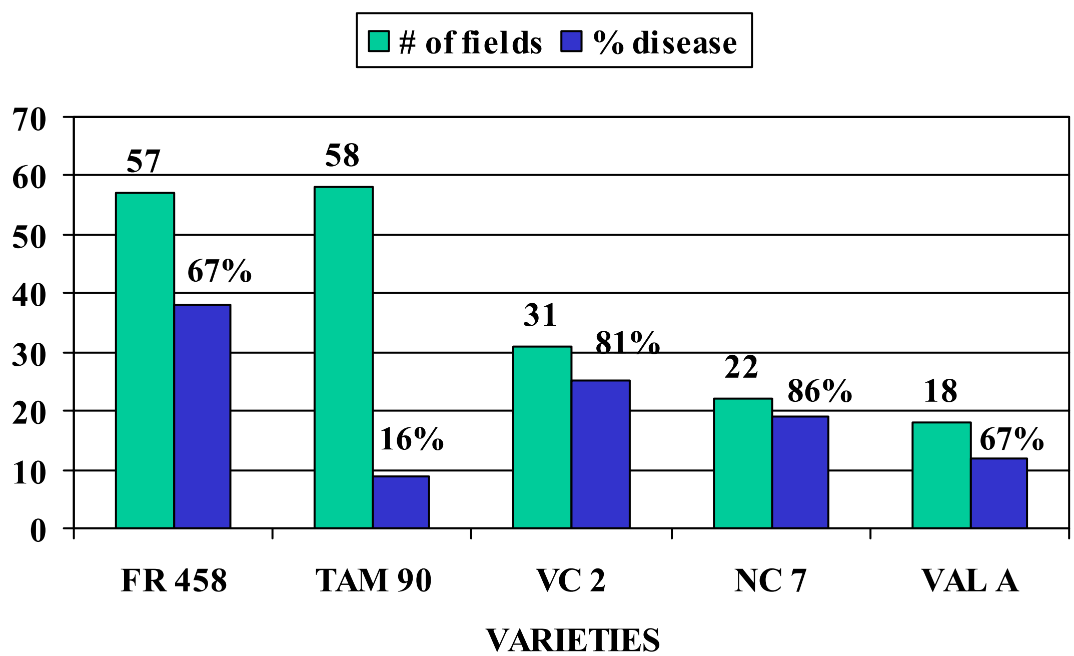


Figure 3. Rotation index across 216 fields surveyed.

1=out of rotation
2=slightly out of rotation
3=good rotation

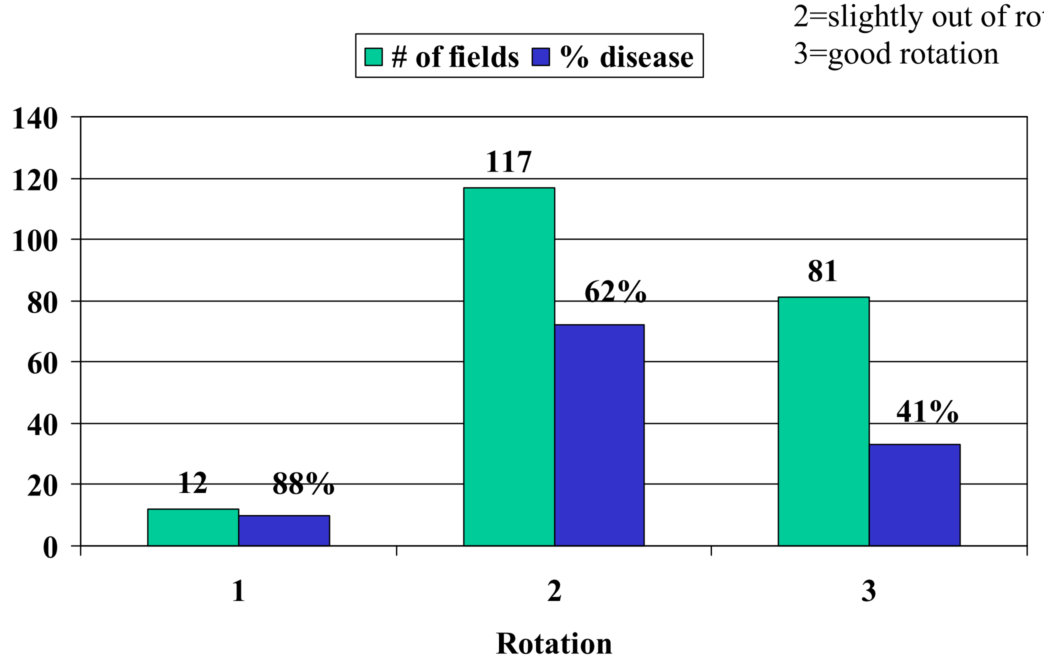
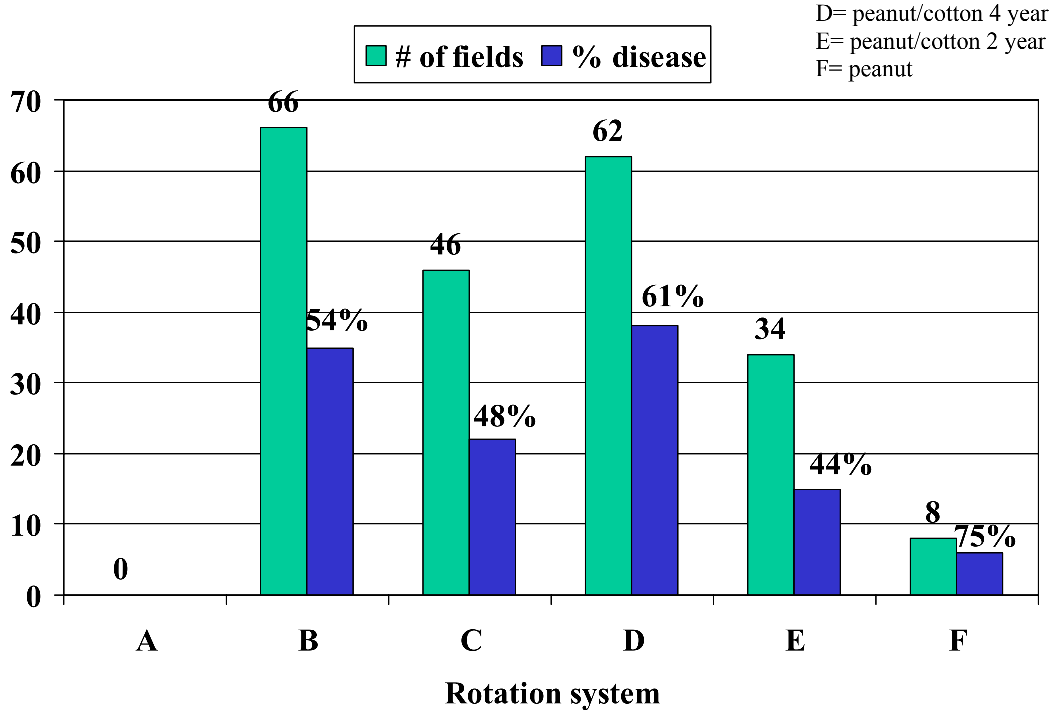


Figure 4. Rotation system index across 216 fields surveyed.

A= small grain/peanut 2 years
B= cotton/grass/grain/peanut
C= peanut/cotton 3 year
D= peanut/cotton 4 year
E= peanut/cotton 2 year
F= peanut



Report No. 7

Development of Peanut Cultivars with High O/L Ratios and Root-knot Nematode Resistance

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SUMMARY

Fatty acid analysis by gas chromatography for determination of O/L ration was completed on 30 BC3 breeding lines. We have nearly completed screening those individuals with the high O/L trait for nematode resistance. To date 142 individuals with both traits have been identified, including 79 individuals that also have resistance to Sclerotina blight. Thus we have achieved our objectives for 2003. Future efforts will focus on seed increase and yield testing.

INTRODUCTION

The peanut nematology and breeding program has been successful in its attempts to identify, characterize and develop resistance to the root-knot nematode. We have released two cultivars with high levels of resistance to the root-knot nematode (COAN and NemaTAM). This resistance will permit growers to control nematodes without the costly expense of nematicide treatments. We also expect that growers will find that nematode control with these resistance cultivars will be superior to the level of control typically observed following an application of a nematicide. Our current efforts are now aimed at the introgression of nematode resistance into peanut cultivars that also possess such important traits as a high O/L ratio and resistance to Sclerotina blight. This project compliments a sister project to introgress nematode resistance into peanut cultivars that are also resistant to the tomato spotted wilt virus, which is funded by the National Peanut Board. This report documents the progress made during the past year and outlines our objectives for 2004-2005.

MATERIALS AND METHODS

Introgression of nematode resistance into high O/L peanut lines. In 2002 we completed a second backcross of nematode resistance into several breeding lines that carry the high O/L trait. In 2003 we sought to achieve a third back cross of nematode resistant sections to several recurrent parents with the high O/L trait. We also added some new parental material to our crossing scheme. High O/L-nematode resistant progeny from the second back cross generation were crossed with the newly released cultivar Tamrum OL 02 and with genotypes carrying resistance to Sclerotina blight.

After the desired crosses were made and the F1 generation was harvested, these seed were planted to produce the F2 generation. The F2 individuals were then screened for the high O/L trait by cutting a small piece (about 30 mg) from the top of the seed. The fatty acids were extracted from these seed pieces with organic solvents. The ratio of oleic to linoleic fatty acids in these extracts was then measured using gas-chromatography. Those seed that had the desired high O/L trait were then planted. Nematode resistance was identified using molecular markers linked to resistance that we developed previously. When the plants are approximately 4 weeks old leaf tissue samples were collected for extraction of DNA. The DNA was digested with the restriction enzyme Eco RI, separated by electrophoresis on agarose gels, transferred to nylon membranes, and then probed to identify individuals that were either homozygous or heterozygous for the gene for nematode resistance. Individuals with both the high O/L trait and nematode resistance were saved for use as donor parents for a fourth back cross generation. Most importantly, these individuals will be used to produce seed. Our goal is to produce sufficient seed of these lines in 2004 to begin yield testing at multiple locations in 2005.

RESULTS

Fatty acid analysis for O/L ratio was completed on a total of 1167 F2 individual derived from 30 crosses. About 100 of these assays were completed by Dr. Y. Lopez at the TAES center in Lubbock The remainder were completed by the newly established fatty acid analysis facility in the Dept of Plant Pathology & Microbiology at College Station. We also anticipate completing additional assays for M. Baring and C. E. Simpson on breeding lines that are not part of the nematode resistance project. Figure 1 shows an example of the data from gas chromatography used to identify individuals with the high O/L trait. Across all groups, 26.7 % of the individuals were found to have a O/L ratio of greater than 10.0 (Table 1).

By the first of March 2004 we had completed the nematode resistance analysis on 265 individuals with the high O/L trait (Table 1) and will complete the analysis of the remaining individuals within the next six weeks. Approximately, 51 % of the individuals with high O/L are also nematode resistant, with 14% being homozygous for resistance (Figure 2).

Table 1. Summary of numbers of individuals screened for high O/L trait by gas chromatography and for nematode resistance using DNA markers.

Group	No. Individuals Tested	No. with High O/L	No. with high O/L + Nematode Resistance
High O/L	553	132	57
High O/L + Resistance to Sclerotina Blight	474	133	79
COAN x Tamrun OL 02	30	10	-
NemaTAM x Tamrun OL 02	30	7	-
NemaTAM x high O/L	80	20	-

DISCUSSION

During 2002 it became apparent that the various components of the Texas peanut breeding program were generating more individuals that had to be screened for the high O/L trait than could be done efficiently or in a timely manner by Y. Lopez at the Lubbock center. Therefore, a gas chromatograph was acquired from the Dept of Plant Pathology and Microbiology and set up specifically for analysis of fatty acids. My laboratory has developed expertise in fatty acid analysis by gas chromatography to compliment its ability to use DNA markers for the analysis of nematode resistance. The combination of these two techniques allowed us to complete the O/L analysis of over 1100 individuals and we have nearly completed the nematode resistance analysis of those individuals that carried the high O/L trait. Thus we successfully completed our primary objective for the year. Additionally, we are now in a position to provide assistance to other components of the breeding program and will be doing the gas chromatography analysis on samples from M. Baring's breeding program. The greater capacity within the overall peanut improvement program for this essential analysis will prevent O/L analysis from becoming a bottle neck that restricts the overall progress of several breeding efforts.

During the 2004 growing season we will increase the number of seed available from several lines that have high O/L, nematode resistance, and some that will also have Sclerotinia blight resistance. Yield testing at a limited number of locations will begin in 2005. It is hoped that by the end of the 2006 season we will be able to identify one or more lines for seed increase and release after the 2007 season.

ACKNOWLEDGMENTS

We express our sincere appreciation to the Texas Peanut Producers Board for supporting our efforts to develop improved peanut varieties for the Texas peanut farmer. We also want to acknowledge the efforts of Ms. Elizabeth Morgan, a Research Assistant for J. L. Starr, who has become proficient in both gas chromatography and DNA analysis.

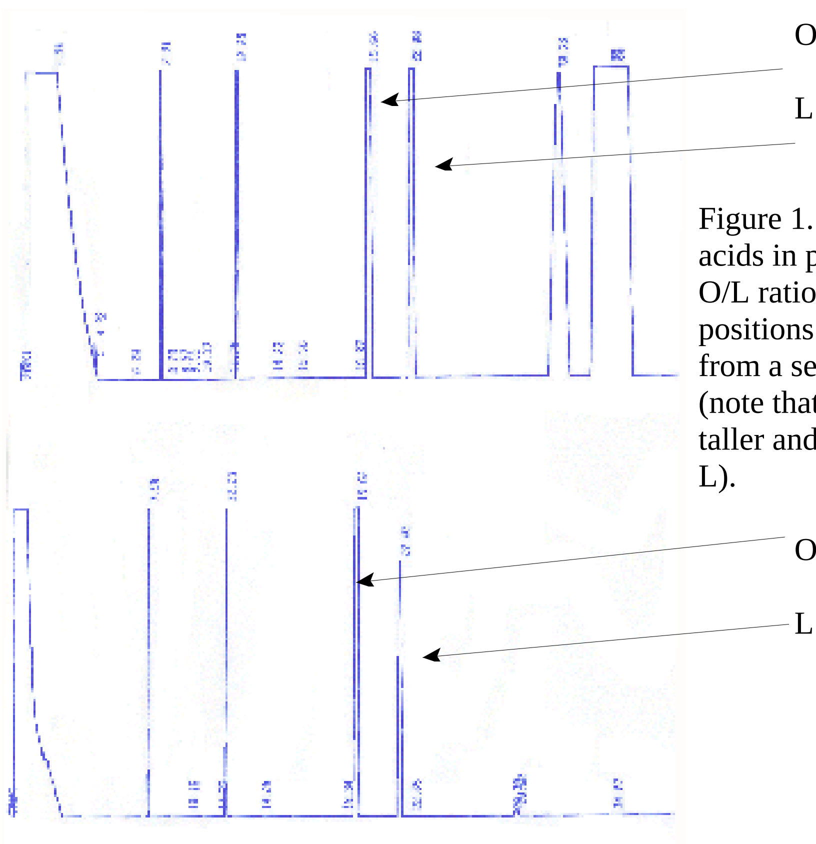

Figure 1. Gas chromatography of fatty acids in peanut. The upper profile has an O/L ration of 2:1(compare size of peaks at positions O and L). The lower profile is from a seed with a high O/L ratio >10:1 (note that the peak at position O is both taller and broader than the peak at position L).

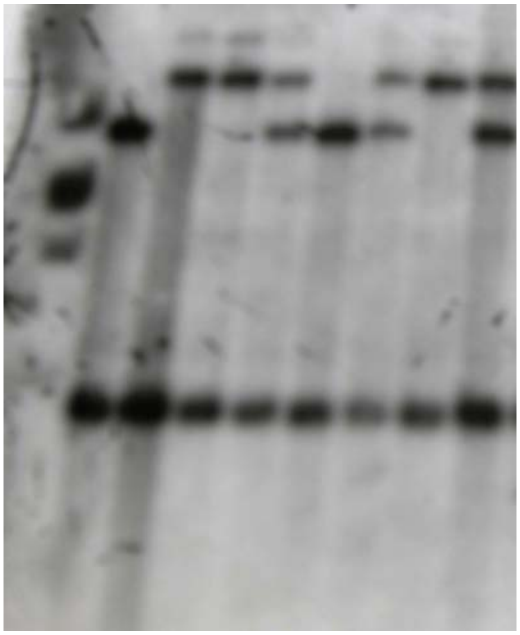

Figure 2. Random Fragment Length Polymorphism assay to identify peanut individuals that are homozygous or heterozygous for the nematode resistance gene. Lanes 2, 3 and 7 contains DNA from individuals that are homozygous for resistance; lanes 4, 6, and 8 are from individuals heterozygous for resistance; and lanes 1 and 5 are from individuals that are susceptible

Report No. 8

PEANUT BREEDING AND TESTING

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Summary

We had twenty-one (Burow 10, Baring 6, Simpson 5) test sites for breeding and testing plots in 2003, and most sites began the crop season with sufficient moisture from rainfall or irrigation for land preparation and planting . Planting in Central Texas was on a timely basis but record cold temperatures occurred in early to mid June. Then in late June, July, and August, we had a two-month hot and dry period with no effective rainfall. This was the second consecutive year for such a mid-summer dry period. The early cold followed immediately by the extreme heat caused some production problems that we cannot explain, but resulted in some small seed but some very high grades (TSMK's). This same or similar phenomenon resulted in some quality problems in the plot materials grown in West Texas. In some of our West Texas tests a late season hail storm essentially destroyed our plots in three tests at one site in near Brownfield. Over all, our grades and yields were relatively good because of the late freeze date. We were able to gather some valuable yield data, evaluation results, seed increases and generation advances, We were pleased with plot yields above 5000 pounds per acre in four sites and some plot yields above the 6000 pound range in at least two tests.

Our Spanish high O/L variety, OLin, continues to be plagued by seed increase problems. Our yield data continue to indicate that OLin will probably be about 10% lower yielding than Tamspan 90 but still has the potential to produce well over 5000 pounds of pods per acre, a very acceptable yield for an early maturing variety.

Our first runner high O/L variety, Tamrun OL 01 has performed well in South Texas and has not appeared to suffer any ill effects in the market place because of 1:1 ratio of jumbo to medium seed. The other high O/L runner, Tamrun OL 02, was not available for 2003, but the situation should be better for 2004, with seed available for commercial production. Registered Seed increases in South Texas located adjacent to seed increases of the Tamrun OL 01 variety resulted in identical yields between the two new varieties. Yields continue to be very good for both varieties and the O/L of both varieties is well above the normal range.

NemaTAM, our second root-knot nematode resistant variety, must be re-increased because all available seed, except a very few lbs. of Breeder Seed were accidentally diverted to the edible market. We have sufficient seed to plant a five acre increase, which should give us about 100 acres in 2005. This should increase to something over 1,800 acres in 2006. We have studied the possibility of making a winter increase to cut a year off of the re-increase time, but to plant enough in Puerto Rico (or Argentina) does not appear to be cost effective.

Breeding populations have been built and/or evaluated in studies on early maturity, multiple disease resistance, and leaf spot resistance. We anticipate developing molecular markers to use in selecting within these populations.

INTRODUCTION

The hot dry conditions in the summer months of 2003 placed another year's stress on irrigation water supplies. From previous experience we know that a hot dry summer will generally result in smaller seed sizes. That is exactly what happened in 2003. The same combination apparently also put the West Texas crop in an additional stress that relates to the much talked about "off flavors." South Texas had adequate moisture for land preparation, however, many farmers put down ½ to ¾ inch of irrigation after planting to ensure proper germination. Three weeks after planting heavy rains and high winds from a hurricane aftermath contributed to over 28 inches of rainfall from planting to harvest, resulting in a lower requirement for irrigation, but also a significant infection of Southern Blight and leafspot earlier in the growth period. Yields and grades for the South Texas crop were good to excellent for the 2003 growing season.

Data on some of our yield tests at all locations were very good, reflecting those tests that had adequate water for full irrigation during the dry mid-summer and were harvested before pods began to shed. Yields were also exceptional in our Spanish high O/L plots on the Timmons farm in Terry County. The Spanish tests at Timmons farm had an early set-back when a hail storm came through in the first month of the growing season. The plants recovered from the hail damage; however, they had to be left in the field 2-3 weeks longer than normal to fully mature. Our high O/L BC_4 Spanish lines were grown in Terry and Erath Counties and Ft. Cobb, OK. They yielded well at Terry County **Table 10**, but more modestly at the other two locations. Data was combined from all locations and the yield range was between 3100 and 3670 lbs./acre. Several of the lines had yields and grades that were statistically equal to or better than both Tamspan 90 and OLin. Of particular importance in these tests is that we have lines that are yielding in the same group as Tamspan 90 and Spanco on a regular basis. Another important fact is that the better yielding lines are a little larger seeded, a trait that one major company has expressed significant interest in from the high O/L Spanish type peanuts grown in West Texas. Worth mentioning here are lines 02T4838, 02T4809, 02T4707, and 02T4654. Entry 02T4809 had the highest yield at 6217 Lbs./A and highest value at $1072 per acre in the Terry County test. We are conducting a small greenhouse increase on some of these larger Spanish in anticipation of a possible Puerto Rico winter nursery increase in November 2004 of one or two of these lines.

NemaTAM, our second, more productive nematode resistant line continues to perform well under RK nematode pressure. Additional information and data can be found later in this report and in the Nematology report.

Uniform Peanut Performance Test (UPPT)

Three locations of the 2003 UPPT runner/Virginia test were conducted in Texas; one each in Northwest, South, and Central Texas. The sites were the Western Peanut Growers Research Farm in Gaines County, the Phillips farm in Frio County, and TAES in Erath County. A total of twelve breeding lines plus two check cultivars, Florunner and NC-7 made up the test. The tested lines included four Virginia and eight runner lines. The runner lines were submitted as follows: Georgia – 3 lines, Peanut CRSP – 2 lines, USDA 1 line, Virginia Tech – 1 line, North Carolina 2 lines, and Florida – 3 lines. The Virginia type lines were submitted from Georgia and Virginia. We also added some local checks, including Tamrun 96, Flavor Runner 458, Tamrun OL 01, Tamrun OL 02, and two of our more promising high O/L/multiple disease resistant lines (Table 1).

The data from the three tests are summarized in **Table 1**. We think the differences in environment were too great to average the three locations together into one analysis, so individual test data are shown. In the Gaines County test (WPGRF) yields were much better this year than last for this location. Three of the top four entries at this location were Virginia types. The Florida line UF00324 was third from the top of the West Texas test but caution is advised on this line because the test at Stephenville shows the line at the bottom of the test due to a very high infection of Sclerotinia blight. Flavor Runner 458 had a good yield averages for the test, but there was no pod rot and/or Sclerotinia present. Two of our local check entries, Tx994389 and Tx994371, were in the top statistical grouping in this test as well as in Erath County and in the top or second grouping in Frio County. Tamrun OL 02 was also in the top or second statistical group for yield and value per acre in Erath and Frio Counties. The two CRSP lines are hybrids derived from a cross with a Bolivian land race called Bayo Grande. This is a large seeded Virginia type that is late maturing. These lines performed fairly well in South and Central Texas but were low yielding in West Texas.

Spanish UPPT Denver City

This experiment was performed to begin to gather long-term quality data for Spanish and Valencia lines, to be used for comparison when future varieties are to be released. For many years, no Spanish or Valencia lines have been included in the UPPT test. Our results **Table 2** showed that Spanish lines generally yielded better than the two Valencia varieties. Seeds of OLin were slightly smaller than seeds of the other varieties tested.

Breeding for Yield and Early Maturity

$F_{2:6}$ lines.

Data from these experiments confirmed the earliness of Tx017746 compared to other runner breeding lines and varieties. The $F_{2:6}$ lines are the most-advanced lines under development for early maturity and high yield. These lines were evaluated at five locations (Denver City, Earth, Ft. Cobb, Wellington, and Pearsall.) Data from the WPGRF and Earth are presented in **Tables 3 and 4**; data from other locations will be presented in the TPPB Quality report. At each location, the experiment was split between Runner and Spanish lines. Among the runners at Denver City, lines Tx017746 and Tx017740 were equal to or earlier than established varieties. Maturity of Florunner and FlavorRunner 458 were 42% and 43%, respectively. Lines Tx017746 and Tx017740 had 58% and 68% mature pods at this location. Data from Earth also showed Tx017746 to be early. Here, as expected from observation of plants in the field, the peanuts were not as mature as at Denver City. Florunner and FlavorRunner458 were only 17% and 7% mature at harvest. Tx017746 had 42% mature pods, but Tx017740 had only 18% mature pods. Last year, Tx017746 appeared to be intermediate in maturity between runner and Spanish at both locations, as this year also. It also was in the top yield and value per acre category. We are still gathering yield, seed size, and shelling data from the plants grown at Earth. Overall, Tx017746 appears to be a promising line, with earlier maturity than runners in general and good yield. However, shelling percentage is low, and the line has the low-O/L trait. This line is being crosses by TamrunOL 01 and Tamrun OL 02 to improve shelling percentage and develop a high-O/L variant of this line.

In the Spanish test at Denver City, no breeding lines were earlier than Spanco, but several (Tx017756, Tx017764) were earlier than OLin, which was only 55% mature at harvest. However, many of the breeding lines had appreciably-smaller seeds than both Olin and Spanco. At Earth, Olin was as mature as other varieties, so we cannot conclude on these data alone that OLin is a late variety.

Valencia x Spanish O/L Crosses. These crosses were begun by the late Dr. Olin Smith to combine the earliness of Valencias with the high-O/L trait being bred in Spanish peanuts, and later released as OLin. This population was grown at two locations in Texas (Halfway, Etter) in 2004 as short rows of space-planted (one plant per foot) . Seeds are being evaluated for yield, maturity, O/L ratio, number of seeds per pod, and seed coat color.

At this site, the most-mature line had only 55% mature pods **Table 5**. This may be attributed in part to the spring weather which forced delay of planting until June 23 because of cool soil temperatures. Several breeding lines were in the top category for yield and maturity (as were the parents New Mexico Valencia A and X-101.) We will be evaluating number of seeds per pod, seed coat color, and O/L ratios to find whether any Spanish lines fall in this top category, and whether any Valencias have high O/L.

F2:5 progeny and additional crosses. The crosses are a significant part of the project and the data are presented in the NPB Early Maturity report.

High O/L Sclerotinia Resistant Runner Tests

We conducted four high O/L Sclerotinia resistant yield tests in 2003 and each contained twenty entries. The tests were identical in make-up and contained 16 of our advanced breeding lines and four commercially available cultivars. The purpose of this test was to compare our best breeding lines to our best varieties being grown by peanut farmers. **Table 6** shows the combined data analysis from the Central and West Texas and Oklahoma tests. In addition there are four columns at the right of the table that show average yields for each of the four harvested tests.

The combined analysis shows lower than expected yields for many of the breeding lines which is a direct result of the disease pressure in the one test at Stephenville and in the Oklahoma test. There were no statistical differences between the yields for any of the lines in three of the four test locations. The Erath County (without disease) trial was the only location which showed significant differences between entries for yield.

Tamrun 96 and Tamrun OL 01 yields were towards the top of the tests across all locations when the combined analysis were evaluated. Tamrun OL 02 also performed at the top of the test in Gaines county and Erath county without disease. There were several other lines including Tx991705, Tx991722, Tx991709 and Tx991720 that performed equal to the check varieties.

Crosses between Tamrun 98 (high grade, Sclerotinia resistance) and several of our breeding lines including Tamrun OL 01 and Tamrun OL 02 were made in 2002 in an effort to increase grade performance and the level of Sclerotinia resistance. One hundred fifty individual F2 plant selections were made under heavy Sclerotinia pressure in 2003. Each individual selection is being analyzed for O/L ratio and will be planted under both TSWV and Sclerotinia minor pressure for further selection in 2004. Grade characteristics will be evaluated to determine whether or not improvement has been made.

Multiple Disease Resistance

Several breeding lines and varieties have been crossed in an effort to combine different disease resistances from individual lines into a common set of breeding lines with multiple disease resistance. Two years of selection work were completed and the second year of yield testing has just been completed. Twenty-four breeding lines, one germplasm line, and 5 varieties made up the 30 entry test which is shown in **Table 7.** This test was replicated as yield trials in Frio County, Gaines County, Erath County, and Ft. Cobb, Oklahoma. All of the locations except Gaines County had either Tomato Spotted Wilt Virus pressure or Sclerotinia minor disease pressure.

Results from the 2003 growing season were not consistent with results from last years data which might be due to moisture conditions, disease pressures, temperatures or a combination of all three variables. For what ever reason lines that performed extremely well across all locations last year such as Tamrun OL 01, and Tx01F5415 did not perform well this year under these conditions. Breeding lines Tx014138 and Tx015404 performed well across all locations this year. More testing will be necessary to determine with any certainty which lines are the best. Several of the elite performing lines from 2002 and 2003 will be tested in an advanced line yield test in 2004 across multiple locations

Spanish and Bunch-Type Tests

Several Spanish and bunch-type selections segregated out of the runner by runner crosses made for multiple disease resistance. Fourteen of these lines went through two intense years of selection under both TSWV and Sclerotinia minor disease pressures. Many of these lines have Spanish maturity, but they have seed size equal to or larger than the average runner peanut.

These lines were tested in 7 locations during the 2003 growing season. Two locations each in South, Central, and West Texas and a single location in Ft. Cobb, Oklahoma were the trial sites. One location in West Texas was lost due to hail damage approximately three weeks prior to harvest.

The combined analysis for this test across all 7 locations is located on **Table 8**. The four columns on the right side of the table indicate the yield data from the individual regions. The combined analysis shows that Virugard and AT108 were at the top of the test, but that there were a couple of breeding lines specifically 01F5407 and Tx018817 which were in the same statistical grouping. Several of the best lines are still segregating for growth habit and are presently being re-selected in an attempt to provide the growers with a multiple disease resistant peanut with Spanish maturity and runner seed size. The locations were harvested at the typical digging date for Spanish peanuts within each individual region. These lines will be yield tested one more year to verify the data results.

Root-knot Nematode Resistance

We are continuing our effort to incorporate the root-knot nematode resistance into multi-resistant and high O/L lines through a backcrossing program we initiated in 1987. We released COAN and NemaTAM from this program and we are in the 4th backcross in incorporating the genes into Tamrun 96. Data from these lines, tested at four different locations in the 2003 crop year can be found in **Table 9**. Our testing effort this past year was directed primarily at evaluating several lines that were selected from the first backcross of our effort to combine nematode resistance with the tomato spotted wilt virus tolerance of Tamrun 96. (Note the J-83, J-56, etc.) Two older lines continue to impress us with their higher TSMK; TP(p)298-3-10 and TP281-4-9, which had a TSMK of 74.4 and 73.8, respectively, in the combined data analysis. We did not have high infestations of nematodes at any location in 2003; however, at the Keith Farm (**Table 10**) nematode infestation was significant late in the season because all of the susceptible check varieties were adversely affected. We do not have an explanation for the poor performance of NemaTAM at the Seay Farm in Atascosa County.

Transfer of root-knot nematode resistance to using molecular markers.

We have been investigating the DNA of the root-knot resistant materials for several years and have identified molecular markers that are closely associated with the resistance gene that we have transferred into the cultivated peanut. We are now able to make selections for resistant nematode lines using these markers, which should speed the process of variety development for nematode resistant lines.

We are currently in the third and fourth backcross generation using the molecular markers in a program where we are transferring the RK nematode resistance gene into tomato spotted wilt resistant material, lines with high O/L and TSWV resistance, lines with high O/L and sclerotinia resistance and still other lines with high O/L, sclerotinia resistance, and leafspot resistance.. Our objective is to develop a tomato spotted wilt resistant variety that is also resistant to RK nematodes as well as having the high O/L genes and sclerotinia resistance. More details of this program can be found in the Nematology report.

Sclerotinia Resistance Breeding

Our new crosses to evaluate lines for Sclerotinia resistance are being seed increased and will be tested when sufficient seed are available. We have several breeding lines which have sclerotinia resistance and high O/L. The screening we do has become a necessary part of the program, but the field screening takes a lot of valuable time and getting uniform infection causes much concern as well. The success we have had with molecular markers and Marker Assisted Selection (MAS) in our nematode resistance program has convinced us that it is imperative for us to develop molecular markers that are associated with sclerotinia resistance in peanut.

Several reports indicate that it is easier to find markers in hybrids between the cultivated species and wild relatives than in cultivated crops themselves. This fits our program very well because we have a complex hybrid that we use in the nematode and leafspot resistance programs, named TxAG-6. This line has been the major “bridge” we used in transferring root-knot nematode and leafspot resistance into cultivated peanut.

It appears that TxAG-6 has no genes for sclerotinia resistance and crosses with TxAG-6 were not successful to develop the needed populations. We are still evaluating this approach for molecular marker development by crossing TxAG-6 with sclerotinia resistant breeding lines.

Leafspot resistance

Resistance to both Early and Late Leafspot has been developed in the form of two germplasm lines; Tx964117 and Tx974120. The two lines have excellent resistance to leafspot, but do not have the agronomic traits necessary for variety release.

A crossing program to introgress the leafspot resistance into our high O/L TSWV resistant lines was started in 1999. Eighteen selections were made in 2001 based on agronomic traits, high O/L ratio and limited disease ratings. These lines were planted as single row plots with three replications for purposes of seed increase and disease ratings at the Yoakum Experiment Station in 2002. Higher than average rainfall during the growing season provided extremely heavy disease pressure. While all of the lines formed a high number of Leafspot lesions, five of the breeding lines maintained their canopy while the remaining lines and checks completely defoliated.

These five moderately Leafspot resistant lines, 9 lines which tested low for Leafspot resistance and the parents combined to form one yield test located at Frio County under fungicide treatments and one yield test at the Yoakum Experiment Station under heavy Leafspot pressure. The results of the yield tests showed that the high O/L TSWV resistant parents average yield was 6200 lbs./A and the two Leafspot resistant parents average yield was 4450 lbs./A. When looking at the F2:4 progeny, the 9 lines that showed no Leafspot resistance had and average yield of 5300 lbs./A and the

5 lines that had moderate Leafspot resistance had average yields of 4415. This indicates that there is a linkage present between genes for Leafspot resistance and genes for lower yield potential.

The only method available at this time for breaking this linkage is backcrossing. Presently, we have made the first backcross to increase Leafspot resistance and will have over 1000 individual F2 and F3 space plants to select from in our 2004 breeding nursery at Yoakum.

ACKNOWLEDGMENTS

We express our sincere appreciation to the Texas Peanut Producers Board and thus, the Texas Peanut Producers, for assisting our program again in 2003. A large part of the work reported here would not have been possible without this generous support.

We also acknowledge the support of our several cooperators and collaborators. We especially thank Scotty Koonce and Bob Whitney (CEA), Comanche County; Don Keith and Joe Pope (CEA), Erath County; James Overstreet & Bennet Partnership, Murray Phillips, and Brad Easterling (IPM), Frio County; Otis Lee Johnson, and Members of the Western Peanut Growers Research Farm, Gaines County; Andy Timmons, Terry County; Haldon Messamore, and James Grichar, Brent Bessler and the entire staff at the Yoakum Research Station.

Table 1. Uniform Peanut Performance Test - Three Texas Locations

Gaines County-W.P.G.R.F.

Cultivar	Value/A	Lbs./A	TSMK%	Sd./Lb.
UF00324	983a-c	5248ab	76.0a	680de
N009ol17	973a-c	5011a-d	74.4a-d	434i
Flavor458	951a-c	5043a-d	76.2a	719b-d
NC7	939a-c	4966a-e	72.5d-g	469h
UF00620	925a-c	5212ab	71.5fg	687de
Tamrun02	912b-d	5049a-c	72.6d-g	691de
Tamrun96	907b-e	5067a-c	72.8c-g	685de
Tx994389	902b-e	4827a-f	75.7ab	660e
Florunner	888b-e	4937a-e	72.1e-g	744bc
Tx994371	866c-e	5113ab	68.3h	760b
Tamrun01	860c-e	4708b-g	73.9b-e	612f
GA002506	858e-c	4385c-h	74.7a-c	604f
CRSP14	785d-f	4307e-h	73.8b-e	660e
C34-24	780d-f	4352d-h	72.5d-g	720b-d
CRSP08	772ef	4230f-h	73.9b-e	661e
UF02328	721f	4090gh	71.0g	703cd
GA982502	713f	4406c-g	61.7i	1101a
GA002501	660f	3698h	72.2e-g	711cd
VT6102-6	1051a	5468a	73.6c-f	493g
N98003	1009ab	5311a	72.8c-g	505g
Mean	873	4771	72.6	639
CV%	11	10.3	2	4
LDS	136	693	2	114

Frio County-Pearsall.Tx.

Cultivar	Value/A	Lbs./A	TSMK%	Sd./Lb.
GA002506	898a	4459a-c	77.6a	600e
Tamrun02	873a	4992a	71.1a-e	619e
Tamrun01	866a	4984a	70.7b-e	656de
Tx994389	820ab	4437a-c	75.1a-c	650de
Tamrun96	803ab	4687ab	69.3c-e	659c-e
C34-24	788ab	4489a-c	71.0a-e	653de
CRSP14	727bc	3885c-e	76.0ab	598e
UF02328	722bc	4009b-e	73.2a-d	657de
GA982502	721bc	4135b-d	70.2b-e	1106a
Tx994371	720bc	4318a-c	67.6de	753b
UF00324	707bc	3949c-e	72.7a-d	645de
CRSP08	707bc	3897c-e	73.9a-d	602e
N98003	649cd	3900c-e	69.5b-e	488f
Flavor458	603c-e	3367e-g	72.0a-e	797b
NC7	590c-e	3174fg	71.7a-e	455fg
UF00620	553d-f	3431d-f	65.9e	704b-d
GA002501	488e-g	2840f-h	69.7b-e	745bc
Florunner	472e-g	2690g-i	70.7b-e	779b
N009ol17	426fg	2418hi	68.0de	474fg
VT6102-6	353g	1996i	68.0de	440g
MEAN	674	3803	71.2	626
CV%	14.5	13.2	6.5	7.8
LSD	139	712	6.6	57

Erath County-Stephenville.Tx.

Cultivar	Value/A	Lbs./A	TSMK%	Sd./Lb.
Tamrun96	816a	4552ab	72.9b-d	876bc
Tamrun01	802a	4374a-c	74.9a-c	683f
Tx994371	790ab	4604a	69.3ef	924b
CRSP08	759a-c	4254a-d	72.4c-e	740ef
UF02328	753a-d	4147a-e	73.5a-d	704f
Tx994389	748a-d	4033b-g	74.9a-c	806c-e
CRSP14	747a-d	4096a-f	73.7a-d	783de
UF00620	713a-d	3867c-h	74.9a-c	800c-e
Florunner	707a-d	3753d-i	76.7a	832cd
Tamrun02	685b-e	3839d-h	72.4c-e	787de
Flavor458	675b-f	3637e-j	75.9ab	843b-d
GA002506	657c-f	3620f-j	74.6a-c	686f
C34-24	640d-f	3520g-k	73.1a-d	862b-d
GA982502	585e-g	3415h-k	68.4f	1256a
GA002501	568fg	3183j-l	73.0b-d	786de
N98003	567fg	3246i-l	71.7c-f	582g
NC7	564fg	3301i-l	70.9d-f	536h
N009ol17	518g	3052kl	69.3ef	529h
VT6102-6	514g	2883l	72.4c-e	548gh
UF00324	391h	2250m	70.9d-f	787de
MEAN	660	3681	72.8	737
CV%	12.4	10	3.4	6.2
LSD	115	520	3.5	84

Data based on 4 replications. Means followed by the same letter are not significantly different by Fisher's LSD(p=0.05)

Table 2. Denver City Spanish UPPT - 2003					
Cultivar	**Value/A**	**Lbs./A**	**TSMK%**	**G/100Sd.**	**Pcs./100g**
OLin	712NS	3783a	72.3NS	48.58	206
Spanco	630	3339ab	72.72	52.38	191
NMValenciaC	561	2796b	73.15	51.70	193
NMValenciaA	558	2754b	73.66	53.23	188
LSD	167	763	2.45	2.72	
CV%	16.67%	14.88%	2.16%	3.29%	

Table 3. Denver City 2003 - $F_{2:6}$ Runner Trial						Earth County
Cultivar	**Value/A**	**Lbs./A**	**TSMK%**	**G/100Sd**	**Mat.%**	**Mat. %**
TX017707	924a	4863a	77.6a	62.8cd	43.3g-i	5.6j
Florunner	911ab	4806ab	77.7a	60.5de	42.0g-j	16.7h-j
TX017730	910a-c	4756a-c	78.0a	58.6d-f	41.9g-j	4.7ij
TX017731	865a-c	4702a-c	75.1bc	62.3c-e	40.7g-k	7.3ij
TX017727	855a-c	4813ab	72.2c-e	58.6ef	38.7g-k	26.2f-j
TX017723	838a-d	4817ab	70.2e-h	54.1fg	45.3g-i	15.1h-j
EarlyRunner	829a-e	4474a-f	75.5a-c	59.0d-f	45.3f-i	na
TX017746	827a-e	4638a-d	72.4c-e	61.1c-e	58.0e-f	42.0d-g
FlavorRunner	820a-e	4291b-g	78.2a	65.0a-c	43.0g-j	6.9ij
TX017740	814a-e	4611a-d	71.7d-f	50.8g-j	68.7c-f	17.8g-j
TX017722	809a-f	4663a-c	70.2e-h	48.1i-l	34.7h-k	19.3g-i
Tamrun96	801c-f	4370b-f	75.0c	66.3ab	40.8g-j	5.6j
TamrunOL02	800b-g	4352a-g	75.0bc	68.1a	26.5h-k	2.0j
Langley	799b-g	4221c-h	77.4ab	61.7c-e	71.3b-f	26.7f-j
TX017701	791c-g	4565a-e	70.3e-h	52.6gh	34.7h-k	34.2e-h
TX017703	769c-h	4374a-f	71.5d-g	53.9fg	19.9ik	28.7e-j
PI161317	738d-i	4196c-h	72.2c-e	51.5g-i	82.7a-d	53.0a-e
TX017747	713d-i	4097c-j	70.9e-g	48.3h-l	89.3a-c	79.7a
TX017744	708e-i	4152c-i	68.9g-j	50.0g-k	66.7c-f	24.3f-j
TX017752	693e-i	4052d-j	69.7f-i	47.1j-m	88.0a-c	69.8a-c
TX017753	671e-i	4070d-j	67.1j	40.9no	80.0a-d	66.0a-d
TX017754	650h-j	3927f-j	67.6ij	50.2g-k	67.3c-f	55.4a-e
R22	643h-j	4166c-i	62.2k	37.2o	93.6a	76.1ab
TX017751	640h-j	3866f-j	67.8h-j	43.1mn	92.0ab	79.3a
TX017748	635ij	3737f-j	68.8g-j	46.0k-m	92.7a	46.0c-f
TX017711	546j	3585ij	62.9k	44.8l-n	47.3f-h	30.7e-i
TX017742	406k	2860k	62.0k	38.0o	78.5a-e	73.3ab
MEAN	756	4121	71.4	52	58	33
CV%	9.4	7.7	2.1	4.7	21.9	44.7
LSD	117	542	2.5	4.1	20.9	25

Table 4. Denver City 2003 - F2:6 Spanish Maturity Test						Earth County
Cultivar	**Value/A**	**Lbs./A**	**TSMK%**	**G/100Sd.**	**Maturity%**	**Maturity%**
Florunner	660a	3349a	74.6a	52.8ab	27.56 j	8.70 f
Spanco	633ab	3252ab	74.2a	51.4bc	90.00 a	78.70 ab
PI161317	623a-c	3350a	70.8a-c	43.8e-g	68.00 b-g	88.00 ab
OLin	584a-e	3098a-c	71.0a-c	45.0d-f	54.95 f-h	75.80 ab
R22	560b-f	3086a-c	68.7cd	34.5lm	84.00 a-c	93.80 a
TX017782	560b-g	3096a-c	68.4c-e	42.6f-h	70.65 a-f	74.10 a-c
TX017764	550c-g	2962a-d	69.8bc	37.6j-l	76.67 a-f	65.30 b-d
TX017756	542b-h	2952a-e	69.3b-d	41.5f-i	87.87 ab	84.10 ab
TX017763	541c-h	2845b-e	72.2a-c	39.2h-k	82.67 a-d	94.00 a
TX017765	532d-h	2867b-e	70.8a-c	39.6h-j	78.10 a-e	82.00 ab
TX017767	531c-h	2814b-e	71.7a-c	37.7i-l	70.00 b-f	90.80 a
TX017779	531d-h	2908b-e	69.0cd	40.5g-j	84.99 a-c	84.10 ab
TX017780	529d-h	2883b-e	69.7bc	40.8g-j	66.87 b-h	80.10 ab
TX017760	519d-h	2775c-e	70.7a-c	40.8g-j	84.87 a-c	72.10 a-c
TX017771	514d-h	3036a-c	63.6f	39.3h-k	63.63 c-h	47.30 c-e
TX017777	500e-h	2909a-e	64.2ef	39.5h-k	73.87 a-f	75.10 a-c
TX017758	497e-h	2702c-f	69.5b-d	39.0h-k	58.87 e-h	72.10 a-c
TX017778	485f-h	2772c-e	65.5d-f	39.8h-j	47.52 g-i	42.20 de
TX017775	476f-h	2825b-e	62.8f	39.3h-k	54.76 f-h	37.30 e
TX017757	466g-i	2534d-f	69.7bc	42.9e-h	68.87 a-g	82.10 ab
TX017759	465hi	2504ef	70.0bc	35.9k-m	81.63 a-d	87.30 ab
TX017776	454h-j	2741c-e	62.1f	45.4d-f	43.12 h-j	46.80 c-e
PI475919	367i-k	2213fg	62.8f	47.1de	85.22 a-c	80.30 ab
TP922	319k	1880gh	64.4ef	32.3m	88.52 ab	90.90 a
BSS56	301k	1645h	71.0a-c	47.9cd	74.67 a-f	87.30 ab
MEAN	513	2810	66.4	42.0	70.7	72.8
CV%	9.6	8.9	3.2	5	17.4	18.3
LSD	82	413	3.6	3.5	19.7	23.4

Table 5. Etter Valencia x Spanish O/L												
Genotype	**LbPodAc**		**% Mature**			**Genotype**	**LbPodAc**		**% Mature**	
18	2733	a	52	ab		**16**	1493	c-r	19	g-q
53	2544	ab	48	a-c		**23**	1465	c-r	17	h-q
X-101	2247	a-c	33	a-m		**44**	1445	c-r	15	j-q
21	2202	a-d	33	a-m		**39**	1434	c-r	34	a-m
46	2167	a-e	18	g-q		**13**	1432	c-r	13	l-q
9	2158	a-e	52	ab		**37**	1425	c-r	35	a-l
43	2122	a-f	44	a-e		**10**	1406	d-r	39	a-h
NMValA	2095	a-g	46	a-d		**49**	1405	d-r	28	c-o
NMValC	2087	a-g	31	b-n		**20**	1375	d-s	40	a-g
51	2004	a-h	38	a-i		**30**	1367	e-s	37	a-j
Spanco	1990	a-i	27	c-p		**24**	1359	e-s	55	a
25	1943	a-i	30	b-n		**48**	1301	f-s	35	a-l
27	1904	a-j	20	g-q		**34**	1290	f-s	27	c-p
60	1885	b-j	15	j-q		**47**	1288	f-s	28	c-o
OLin	1835	b-l	5	p-q		**7**	1264	g-s	7	o-q
36	1834	b-l	28	c-o		**15**	1227	h-s	22	e-q
50	1829	b-m	28	c-o		**6**	1164	i-s	15	j-q
11	1792	b-n	16	i-q		**4**	1070	j-s	30	b-n
12	1739	b-o	35	a-l		**19**	1062	k-s	14	k-q
40	1709	c-o	49	a-c		**17**	1018	l-s	36	a-k
8	1691	c-p	14	k-q		**14**	998	m-s	39	a-h
42	1645	c-p	24	d-p		**1**	986	n-s	18	g-q
33	1607	c-r	46	a-d		**28**	933	o-s	43	a-f
5	1583	c-r	5	p-q		**32**	874	p-s	39	a-h
29	1582	c-r	23	e-p		**38**	869	p-s	25	d-p
UF435	1578	c-r	0	q		**31**	836	q-s	10	n-q
26	1541	c-r	21	f-q		**35**	806	rs	7	o-q
52	1535	c-r	38	a-i		**41**	553	s	12	m-q
45	1528	c-r	24	d-p		**22**	----	.	30	b-n
3	1511	c-r	14	k-q		**LDS=**	833.6		22.64	
2	1493	c-r	21	f-q		**MEAN=**	1538.3		27.42	

Table. 6 High O/L Sclerotinia Resistant Line Yield Tests-2003

Combined Analysis from Four Locations					Gaines Co	Erath Co	Erath Co	Ft. Cobb
Cultivar	**Value/A**	**Lbs./A**	**TSMK%**	**Sd./Lb**	**No Dis.**	**Disease**	**No Dis.**	**Disease**
TAMRUN 96	777a	4347a	72.4a-d	780f-i	4199ns	3456ns	5684a	4049ns
Tx 991705	741ab	4236ab	71.9a-f	766g-j	4068	3977	5012bc	3888
T-OL-01	716a-c	4172a-c	70.4ef	726j	3872	3753	5013bc	4049
Tx 991709	716a-c	3949a-f	73.1a	791e-i	3985	3700	4689b-e	3420
Tx 991722	713a-c	4056a-d	72.3a-f	811c-g	4608	3259	4677b-e	3678
Tx 991720	697a-d	3910b-f	72.6a-d	751ij	3855	3709	4899b-d	3178
TAMRUN 98	695b-d	3870b-f	72.6a-c	846a-d	4040	2773	5019bc	3646
Tx 991701	693b-d	3911b-f	71.7a-f	760h-j	3776	3543	4891b-d	3437
Tx 991711	684b-d	3803c-f	72.7ab	797d-h	4173	3554	4244e	3340
Tx 991715	679b-d	3849b-f	71.6a-f	804c-h	4095	3272	4561b-e	3469
T-OL-02	678b-d	3999a-e	70.2f	776f-i	4161	3160	5111ab	3565
Tx 991713	661cd	3777c-f	70.7b-f	823b-f	4061	3167	4764b-e	3114
Tx 991717	659cd	3817c-f	71.5a-f	819b-f	3828	3227	4472c-e	3743
Tx 991710	657cd	3648d-f	72.8ab	866ab	3830	2680	4646b-e	3436
Tx 991716	655cd	3796c-f	70.4d-f	810c-g	3906	3430	4380de	3469
Tx 991712	655cd	3714d-f	72.1a-f	853a-c	3902	3210	4291e	3453
Tx 991714	645cd	3749d-f	70.2f	879a	3825	3339	4266e	3565
Tx 991706	644cd	3663d-f	71.8a-f	796e-i	3864	3151	4230e	3404
Tx 991719	632d	3569f	72.0a-f	837a-e	3712	2566	4547b-e	3453
Tx 991721	628d	3625ef	70.5c-f	816b-f	4080	2675	4518b-e	3227
Mean	681	3873	71.7	804	3992	3275	4696	3529
CV%	14.6	13.1	3.7	7.5	10.4	16.9	7.6	19.8
LSD	79.9	408	2.2	134	686	915	593	1153

Table 8. Spanish and Bunch-Type Yield Tests

Combined Analysis across Six Locations					Terry Co. 1 loc.	Frio Co. 2 loc.	Erath Co. 2 loc.	Ft. Cobb 1 loc.
Cultivar	**Value/A**	**Lbs./A**	**TSMK%**	**Sd./Lb.**	**Lbs./A**	**Lbs./A**	**Lbs./A**	**Lbs./A**
Viragard	724a	4352a	66.4a	684gh	6893a	5419bc	2366a-d	3651a-c
AT 108	722ab	4333ab	65.5a-d	747de	5394bc	6147a	2298b-e	3713ab
01F 5407	694a-c	4241a-c	64.7a-e	775d	5109b-d	5601ab	2566a-c	4003a
T-90	671a-d	4188a-d	62.8e-g	1137a	6709a	4955c-f	2656ab	3194b-e
Tx018817	659a-e	4147a-e	62.6e-g	848c	6792a	4884c-f	2457a-d	Na
Spanco	652a-e	4052a-e	64.4a-f	980b	6743a	4459e-g	2643ab	3361a-d
01F 6235	648a-e	3917b-f	65.6a-d	683gh	5435bc	4895c-f	2657ab	2967d-f
01Y 4200	642b-f	3895c-f	66.1ab	660hi	5441bc	4549d-g	2788a	3257b-e
OLin	624c-g	3823d-g	65.3a-d	1052ab	6122ab	4193fg	2686ab	2676ef
01Y 4192	624c-g	3753e-g	66.1a-c	680gh	4787cd	5002c-e	2495a-d	2738d-f
01F 6232	620c-g	3809d-g	64.7a-e	745d-f	5035b-d	5047b-e	2172c-f	3381a-d
01Y 4196	595d-h	3620f-h	65.7a-d	696g	4824cd	4549d-g	2519a-c	2759d-f
01Y 4201	594d-h	3768e-g	62.5e-g	714e-g	4845cd	4858c-f	2385a-d	3278b-e
01F 6217	595d-h	3760e-g	61.7g	753de	5063b-d	5279bc	1819f	3298b-e
01Y 4199	578e-j	3536f-j	64.8a-e	745d-f	5001b-d	4845c-f	1768f	2987d-f
01F 5496	564f-j	3591f-i	61.6g	761d	4282c-e	5086b-d	2033d-f	3028c-f
01Y 4195	549g-j	3424g-j	63.7c-g	707fg	3945de	4891c-f	1893ef	3029c-f
01Y 4191	518h-j	3201ij	63.8b-g	633i	4002de	4463e-g	1884ef	2510f
01F 6234	514ij	3273h-j	62.0fg	697g	4320c-e	4377f-g	1769f	3028c-f
01F 5408	508j	3166j	63.4d-g	685gh	3302e	4563d-g	1883ef	2801d-f
MEAN	614	3786	64.2	749	5202	4903	2287	3153
CV%	19.8	16.6	5.6	8.5	14	10.4	17.7	12.3
LSD	80	418	2.4	131	1200	598	463	649

Table 7. Multiple Disease Resistant Line Yield Tests

Combined Analysis across Four Locations					Gaines Co.	Frio Co.	Erath Co.	Ft. Cobb
Cultivar	**Value/A**	**Lbs./A**	**TSMK%**	**Sd./Lb.**	**Lbs./A**	**Lbs./A**	**Lbs./A**	**Lbs./A**
01Y 4138	842a	5107a	66.3ef	799c-g	5722bc	6888a-c	4174a	3646ab
Ga Green	827ab	4654a-c	71.6a-c	829b-d	6250a	6847a-d	2436h-k	3081d-h
T-96	821ab	4715a-c	69.9a-d	761h-k	5388b-f	6933a-c	3554a-e	2985d-j
01F 5404	811a-c	4733ab	69.0b-e	794d-g	5227c-h	7002ab	3444a-f	3259b-e
01Y 4104	801a-d	4537b-e	70.0a-d	710mn	4961f-k	6791a-e	3589a-d	2807e-m
01F 6212	798a-d	4540b-e	70.2a-d	687no	5634b-d	6066d-i	3830ab	2630h-o
01F 6239	781a-e	4368b-g	71.7a-c	782f-j	5071e-j	6202b-h	2780c-i	3421a-d
01F 5478	777a-e	4593b-d	67.8de	806c-f	5507b-e	6200b-h	3630a-d	3033d-i
01F 5445	774a-f	4522b-e	68.3de	822b-e	4950f-k	6868a-d	3850ab	2420k-o
01F 5443	773a-g	4404b-g	70.1a-d	814b-f	5277c-g	6030e-i	3437a-g	2872e-k
01F 6223	768a-g	4459b-f	69.0b-e	727lm	5291c-g	6623a-f	3406a-h	2517j-o
01Y 4126	768a-g	4440b-f	68.3de	702mn	5140d-i	6424a-g	3758a-c	2436k-o
01F 6251	757a-h	4410b-g	71.9ab	811b-f	5627b-d	5529hi	332b-i	3452a-d
01F 6246	755a-h	4255c-h	70.3a-d	750kl	4611j-l	6181c-i	2452g-k	3775a
Tx961639-3	750b-h	4315b-g	69.2a-d	846b	4918f-l	6195b-h	3065b-i	3081d-h
01Y 4133	747b-h	4427b-g	67.4de	752j-l	5246	6327a-h	3312a-h	2823e-l
01F 5415	745b-h	4150d-h	72.1a	848b	4420lm	6123c-i	2474f-k	3582a-c
01F 6269	743b-h	4471b-f	67.7de	828b-d	5274c-g	6447a-g	3048b-i	3114c-g
01F 5405	739b-i	4286b-h	68.5de	759i-k	5158d-h	5988e-i	3740a-c	2259no
01Y 4134	726c-i	4124e-h	70.1a-d	769g-k	4904f-l	5773g-i	3413a-h	2404k-o
FlavRun458	720c-i	4157d-h	68.1de	834bc	5496b-e	5978e-i	2493f-k	2662g-o
01Y 4123	716d-i	4164d-h	67.8de	790e-i	4599j-l	6192b-h	2703d-i	3162c-f
T-OL-01	714d-i	4172d-h	68.1de	667o	4547kl	7030a	2578e-i	2533j-o
01F 6275	703e-j	4091e-h	68.4de	843b	4792g-l	5905f-i	3326a-h	2339m-o
01F 5470	698e-j	4075e-h	68.3de	832bc	4586j-l	6868a-d	2151i-k	2694f-n
01Y 4137	684f-j	4035f-h	67.4de	713mn	4630i-l	5864f-i	3288a-h	2356l-o
SunOleic95R	682g-j	3970g-i	69.4a-d	769g-k	5836ab	5732g-i	1713jk	2598i-o
01Y 4106	666h-j	4114e-h	64.4f	898a	4719h-l	6153c-i	3391a-h	2194o
01F 6250	649ij	3832hi	67.4de	744kl	4974f-k	5913f-i	1781jk	2662g-o
01F 5422	613j	3502i	68.8c-e	794d-g	3976m	5375i	1607k	3049d-i
MEAN	745	4321	68.9	779	5091	6282	3048	2861
CV%	15.3	13.5	5.3	5.3	6.3	8	19.9	10
LSD	92	468	2.9	33	522	816	992	470

Table 9. 2003 Combined Nematode Resistant Line Yield Tests-2003

Combined Analysis from Four Locations					TAES	Koonce	Keith	Seay
Cultivar	Value/A	Lbs./A	TSMK%	Sd./Lb	Erath Co	Comanch	Erath	Atascosa
TP298-3-10	751a	4234ab	74.4a	830fg	4588c-e	5383ab	4211a	2753d-f
TP281-4-9	750a	4215ab	73.8ab	829e-g	4737b-e	5247a-c	4146ab	2730d-f
J-83	746a	4267a	71.7a-e	787cd	4898a-d	5084a-d	3751a-d	3333ab
J-56	728ab	4241ab	70.8c-e	939jk	4908a-d	5051a-f	3531c-e	3475a
TP296-4-4	708a-c	4124ab	72.7a-d	817d-f	4453de	5070a-e	3889a-d	3085a-e
NemaTAM	691a-d	3946a-c	72.8a-c	823ef	4638c-e	5002a-f	3922a-d	2223gh
Tamrun 96	690b-d	4249ab	69.2e-g	821d-f	5422a	5464a	3075f-h	3037a-f
T'run OL02	682a-e	4143ab	70.2c-f	746b	5054a-c	5399ab	2923gh	3197a-d
J-211	680a-e	4220ab	71b-e	660a	5275ab	4218i	4102ab	3287a-c
J-90	675b-d	3958a-e	71b-e	774bc	4548c-e	4527e-i	3720a-d	3038a-f
TP300-2-9	652b-f	3971a-e	71.2b-e	829e-g	4417d-f	4816c-h	4009a-c	2643e-g
J-206	647b-f	4055a-d	69.9d-f	872hi	4956a-d	4885b-g	3665b-e	2713d-g
J-86	640b-f	3965a-e	70.0c-f	792c-e	4670c-e	4285hi	4103ab	2801c-f
J-46	635b-f	4088a-c	69.3e-g	745b	4796b-d	4598d-i	3763a-d	3197a-d
TP294-1-4	634c-f	3735de	71.2b-e	905ij	4143ef	4611d-i	3486d-f	2699d-g
J-135	621c-f	3928b-e	67.8fg	1037l	4744b-d	4392g-i	3696a-d	2881b-f
J-54	608d-f	3783c-e	67.8fg	989kl	4521c-e	4515f-i	3175e-g	2921b-f
J-178	604d-f	3988a-e	66.6g	1001l	4563c-e	4885b-g	3647b-e	2857b-f
Florunner	590ef	3676e	69e-g	864g-i	4530c-e	4972a-f	2652h	2549fg
COAN	560f	3274f	71.1b-e	835f-h	3849f	4294hi	2948gh	2004h
Mean	665	4003	70.6	836	4686	4835	3621	2871
CV%	20.2	11.6	5.8	6.7	9	8	10	12.4
LSD	93	324	2.8	?	598	548	516	5.3

Table 10. Spanish O/L #1 Yield Tests

Combined Analysis across Four Locations					Gaines Co.	Erath Co.	Erath Co.	Ft. Cobb
Cultivar	Value/A	Lbs./A	TSMK%	Sd./Lb.	No Dis.	No Dis.	Sclero.	Sclero.
Spanco	624a	3672a	69.1ab	1033	5981NS	3096NS	2730a-d	2880a-c
Tamspan90	620ab	3628ab	67.9a-d	1194	5968	3115	2789a-c	2638c-e
02T4838	602a-c	3627ab	66.7c-f	937	5914	2895	2745a-d	2953a
02T4809	593a-d	3577a-c	66.2c-f	982	6217	2875	2361a-d	2855a-c
02T4707	591a-d	3555a-d	66.9b-f	951	5890	2464	2937a	2928ab
02T4636	587a-d	3472a-e	68.3a-c	1026	5554	3129	2444a-d	2759a-d
02T4715	578a-e	3487a-e	65.4ef	1169	5537	3248	2501a-d	2662b-e
02T4654	575a-e	3423a-f	66.8c-f	988	5994	4667	2392a-d	2638c-e
02T4617	571a-e	3387a-f	67.3a-f	973	5464	3114	2210b-d	2759a-d
02T4759	570a-e	3392a-f	67.8a-d	953	5218	3061	2674a-d	2613c-e
02T4626	568a-e	3402a-f	67.2a-f	984	5560	2590	2772a-c	2686a-e
02T4727	564a-e	3315b-g	67.9a-d	928	6020	2407	2168b-d	2662b-e
02T4745	560b-e	3382a-f	66.1c-f	984	5537	2337	2821ab	2832a-c
02T4603	557b-e	3355a-g	67.3a-f	951	5321	2788	2647a-d	2662b-e
02T4606	557b-e	3357a-g	66.7c-f	911	5404	2603	2590a-d	2832a-c
02T4843	544c-e	3213d-g	66.8b-f	1175	5526	2492	2318a-d	2517de
02T4639	536de	3234c-g	65.9d-f	995	5674	2734	2105d	2420e
OLin	522e	3028g	69.3a	1106	5369	2497	2166b-d	2081f
02T4622	522e	3199e-g	65.1f	1012	5450	2748	2153cd	2445e
02T4857	518e	3103fg	67.4a-e	939	4533	2931	2527a-d	2420e
MEAN	568	3390	67.1	1004	5606	2789	2502	2662
CV%	14	13	4.2	5.5	10	17.7	16.1	6.5
LSD	64.4	353	2.3	44	923	815	666	285

Report No. 9

Peanut Marketability/Flavor
March 8, 2004

Title: Technical support to TPPB for directing flavor and marketability research in West Texas

Michael Franke, Kim Franke, Foy Mills, Jr., and Ralph Yoder
J. Leek Associates, Inc., Agriculture and Sensory Systems, Brownfield, Texas.

Summary

J. Leek Associates, Inc. (JLA) provided technical support to the Texas Peanut Producer's Board regarding peanut flavor and quality issues during 2003. Technical support focused in two areas: 1) education and board awareness of peanut quality issues and 2) analytical support to nitrogen fertility studies conducted by Dr. Calvin Trostle and the impact on peanut quality and flavor.

In January, a half-day training seminar was led by Jim Leek, President of JLA; Foy Mills, Vice-President. Ag Systems; Michael Franke, Ag Systems Southwest; and Kim Franke, Sensory Leader, for board members and Dr. Todd Baughman, extension peanut specialist. Topics of the seminar included definition of peanut quality and how it relates to each segment of the industry, management and cultural practices that can affect peanut quality, the components of peanut sensory analysis, conducting proper sensory analysis, the areas of peanut flavor that consumers are most interested in, and an overview of the desirable and undesirable flavors that make up overall peanut flavor.

At the request of the board, funds allocated for technical support were used to provide analytical support to the nitrogen fertility study conducted by Dr. Calvin Trostle. Dr. Trostle provided peanut samples from replicated tests evaluating various peanut inoculants in combination with nitrogen applications (Western Peanut Grower's Research Farm), and the addition of nitrogen at varying amounts during the season (Chuck Rowland's farm). Results from the individual tests are discussed below.

Western Peanut Grower's Research Farm

Location:	WPGRF							
	Seed Size Distribution (%)			%	%	%	Roasted Peanut	Peanut Off
Treatment	Jumbo	Medium	Number One	Sugar	Fat	Protein	Flavor Intensity	Flavor Intensity
#11 – 20lb N Pre + 0 lb N Mid Nitragin Liquid Lift	54.2 a	33.8 b	12.0 c	4.8 c	46.9 b	25.6 a	4.0	2.1 b
#13 - 20 lb N Pre + 80 lb N Mid Nitragin Liquid Lift	48.5 a	35.2 b	16.3 bc	4.7 c	47.8 b	23.7 a	3.8	3.3 a
# 19 – 20 lb N Pre + 0 lb N Mid Nitragin Soil Implant Granular	47.1 ab	36.8 b	16.1 a	5.0 b	48.2 ab	24.0 a	3.9	3.4 a
# 34 – 20 lb N Pre + 0 lb N Mid Nitragin Peanut Special Seedbox	35.6 b	49.1 a	15.3 ab	5.4 a	50.2 a	18.7 b	3.6	3.4 a
							NS	

Means in columns followed by the same letter are not significantly different a the 0.05 level.

Seed Size Distribution

In the inoculant study at the Western Peanut Grower's Research Farm, seed size was significantly different among the treatments. Based on the lack of nodule development, the peanut seed box inoculant treatment was effectively a control in the comparisons above, with 20 lbs. of pre-plant nitrogen being the only source of nitrogen during the season. The peanut seed box inoculant treatment produced significantly fewer jumbo kernels and significantly more number one kernels than the liquid lift treatment with 20 lbs. pre-plant nitrogen and no additional nitrogen during the season. Nodule formation did not occur with the seed box treatment and it is likely that there was not enough nitrogen available to the plants to promote early, and consistent pod development. The granular inoculant treatment and liquid lift with the addition of 80 lbs. mid-season nitrogen produces similar results as the seed box inoculant treatment; however, the differences were not as large. The percentage of number one kernels has significant implications on peanut flavor and quality as some food manufacturers require number one seed in their product formulations.

Kernel Composition

There were significant differences among inoculant treatments for sugar, fat, and protein concentrations. The seed box inoculant and granular inoculant treatments produced significantly higher sugar levels than the liquid lift and additional nitrogen treatments. Along with seed size, this may also indicate that pod development was delayed and that there was not enough nitrogen available later in the season to promote consistent pod development and growth. We anticipated protein levels to be lower in these treatments as well. However, only the seed box inoculant treatment had significantly lower levels of protein than the other inoculant treatments. It is interesting to note that the fat levels for the seedbox inoculant treatment were significantly higher than the other inoculant treatments and that the lack of available nitrogen during the season may be having a significant affect on biochemical processes occurring in the kernel during development and maturation.

Flavor

Roasted peanut flavor was relatively low, but did not differ among inoculant treatments. Lower roasted peanut flavor indicates a relative lack of maturity. Peanut off-flavors were present in all the samples evaluated, but the level of off-flavor was significantly lower in the liquid lift, pre-plant nitrogen only, treatment. The level of off-flavors present in the samples masked the level of roasted peanut flavor, but none of the treatments produced a sensory profile that would be comparable to a Southeast runner peanut.

Chuck Rowland

Location:	CR							
	Seed Size Distribution (%)			%	%	%	Roasted Peanut	Peanut Off
Treatment	Jumbo	Medium	Number One	Sugar	Fat	Protein	Flavor Intensity	Flavor Intensity
0 lb N 1 x Nitragin Liquid Lift	56.1	32.9	10.9 b	4.9	45.0	28.7	4.5	0.5
50 lb N 1 x Nitragin Liquid Lift	51.7	35.6	12.7 a	4.8	45.5	29.0	4.8	0.8
100 lb N 1 x Nitragin Liquid Lift	49.4	37.3	13.3 a	4.6	45.9	28.1	4.7	0.3
	NS	NS		NS	NS	NS	NS	NS

Means in columns followed by the same letter are not significantly different at the 0.05 level.

Seed Size Distribution

In the nitrogen study at Chuck Rowland's farm, seed size was relatively consistent among treatments with the exception of the percentage of number one kernels produced. The addition of 50 and 100 lbs. of nitrogen mid-season increased the percentage of number one kernels produced over liquid lift with no pre-plant or mid-season nitrogen.

Kernel Composition

There were no significant differences among nitrogen treatments for sugar, fat, and protein concentrations. Overall, sugar levels were relatively high and fat levels were lower than normal for runner peanuts. Protein was a little higher across all treatments than normal.

Flavor

Roasted peanut flavor across all treatments was higher and levels of fruity/fermented off-flavors lower than flavor scores from the samples at Western Peanut Grower's Research Farm. However, there was no significant difference in flavor profile across nitrogen treatments. Roasted peanut flavor scores were lower than those often produced from Southeast runner peanuts.

Implications

Proper selection of inoculant and application have significant implications on agronomic characteristics and peanut quality. The decision to apply supplemental nitrogen should be based on soil fertility, nodule formation/activity, and period during the growing season. Based on the data presented above, applications of additional nitrogen could significantly increase the percentage of number one kernels and have differential affects on peanut composition and possibly flavor.

Acknowledgements

JLA wishes to thank the Texas Peanut Producer's Board for financial support and Dr. Calvin Trostle for providing samples and knowledge to this project.

Report No. 10

Near-Final Report to TPPB for a 2003 Project
(A final report will be submitted when the project is finished. See the last paragraph for an explanation.)

New Peanut Pest Management Resources for the Southern High Plains

Patrick Porter, Scott Russell, and Mike Blanton
Grant 03:70091

Sample video units are provided on a CD that accompanies this document.

Status of video units:

Four days of shooting in 2003 resulted in at least six videos featuring Clyde Crumley and Scott Russell. These will average six to eight minutes in length and will be put on the peanut IPM website, DVD, and VHS. The status of each unit appears in the following table.

Table 1. Status of Peanut IPM video units.

Unit	Status
Souting for Early-Season Pests	Completed*
Plant Development	Imported**
Scouting for Mid-Season Pests	Imported**
Tomato Spotted Wilt	Imported**
Foliage Feeding Pests	Imported**
Determining Peanut Maturity for Harvest	Completed*
Still photos for all videos	Completed

* Completed means that the video is done, but needs to be updated to a new format when funds are available to purchase a software upgrade.
** Imported means that the raw footage has been assembled and rough-cut. Transitions, still photos, and graphics need to be added.

2004 Units Pending (no cost to TPPB):

Additional units on disease and irrigation will be filmed in 2004. We also hope to add a unit on the lesser cornstalk borer if we can find an infestation, and will add additional units if production problems arise.

Peanut IPM Website:

The website will be built this Spring. It will feature all the videos, still photos of pests and diseases, and every electronic peanut resource available from the TAMU system.

Expenditures Thus Far:

Consultant fee to Clyde Crumley: $2.300
Travel for Scott Russell and Pat Porter: $191.35
Computer equipment and software: $1,013
TPPB funds yet to be released to finish the project: $2,841.

Purchases needed before the project can be completed: (Why we are not finished yet)

We do not pad grants, and do not have surplus dollars in other accounts to spend on this project. Because a significant portion of the funding for this grant is to be paid after this final report, I do not yet have the funds to complete the purchasing required for this project. Once the final funds are released, I shall buy the upgraded video processing software, DVDs, CDs, etc. as listed in the original grant request.

Report No. 11

Irrigation Water Management: Irrigation Scheduling and Application Methods

Dana O. Porter, A. Michael Schubert, Jacob Reed and Terry Wheeler
Texas Agricultural Experiment Station, Lubbock, TX

SUMMARY

Coordinated research activities focused upon peanut irrigation management have been conducted at the Western Peanut Growers Association Research Farm (WPGRF) over the last four years. Primary objectives are to improve efficiency and effectiveness of limited irrigation resources by identifying irrigation methods and management strategies that offer the best combinations of irrigation efficiency and crop yield and quality. The work at WPGRF expands upon related studies conducted at other sites, testing irrigation strategies under a more broad range of conditions (coarse soils, shallow caliche areas, and more severely sloping topography).

Irrigation management issues addressed through this research include irrigation rates (amounts) and irrigation methods. Irrigation applications targeting 50 %, 75 %, 100 %, and 125 % crop evapotranspiration (ET) replacement have been evaluated at multiple locations in various studies. Results of early work in this study indicated that there is no advantage to applying water in excess of 100% ET (full irrigation). In the 2002 season, there was no significant difference in yield or quality obtained between the 75 % ET and 100 % ET treatments; however 50 % ET replacement netted significantly lower yields, as expected. In 2003, there were significant differences, with 100% ET yielding the highest, followed by the 75% ET and then the 50% ET treatments. This is more consistent with conventional assumptions, especially in a cropping season with rainfall well below average.

Irrigation method studies at multiple locations have returned mixed results over the long-term, with low energy precision application (LEPA) generally out-performing low elevation spray application (LESA) and mid-elevation spray application (MESA) methods, particularly under deficit irrigation scenarios. Recent studies, including this project at the Western Peanut Growers Research Farm in particular, have indicated that spray application may offer notable advantages under certain conditions, especially in very coarse soils with poor lateral water distribution. In the 2002 cropping season, the research team introduced multiple crop varieties into the study to investigate apparent irrigation method-by-variety interactions. An alternative managed LEPA-LESA-LEPA irrigation strategy was also added as a refinement to take advantage of the inherent advantages offered by both LEPA and LESA methods. These treatments were repeated in 2003 to provide a stronger dataset upon which to make recommendations.

INTRODUCTION AND BACKGROUND

Increases in peanut acreage in the Texas Southern High Plains (TSHP) have led to an increased demand for research-based information, demonstration of applicability in the field, and delivery of usable information to peanut producers and the peanut industry. Several geological, geographical, and climatic features make the TSHP different from most U.S. peanut producing areas; these include low annual precipitation and low humidity. Evaporative demand greatly exceeds precipitation, and irrigation capacity generally is insufficient to meet crop water demand, hence varying degrees of deficit irrigation are common. Optimum irrigation management is essential to produce acceptable yields of high quality peanuts, to balance the cost of irrigation with its benefits, to produce a good fit of peanut production within the overall farm enterprise, and to conserve limited water resources.

Efficient and effective irrigation involves selection of an optimal application method ("LESA", low elevation spray application *vs.* "LEPA", low energy precision application). It also involves managing these applications for optimal performance and benefit, all within the farm-specific constraints of soil conditions, topography, and available water resources. A key objective is to achieve both high water application efficiency and near-surface soil conditions that support pegging and pod development. This project addresses these water management issues, building upon previous research efforts to include a wider range of field conditions and investigating apparent differences in response to irrigation strategies by different peanut varieties.

METHODS AND MATERIALS

Three varieties of peanuts (Florunner, Tamrun 96, FlavorRunner 458) were planted during the first week of May, 2003 at the Western Peanut Growers Association Research Farm (WPGRF) in Gaines County, Texas. Irrigation treatments were imposed in spans 5, 6, and 7 under the 9-span quarter-mile center pivot East Circle on the farm.

Table 1. Summary of irrigation treatments, 2002 and 2003.

Application Rate	MESA (I-Wob™ nozzle)	LESA (LDN™ nozzle)	LEPA (drag hoses)	LEPA-LESA-LEPA (managed LEPA)
100 % ET			X	
75 % ET	X	X	X	X
50 % ET		X	X	

(Manufacturer and product names are provided for information purposes only, and are not intended as endorsements.)

Irrigation treatments, summarized in Table 1, included irrigation method and irrigation rate treatments. Irrigation methods include low energy precision application (LEPA) and two types of spray application nozzles: 1) Senninger LDN™ low drift spray nozzle, a low elevation spray application (LESA) method and 2) Senninger I-Wob™ "wobbler" nozzle, a mid-elevation spray application (MESA) method. A LEPA-LESA-LEPA or "managed LEPA" irrigation strategy was added in 2002 as a refinement to take advantage of the benefits of both LEPA irrigation (higher application efficiency) and LESA irrigation (better near-surface soil wetting pattern for pegging and pod development). Irrigation rates included 50%, 75%, and 100% ET replacement through LEPA application. These target irrigation rates represent varying levels of irrigation capacity, from deficit irrigation to full irrigation. All irrigation treatments were delivered through the same center pivot irrigation system at low pressure; pressure regulators were used on all irrigation "drops" (nozzle positions) to maximize uniformity of application. Planting and tillage operations were in a circle pattern, consistent with the travel of the center pivot irrigation system and with recommended standard LEPA practice.

Precipitation included approximately 0.4 inches pre-plant and 6.0 inches in-season rainfall. Pre-plant irrigation (3 inches) was applied to facilitate germination of the crop. In-season irrigation applications were approximately 14, 21, and 28 inches for the 50%, 75%, 100% ET target treatments, respectively. In an effort to accommodate various planting dates of projects on the site, an excessive amount of pre-plant and early-season irrigation was applied in the 2002 season. This problem was corrected in 2003 through better coordination of the various research projects at the site. It must be noted that in absence of a tested South Plains appropriate crop coefficient curve for peanut, crop water use estimates were based upon a combination of curves available.

Peanuts were harvested by a combine equipped with a Peanut Yield Mapping System (PYMS). Plot samples were harvested with a bagging combine (plot samples 4 rows by 20 ft; 3 locations for each of 2 field area replications). Bagging combine samples were retained for grade and quality analyses.

RESULTS AND DISCUSSION

Results from Irrigation Application Rate Study

Irrigation application rates targeting 50%, 75%, and 100% evapotranspiration (ET) replacement were applied through LEPA irrigation during the 2003 cropping season. Standard LEPA practice included application by drag hoses in alternate furrows, circular planting pattern to match traffic of the center pivot irrigation system, and furrow dikes (to the extent practical) to maximize in-furrow water application uniformity. Furrow dikes are extremely difficult to maintain in the sandy soils at WPGRF. Yield was determined through small plot sampling with a bagging combine (4 rows by 20 ft. for each treatment and replication block; a total of 6 samples for each treatment - by - variety combination) and with the Peanut Yield Monitor System (PYMS)-equipped peanut combine. Samples were graded in the laboratory to evaluate product quality. Table 2 summarizes the yield responses of each variety to irrigation treatments using the two data sources, as well as the grades obtained from the small plot samples. When comparing the small plots and yield mapping, the mean yield trends for each variety- irrigation level combination are fairly similar. When 120 randomly selected observation points (for each treatment -by- variety combination) from the PYMS were compared, yields for all cultivars were lowest under the 50% ET treatment and highest for 100%ET (full irrigation) treatment. Results are summarized graphically in Figure 1. Peanut grades from the 75% ET and 100% ET treatments were not significantly different; lower grades resulted from the 50% ET treatments.

Table 2. Mean harvested yield and grade by irrigation treatment, WPGRF 2003.

Irrigation Treatment	LESA (75%ET)	MESA / wobbler (75%ET)	LEPA-LESA-LEPA (75%ET)	LEPA 75%ET	LEPA 100% ET	LEPA 50% ET
PYMS Yield (lb/ac)						
Florunner	3,360 c*	3,915 a	3,911 a	3,587 b	3,905 a	2,743 d
Tamrun 96	3,407 b	3,898 a	3,550 b	2,972 c	3,776 a	2,617 d
FlavorRunner 458	3,453 b	3,769 a	3,407 b	3,391 b,c	3,640 a	3,226 c
Plot Yield (lb/ac)						
Florunner	4,188	4,728	3,881	4,308	4,535	3,441
Tamrun 96	3,868	4,495	4,028	4,148	4,348	3,174
FlavorRunner 458	4,201	4,722	3,201	3,828	3,835	2,914
Grade						
Florunner	74.7 a,b	77.2 a	70.7 c	72.0 b,c	74.3 a,b	68.9 c
Tamrun 96	73.8 a	74.8 a	68.9 b,c	69.5 b	70.8 b	66.6 c
FlavorRunner 458	76.6 a	76.3 a	71.4 b	73.1 b	72.8 b	67.8 c

** Note: values in each row followed by the same letter are not significantly different at 0.05 probability.*

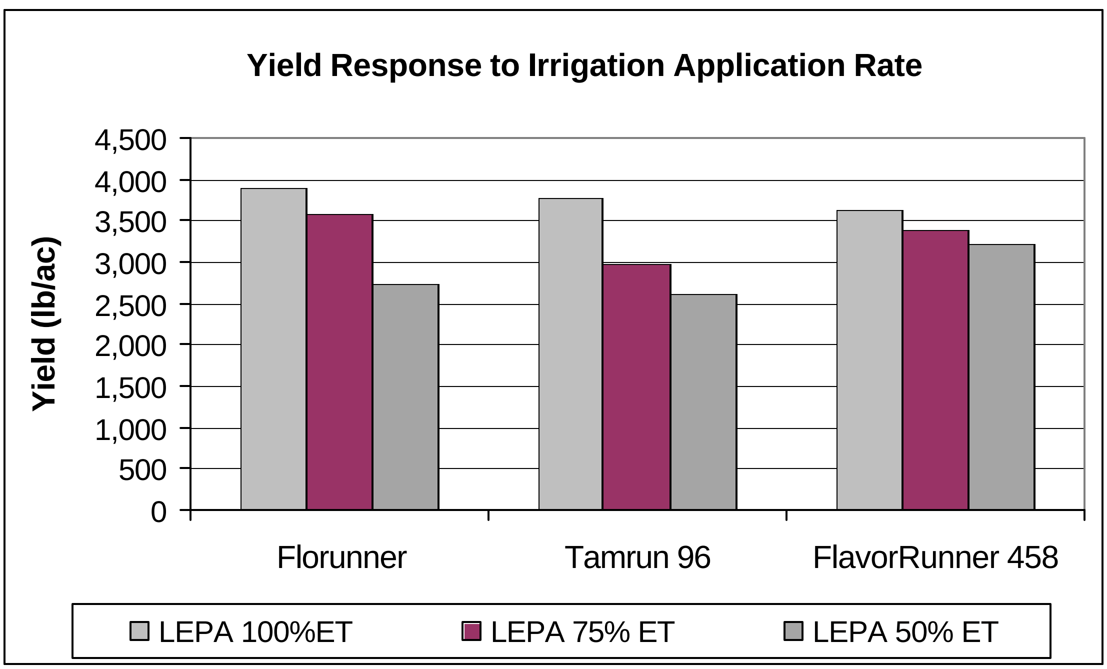

Figure 1. Effect of irrigation rate on peanut yield.

Results from Irrigation Application Method Study

Throughout the 2000 and 2001 cropping seasons two LEPA methods (drag hoses and bubbler-mode nozzles) and two spray methods (low drift spray and wobbler-type nozzles) were used at WPGRF to apply water at a base target irrigation rate of 75% crop evapotranspiration replacement. Because results from drag hoses and bubbler LEPA applicators were similar, the bubbler applicator was discontinued and only drag hoses were used for LEPA applications in 2002 and 2003. This allowed space for inclusion of an additional application strategy (LEPA-LESA-LEPA) at the site during 2002 and 2003. Yields were determined by small plot sampling (4 rows by 20 ft. for each treatment and replication block) and with the PYMS-equipped peanut combine. Samples were graded in the laboratory to evaluate product quality.

Effects of irrigation method treatments are summarized in Table 2 and Figures 2 and 3. When the numerous GPS-referenced yield mapping points were analyzed, we were able to identify differences in the effects of irrigation methods on each variety. All the peanuts responded well to the full irrigation (100%ET) LEPA and to the 75% ET MESA-wobbler treatments. The managed LEPA (LEPA-LESA-LEPA) strategy also netted favorable results. The strictly spray treatments (LESA and MESA) indicated higher grades. This apparently results from higher maturity, facilitated by the more consistent wetting pattern in the pegging zone. Of all the varieties, it appears that Florunner may have responded most favorably to LEPA, while Tamrun 96 responded more favorably to the spray treatments (MESA-wobbler, LESA, and LEPA-LESA-LEPA).

In previous years' work at WPGRF, there have been mixed results from the comparison of spray irrigation methods (LESA and MESA) and the LEPA applications. A long-term study conducted under the leadership of Mike Schubert at the Ag-CARES facility in Gaines County indicated that - especially under deficit irrigation conditions - LEPA tended to outperform spray irrigation. The soil at WPGRF is more coarse, and the topography is more steep than at the Ag-CARES facility. Each location is representative of many fields in commercial peanut production. At the time of this writing, collaborators are continuing to analyze the research data, and we have recently developed some information tools that will help in analysis of conditions at both sites (and others) to further clarify limits (soil conditions, irrigation water capacities that affect the relative advantages of the irrigation methods and strategies available.

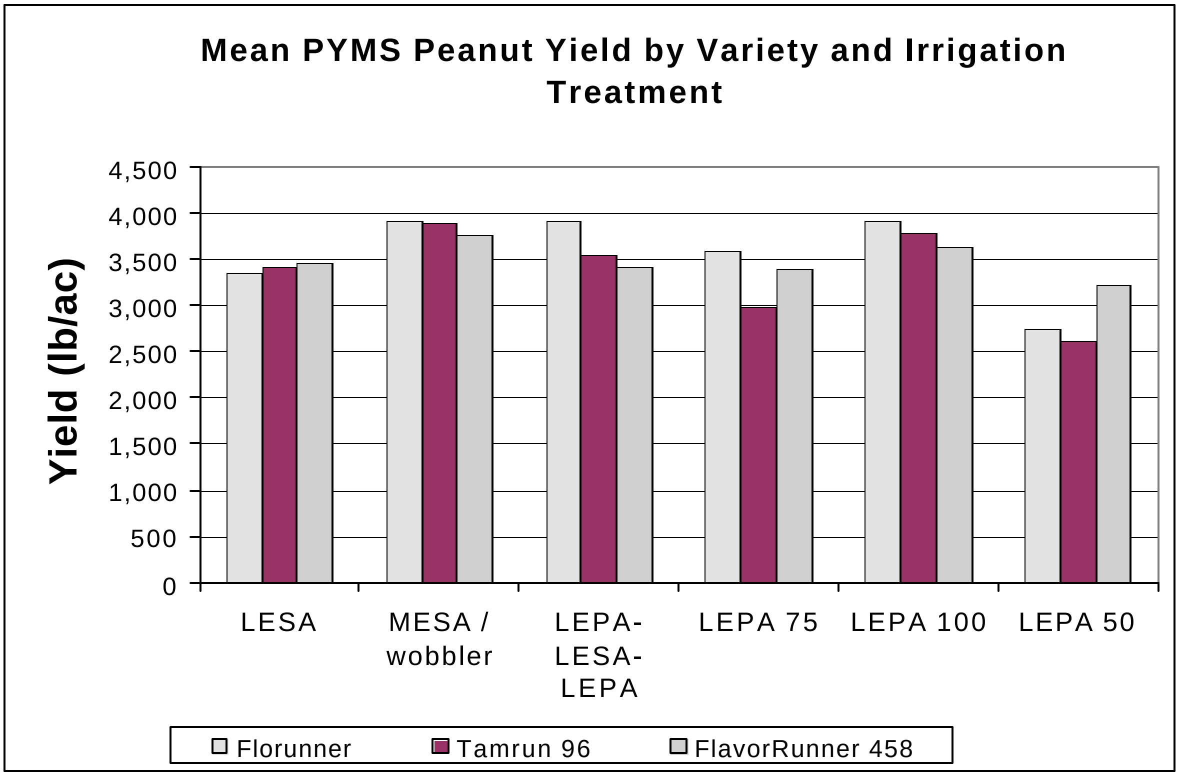

Figure 2. Effect of irrigation treatment on peanut yield, WPGRF, 2003.

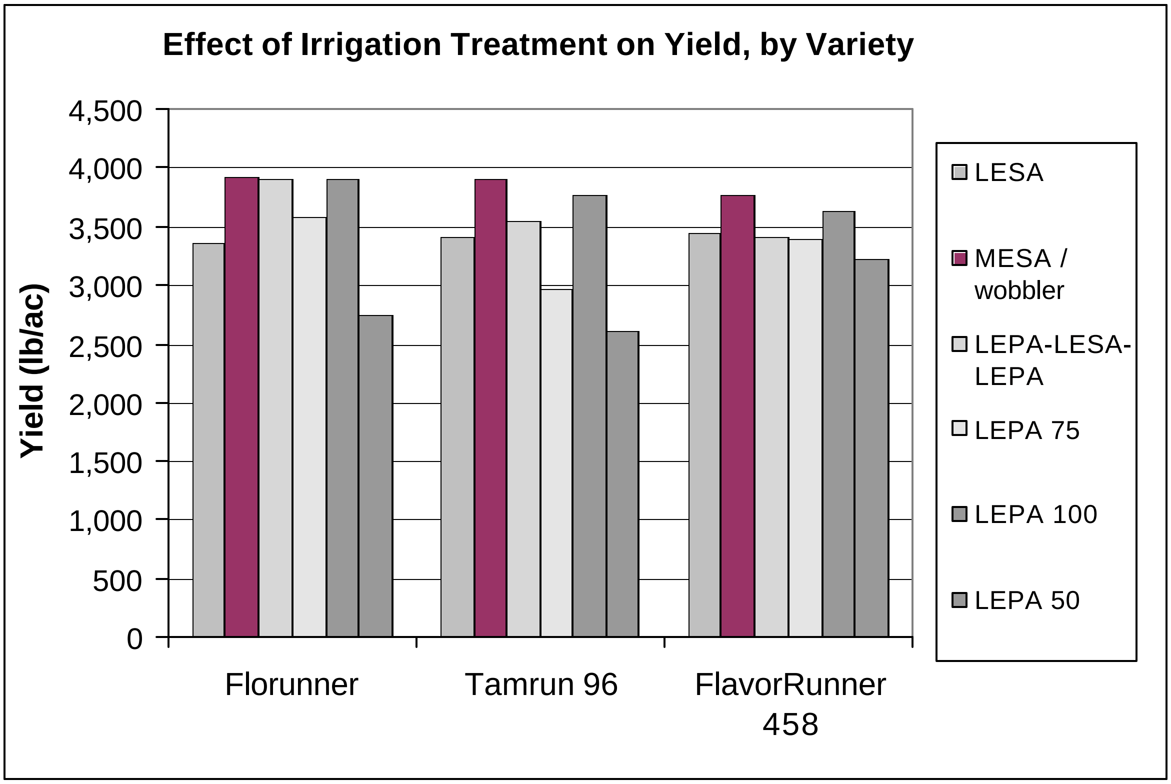

Figure 3. Effect of irrigation treatment on peanut yield, WPGRF, 2003.

ACKNOWLEDGEMENT

Special thanks to Scot Towner and other hard-working student workers for their assistance in field operations and harvest. Special thanks also to the Texas Peanut Producers Board, Western Peanut Growers Association, National Peanut Board, and Texas Agricultural Experiment Station and Texas Cooperative Extension for their financial and in-kind support for this and related work at the site.

Report No. 12

United States Department of Agriculture

A Survey of Peanut Buying Points in West Texas to Assess Harvest Maturity Level and Curing Temperatures

Timothy H. Sanders, Paul D. Blankenship
USDA, ARS, Market Quality and Handling Research Unit
Raleigh, North Carolina and National Peanut Research Laboratory,
Dawson, GA

Executive Summary

This work was conducted to examine the post harvest handling and curing practices found in West Texas. Curing peanuts at temperatures above ca 38 C nuts may result in fruity fermented off-flavor. Because of the unusual growing conditions the earliest harvested peanuts in West Texas were very immature as confirmed by hull scrape examination of some samples. Twenty one buying points from just south of Amarillo to Seminole were visited between October 14-20,2003. Buying point managers estimated that they would purchase about 320, 000 tons and had storage capacity of about 273,000 tons. Drying capacity as counted on the buying points was 650 wagon connections and 364 trailer connections. Guidelines described by managers for curing temperature ranged from 85 F to turning the thermostat up until the burner fired. Maximum observed curing temperatures detected on the buying points ranged from 85 F to 178F and were distributed as follows 85 F- 96F---9 trailers, 105 F-118 F---4 trailers, 130 F-178 F---4 trailers and 4 sites were not drying when visited. Even with these high temperatures in general temperatures for most trailers were in acceptable ranges; however, when mixed in a warehouse one trailer can result in a much larger problem. These data indicate that some flavor problems will result because of post harvest handling given the practices observed.

Report No. 13

United States Department of Agriculture

Comparison of Flavor Characteristics of High and Normal Sugar Level Peanuts Cured at Various Temperatures

Timothy H. Sanders, Christopher L. Butts, and Paul D. Blankenship
USDA, ARS, Market Quality and Handling Research Unit
Raleigh, North Carolina and National Peanut Research Laboratory, Dawson, GA

Executive Summary

Practical experience indicates that the fruity fermented off-flavors sometimes found in peanuts may arise due to interactions among environmental conditions, seed composition, and perhaps cultural practices unique to the region. Fruity fermented off-flavor has been shown to result when peanuts are cured at high temperature (above ca. 38 C) and the off-flavor is greater in immature peanuts. Immature peanuts contain higher sugars and published data indicate that peanuts grown in West Texas have higher sugar levels than other areas. There are suggestions that high sugar levels may predispose peanuts to fruity fermented off-flavor and this study was conducted to subject high and normal sugar level peanuts from the same location to a range of curing temperatures to evaluate the effect of sugar level on development of fruity fermented off-flavor.

Peanuts produced in soil-heated plots, that contained approximately 14.5% less sugar, and peanuts from adjacent unheated plot were both used in the planned curing studies. The peanuts were dried from 32% misture content to approximately 10% using ambient air and air heated 15 F and 30 F above ambient. The average plenum temperatures were 69,100, and 106 F , respectively. The average drying rate increased as drying temperature increased and ranged from 0.27 to 0.77%/hr. Roasted peanut flavor intensity decreased and fruity fermented flavor increased with increasing curing temperature in peanuts from both treatments. Intensity of fruity fermented was higher in peanuts from the unheated plot for all curing temperatures. These data could suggest that higher sugar predisposed peanuts to higher fruity fermented off flavor but these preliminary data must be viewed as somewhat inconclusive because the maturity levels for peanuts in the two treatments were somewhat different. The heated soil plot had lower sugar as planned in the study but coincidentally the overall maturity level of the peanuts in the heated plot was more advanced. This fact confuses the results of the study and will be addressed in a follow on study by using unheated peanuts that were planted earlier than those planted in heated plots.

Report No. 14

United States Department of Agriculture

Effect of Soil Temperature Modification on Sugar Content and Related Physiology in Peanuts in West Texas

Tim Sanders, Diane Rowland, Chris Butts and Paul Blankenship
USDA, ARS, Market Quality and Handling Research Unit
Raleigh, North Carolina , National Peanut Research Laboratory, Dawson, GA

Executive Summary

This study was conducted to determine if lower soil temperatures found in West Texas are responsible for high sugar content of peanuts by maintaining a higher minimum soil temperature than normally found in West Texas. Additionally, these plots provided a location to conduct initial evaluations of peanut physiological capacity and collect data on soil and air temperatures. This project was also designed to meet a critical need for lower sugar West Texas peanuts for use in another funded project.

Results of the study indicated that sugar content was significantly lower when soil temperature was maintained above 20 C. This confirms the relationship of cool soil temperature and high sugar normally observed in West Texas peanuts. Pod maturity (hull scrape) of peanuts in heated soil was more advanced and pod and seed size distribution was skewed toward smaller sizes in agreement with data previously published by the investigators. Approximately 90% of the peanuts from the heated plot rode a 16/64-inch slotted screen compared to 93% from the unheated plots. There were approximately 0.5% more jumbo sized peanuts from the unheated plot. The maturity distributions within grade sizes from the two plots were different in that more immature peanuts were found within a grade sizes from the unheated plot.

Throughout the season the following environmental and crop measurements were taken: ambient temperature, relative humidity, solar radiation, soil temperature and moisture, canopy relative humidity and temperature, canopy surface temperature, and crop chlorophyll content.

Report No. 15

USDA

United States Department of Agriculture

Reduction of Pod Temperatures in Windrows with Spray Application of Surround ®, a Kaolin Based Wettable Powder

Timothy H. Sanders, USDA, ARS, Market Quality and Handling Research Unit
Raleigh, North Carolina

Executive Summary

Practical experience indicates that the fruity fermented off-flavors sometimes found in West Texas peanuts may arise due to interactions among environmental conditions, seed composition and perhaps cultural practices unique to the region. Fruity fermented off-flavor has been shown to result when peanuts are cured at high temperature (above ca. 38 C) and the off-flavor is greater in immature peanuts. Exposure of peanuts to high temperatures may occur before digging, during windrow drying or during wagon drying. Temperatures of peanut pods on plants in windrows have been shown to be much higher than air temperatures. During the earliest part of the harvest season, when the off-flavor historically is more common in West Texas, air temperatures are higher, and percentage of immature pods is higher. The purpose of this project was to examine the effectiveness of Surround® WP, and sandwich windrow configurations in reducing peanut pod temperatures compared to pods in normal inverted windrows. The evaluation of effectiveness of the windrow treatments was completed by sensory analysis of peanuts from each treatment.

Sandwich windrow diggers performed in an excellent manner. Temperatures of pods in sandwich windrows were slightly lower than Surround sprayed pod temperatures and also had a slower rate of temperature increase. This resulted in a shorter exposure time to increasing temperatures in the sandwich windrow pods. Data revealed that sandwich windrow pods did not get as cool at night as other treatments and this phenomenon might impact problems from frost damage. Maximum pod temperatures in sandwich windrows were about 7 C lower than the maximum temperature of 37 C in inverted windrows. Compared to inverted windrows, both the Surround and sandwich treatments had lower fruity fermented off flavor in various grade sizes. Intensity of fruity fermented in Jumbo runner size was about 2.3 in normal windrows but was below threshold (less than 1) in the sandwich and Surround treatments.

Report No. 16

Report Submitted to Texas Peanut Producers Board for 2003 Project Work

West Texas Peanut Nutrition with *Rhizobium* and Nitrogen

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Project Objective #1: Continue testing granular, liquid, and frozen *Rhizobium* inoculants with and without fertilizer N to determine the degree of *Rhizobium* nodulation and effect on peanut yield;

The main project for this objective was conducted at Western Peanut Growers Research Farm in Gaines Co. Thirty-five treatments were tested including seedbox, granular, and in-furrow liquid *Bradyrhizobium* inoculants, single vs. double rate inoculant, and a combination of nitrogen fertilizer treatments, including no added N, 20 lbs./A at plant, 100 lbs. N/A at plant, and an additional mid-season N application of 80 lbs. N/A for selected treatments.

A second limited trial site was conducted for liquid (5) and granular (3) *Rhizobium* inoculants on a caliche soil in far west Gaines Co.

A third on-farm inoculant rate trial is a component of a nitrogen rate trial, and is reported below under Objective #2.

A fourth trial site was conducted for granular (3) and seedbox (1) *Rhizobium* inoculants only at the AGCARES research facility in Gaines Co. Our research planter is not equipped for liquid inoculants at AGCARES. Very little nodulation was achieved with any inoculant (results not shown).

Results—Main Trial @ WPGRF, Gaines Co.

Similar responses were noted for both inoculated and fertilized plots with slightly more increased yield due to *Rhizobium*. One key test compared a seedbox product, which some farmers still use, to granular and liquid products from the same company. The seedbox product essentially did not inoculate the peanuts, even at a 6X rate.

Several new products were tested in West Texas for the first time. All of the Becker Underwood liquid products performed well in addition to Lift. Low nodulation and reduced yields were observed in this trial for INTX liquid. One product, Sono Ag. 'Vigro' advertised as inoculating many types of plants (non-specific), was a complete failure.

No conclusive trend to double inoculant rates was observed.

Nodules collected 19 June 2003, 8 August 2003 — 4 reps per treatment, 6' X 45'

Planted May 5, dug Oct. 9, threshed Oct. 16-17.

Peanut grades to be completed.

Treat-ment	Inoculant	Early N rate (lbs./A)	Mid-season (lbs./A)	*Rhizobium* inoc. rate (lbs./A)	6/19 Average Nodules Plant	8/8 Average Nodules Plant	9/15 Chloro-phyll Reading	Yield (lbs./A)
1	None	0	0	0X	0.9	6.0	37.8	2803
2	None	20	0	0X	0.4	6.2	42.5	3123
3	None	20	80	0X	0.2	2.5	46.2	4069
4	None	20	4x20**	0X	0.4	2.7	47.2	4487
5	None	100	0	0X	0.3	6.4	46.2	4229
6	B/U* Rhizo-Flo^ granular	20	0	1X	5.3	20.2	44.4	3980
7	B/U Rhizo-Flo granular	20	80	1X	5.8	12.8	45.0	4694
8	B/U Rhizo-Flo granular	20	0	2X	8.0	26.4	44.9	4483
9	B/U Rhizo-Flo granular	20	80	2X	10.6	17.1	47.4	4753
10	Nitragin Lift liquid	0	0	1X	20.4	34.2	48.0	4474
11	Nitragin Lift liquid	20	0	1X	17.8	30.3	48.4	4250
12	Nitragin Lift liquid	20	80	1X	17.9	25.4	47.0	5133
13	Nitragin Lift liquid	20	4x20	1X	17.2	23.9	49.0	5057
14	Nitragin Lift liquid	100	0	1X	11.0	22.5	47.9	4609
15	Nitragin Lift liquid	20	0	2X	18.3	36.4	48.3	4716
16	Nitragin Lift liquid	20	80	2X	18.2	26.1	48.0	4322
17	Nitragin Lift liquid	20	4x20	2X	18.7	24.1	48.8	4998
18	Nitragin Lift liquid	100	0	2X	16.3	28.9	48.2	4381
19	Nitragin Soil Implant granular	20	0	1X	11.9	21.3	46.5	4322
20	Nitragin Soil Implant granular	20	0	2X	16.5	26.5	46.9	5107
21	B/U 'Urbana' RhizoFix liquid	20	0	1X	22.0	29.9	47.4	4413
22	B/U 'Urbana' RhizoFix liquid	20	0	2X	17.8	31.7	48.0	4643
23	B/U HiStick liquid	20	0	1X	13.9	30.8	47.9	4964
24	B/U HiStick liquid	20	0	2X	17.1	28.1	48.1	4812
25	B/U HiStick L liquid (subtilex)	20	0	1X	15.1	38.9	45.9	5020
26	B/U HiStick L liquid (subtilex)	20	0	2X	10.6	30.5	46.3	4770
27	INTX Microbials N-TAKE liquid	20	0	1X	4.6	16.8	44.0	4027
28	INTX Microbials N-TAKE liquid	20	0	2X	3.2	10.6	42.3	4305
29	INTX Microbials N-ROW granular	20	0	1X	7.8	22.7	46.1	4044
30	INTX Microbials N-ROW granular	20	0	2X	15.7	30.5	45.7	4575
31	Lift + Rhizo-Flo	20	0	1X/1X	16.8	33.8	48.4	4736
32	Sono Ag. Vigro liquid	20	0	1X	0.4	6.4	39.1	2706
33	Sono Ag. Vigro liquid	20	0	2X	0.4	3.3	37.8	3225
34	Nitragin Peanut Special powder	20	0	2X	0.2	3.8	38.6	3069
35	Nitragin Peanut Special powder	20	0	6X	2.0	4.3	37.2	3183
				Rhizobium F	15.47	20.63	7.53	7.69
				Rhizobium P-Value	<0.0001	<0.0001	<0.0001	<0.0001
				Block P-Value	*0.0182*	*<0.0001*	*0.0003*	*<0.0001*
				Rhizobium Mean	10.3	20.6	45.5	4288
				Rhiz PLSD (0.10)	4.4	5.8	2.9	565
				Rhizobium CV	78.7	59.6	9.2	18.9

*Four 20-lb. increments, approx. June 18, July 1, mid-July, Aug. 1

^Formerly Urbana Rhizo-Flo

In the caliche site test in West Gaines Co. minimal nodulation was observed for all products although some significant differences were observed. No differences in yield were found.

Rhizobium Inoculant, Caliche Soil Site, West Gaines Co., 2003
Flavor Runner 458, planted Apr 30, dug Oct 13, thresh Oct 20
Harvest area 6.7' X 36'
No applied N added to test site.

Treat-ment	# of Reps	Inoculant	23-Jun nodules per plant	18-Aug nodules per plant	26-Aug Chlorophyll Reading	Yield (lbs./A)
1	5	Control	0.2	0.3	45.2	3307
2	5	Nitragin Lift liquid	3.9	8.3	46.0	3554
10	4	INTX N-TAKE liquid	0.3	0.5	45.5	3181
11	5	INTX N-ROW granular	2.4	6.2	43.9	3525
12	5	B/U* 'Urbana' RhizoFixL liquid	4.2	4.7	45.9	3256
13	5	B/U HiStick L liquid	3.3	6.6	44.2	3321
14	5	B/U HiStick L & Subtilex liquid	2.6	6.3	44.8	3383
15	4	B/U RhizoFlo granular	1.5	3.6	44.4	3335
16	4	Nitragin Soil Implant granular	5.2	10.4	43.8	3494
*Becker Underwood		Trial average	3.7	6.5	45.0	3368
		P-Value	0.0018	0.0022	0.8341	0.9940
		PLSD (0.10	2.7	4.5	NS	NS
		CV (%)	77.8	69.5	3.3	15

<u>Project Objective #2</u>: Continue 4 to 5 on-farm N trials in the Texas South Plains (0, 50, 100 lbs. N/A applied mid-season);

Trial 1—Gaines Co. (includes inoculant rate trial)

Yield response was found only to application of *Rhizobium* inoculant on-farm in Gaines Co. A comparison of broadcast N vs. knifed N indicated slightly higher yield (but not statistically significant) using the farmer's knife rig.

Gaines Co. On-farm Comparison of N Rate X Liquid Lift *Rhizobium* Rate
Flavor Runner 458, plant May 2, dig Oct 10, thresh Oct 17
4 reps per treatment, 42.5' X 13.3'

Comparison of N Rate X Liquid Lift *Rhizobium* Rate

Arranged by Lift Inoculant Rate	18-Jun nodules (per plant)	15-Aug nodules (per plant)	19-Aug Chlorophyll meter	Yield (lbs./A)
0X	3.9 b	25.5 c	43.8 b	3721 b
1X	23.6 a	56.9 b	45.2 a	4325 a
2X	25.4 a	65.3 a	45.5 a	4247 a
PLSD (0.10)	2.5	8.0	0.9	152

Numbers in the same column followed by the same letter are not significantly different at 0.10.

Comparison of N Rate X Liquid Lift *Rhizobium* Rate

Arranged by N Rate (lbs. N/A)	18-Jun nodules (per plant)	15-Aug nodules (per plant)	19-Aug Chlorophyll meter	Yield (lbs./A)
0 N	20.1 a	52.0 a	44.4 b	4134 a
50 N	18.6 a	52.6 a	44.9 ab	4134 a
100 N	19.3 a	54.7 a	45.6 a	4210 a
PLSD (0.10)	NS	NS	0.9	NS

Numbers in the same column followed by the same letter are not significantly different at 0.10.

Comparison of N Rate and Method of Application

1X Lift Rate Only **Arranged by N Rate (lbs. N/A)**	18-Jun nodules (per plant)	15-Aug nodules (per plant)	19-Aug Chlorophyll meter	Yield (lbs./A)
0 N broadcast	23.4 a	59.9 a	45.0 a	4332 a
50 N broadcast	24.3 a	56.5 a	45.0 a	4354 a
100 N broadcast	23.2 a	54.5 a	45.5 a	4290 a
Knife N (~75 N, June 20th)	24.8 a	59.5 a	44.6 a	4459 a
PLSD (0.10)	NS	NS	NS	NS

Numbers in the same column followed by the same letter are not significantly different at 0.10.

Trials 2 (Terry Co.), 3 & 4 (Lamb Co.)

No significant yields to added mid-season N were observed in these three trials in spite of poor *Rhizobium* nodulation (less than 10 nodules per plant).

Clay Nichols Farm, Terry County
Planted May 5, Dug October 29, Threshed Nov. 9, 13
Flavor Runner 458, Nitragin 'Lift' liquid inoculant
4 plots per rep (40' X 13.3')
No farmer-applied N fertilizer; test N applied June 18

N rate (lbs./A)	18-Jun-03 Nodules/plant	15-Aug-03 Nodules/plant	Chlorophyll Reading (Sept.)	Yield (lbs./A)
0	0.5 a	7.4 a	35.6 b	4143 a
50	0.5 a	4.8 a	39.9 a	4225 a
100	0.7 a	5.8 a	40.8 a	4251 a
Mean	0.6	6.0	38.8	4206
P-value	0.790	0.319	0.023	0.837
PLSD (0.10)	NS	NS	3.0	NS
CV (%)	65.3	40.9	8.2	5.8

Doug Sims Farm, Lamb County
Planted May 16, Dug October 15, Threshed Oct. 22
Tamspan 90, INTX N-Take liquid inoculant
3 plots/rep, harvest area 40' X 10'
No farmer-applied N fertilizer; test N applied June 26

N rate (lbs./A)	8-Jul-03 Nodules/plant	13-Aug-03 Nodules/plant	Chlorophyll Reading (Sept.)	Yield (lbs./A)
0	1.5 a	7.0 a	35.7 a	4367 a
50	2.1 a	4.3 b	39.1 a	4732 a
100	1.4 a	3.5 b	40.2 a	4988 a
Mean	1.6	4.9	38.3	4696
P-value	0.422	0.051	0.131	0.358
PLSD (0.10)	NS	2.4	NS	NS
CV (%)	49.4	46.0	8.7	8.4

Don Harper Farm, Lamb County
Planted May 19, Dug October 15, Threshed Oct. 22
Tamspan 90, Nitragin 'Lift' liquid inoculant
4 plots per rep, harvest area 37.5' X 13.3"
No farmer-applied N fertilizer; test N applied June 26

N rate (lbs./A)	8-Jul-03 Nodules/plant	13-Aug-03 Nodules/plant	Chlorophyll Reading (Sept.)	Yield (lbs./A)
0	6.1 a	9.3 a	35.7 a	2749 a
50	8.9 a	8.3 a	39.1 a	2624 a
100	9.2 a	6.9 a	40.2 a	2555 a
Mean	8.1	8.1	38.3	2643
P-value	0.605	0.758	0.131	0.591
PLSD (0.10)	NS	NS	NS	NS
CV (%)	55.1	51.5	8.7	9.5

Project Objective #3: Test the effect of peanut seed planting depth and time to initial irrigation and the effects on nodulation and yield.

In this trial for seeding depth and inoculant product, in spite of favorable planting conditions, most of the *Rhizobium* inoculant was lost when planting at the 1" depth. Yields were reduced. Producers who shallow plant, especially into dry soil, should reconsider this practice to ensure that inoculum is not lost. Delays in irrigation after planting, particularly in hot, dry surface soils, which readily occurs in very sandy soil, can reduce nodulation.

Western Peanut Growers Assn., Farm
Planted May 5 into moist soil, irrigated ~54 hours later; dug Oct. 10, threshed Oct. 17
Flavor Runner 458, 4 reps., 13.3' X 40'
Plots received ~50 lbs. N/A mid-season in two split applications through the pivot.

Seeding Depth (in.)	6/25/03 Nodules/plant 1X Rate	8/8/03 Nodules/plant 1X Rate	8/19/03 Chlorophyll meter	Yield (lbs./A)
	Liquid Lift	**Liquid Lift**	**Liquid Lift**	**Liquid Lift**
1"	1.2 d	5.4 d	44.4 d	4792 c
2"	15.8 a	37.0 a	45.9 bc	5799 a
3"	15.3 a	33.5 a	46.9 ab	5418 b

	Granular Soil Implant	**Granular Soil Implant**	**Granular Soil Implant**	**Granular Soil Implant**
1"	6.1 c	12.7 c	45.4 cd	4905 c
2"	10.3 b	18.0 b	46.8 abc	5028 bc
3"	13.2 ab	19.3 b	47.1 a	4715 c
P-value, inoc.	0.4500	0.0002	0.1340	0.0221
PLSD, inoc. (0.10)	NS	3.3	NS	351
P-value, depth	<0.0001	<0.0001	0.0054	0.1590
PLSD, depth (0.10)	3.0	4.1	1.0	NS
P-value, D*I	0.006	<0.0001	0.743	0.294
CV (%)	57.0	58.8	3.1	11.2

Report No. 17

Peanut Physiology Research in Northwestern Texas

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Jacob D. Reed, Research Associate, TAES-Lubbock

SUMMARY

Experiments were conducted relating to the effect of irrigation application methods on temperature and relative humidity in the peanut canopy, soil moisture patterns, and plant maps at the Western Peanut Growers Research Farm (WPGRF) near Denver City, Texas, and to a lesser extent at the Agricultural Complex for Advanced Research and Extension Systems (AG-CARES) located in Dawson County near Lamesa, Texas. We used FlavorRunner 458, Tamrun 96, and Florunner in our experiments in 2002 and 2003 to determine if variety x irrigation interactions are related to differences in irrigation response encountered beginning in 2001 compared to that from 1995-2000. We tested Florunner, Tamrun 96, Flavor Runner 458, Tamrun OL 01, Tamrun OL 02, Andru II, Tamspan 90, and Olin under LEPA and LESA irrigation. In addition we have measured plant growth parameters, quality parameters, maturity, and occurrence of off-flavors.

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INTRODUCTION

Since 1980, the acreage of peanuts in the northwest quarter of Texas (North and South High Plains and North and South Low Plains) has increased greatly. There are several unusual aspects of peanut production in this area. (1) All acreage in the High Plains and most acreage in the Low Plains are irrigated. (2) Fields are generally large and compatibility with other crops is generally good, allowing a great potential for crop rotation. (3) Elevation is high and temperatures cool compared to most U.S. peanut growing areas. (4) Low humidity permits significant heat loss with associated cool night temperatures. (5) The growing season is relatively short so that both seed germination and the final stages of peanut maturation frequently occur at soil temperatures below 60^{o} F. (6) Freeze damage is a greater threat than in warmer areas. (7) Greater potential for field drying, as well as traditional and innovative ways of drying peanuts. (8) Low humidity discourages some diseases. (9) There is essentially no aflatoxin. Historically, peanut yields are extremely high and production levels dependable. Each year brings new insights into the interaction of the West Texas environment with peanut production.

We have conducted peanut research at AG-CARES since 1995 and since 2000 at WPGRF. In 2001, we saw a different response of peanuts to irrigation application method compared to 1995-1999. Poor harvest conditions in 2000 caused us to not put much faith in yield figures for that year. A comparison of weather conditions and other factors among the years failed to help us understand why we obtained different responses in 2001. We suspected that the switch in varieties to FlavorRunner 458 in 2000 and 2001 might have been a factor in the different responses. We, therefore, added Florunner (used for our irrigation research in 1995-1997) and Tamrun 96 to our experiments in 2002 and 2003 at WPGRF and AG-CARES. We also increased measurements of field conditions under selected water treatments at WPGRF and added collection of plants at weekly intervals to begin to construct plant maps to determine irrigation and site-specific effects on plant characteristics that contribute to yield and give us additional information about how yield differences occur. In her 2003 and 2004 reports, Dr. Dana Porter discussed results of irrigation research at WPGRF and AG-CARES that examined the effects of different irrigation strategies and application amounts on FlavorRunner 458, Tamrun 96, and Florunner peanuts. Precision Agriculture (PA) tools were used in that research and in other research projects at WPGRF and at other field sites in the area. PA tools and approaches include Global Positioning System (GPS) referencing of observation and measurement locations in the field, GPS-referenced yield mapping using the Peanut Yield Mapping System (PYMS) developed by University of Georgia research engineers and scientists, and Geographic Information System (GIS) computer software to analyze site-specific results. As Dr. Porter has discussed, the large number of data sites supplied by the PYMS have allowed us to obtain better yield data than the four replications of small plot samples per treatment using traditional sampling strategies. PA approaches can also be used to correlate data or observations to peanut yields at those specific sites.

In addition to the large plot experiments, we also conducted small plot variety trials under LEPA and LESA irrigation using normal oleic runners (Florunner and Tamrun 96), high oleic runners (Flavor Runner 458, Tamrun OL 01, Tamrun OL 02, and Andru II), normal oleic Spanish (Tamspan 90) and high oleic Spanish (Olin).

Some manufacturers of peanut products have expressed concern over the flavor of West Texas peanuts in some years and production situations. We, therefore, initiated efforts to characterize off-flavors in peanuts in many of our experiments and some experiments of some collaborators.

RESULTS AND DISCUSSION

Data collected during harvest using the peanut combine equipped with the Peanut Yield Mapping System (PYMS) was used to construct yield maps for the irrigation experiments as in past crop years. Specific points from this map were used to analyze yield data to determine if average yields from the different irrigation regimes reflected real differences or were only apparent differences that came from averaging a range of yields from each treatment. Yield maps can be used with maps of other site-specific characteristics of the field to determine the influence of those characteristics with productivity of that part of the field, which in some cases can point to remedies to increase the yields in problem areas. For example, Jacob Reed and Scott Towner are currently developing a method for using yield and elevation maps along with row direction to determine how slope down-the-row affects peanut yield because of run-off of irrigation water under different irrigation scenarios.

Table 1 shows the yield and grade data for the large plot irrigation experiments presented by Dr. Dana Porter in her report with discussion of results.

Table 1. Mean harvested yield and grade by irrigation treatment, WPGRF 2003.

Irrigation Treatment	LESA (75%ET)	MESA / wobbler (75%ET)	LEPA-LESA-LEPA (75%ET)	LEPA 75%ET	LEPA 100% ET	LEPA 50% ET
PYMS Yield (lb/ac)						
Florunner	3,360 c*	3,915 a	3,911 a	3,587 b	3,905 a	2,743 d
Tamrun 96	3,407 b	3,898 a	3,550 b	2,972 c	3,776 a	2,617 d
Flavor Runner 458	3,453 b	3,769 a	3,407 b	3,391 b,c	3,640 a	3,226 c
Plot Yield (lb/ac)						
Florunner	4,188	4,728	3,881	4,308	4,535	3,441
Tamrun 96	3,868	4,495	4,028	4,148	4,348	3,174
Flavor Runner 458	4,201	4,722	3,201	3,828	3,835	2,914
Grade						
Florunner	74.7 a,b	77.2 a	70.7 c	72.0 b,c	74.3 a,b	68.9 c
Tamrun 96	73.8 a	74.8 a	68.9 b,c	69.5 b	70.8 b	66.6 c
Flavor Runner 458	76.6 a	76.3 a	71.4 b	73.1 b	72.8 b	67.8 c

** Note: values in each row followed by the same letter are not significantly different at 0.05 probability.*

Table 2 shows yield and grades for the small plot experiments. In the small plot variety trials, there were no statistically significant yield differences between LEPA and LESA applications at 75% ET replacement. LEPA always had numerically lower grades than did LESA, most of which were statistically significant. Despite the fact that higher grades are generally assumed to be associated with greater maturity, the percent of pods in the black and brown hull scrape color (most mature) classes tended to be higher in the LEPA-irrigated peanuts.

Table 2. Mean harvested yield and grade by irrigation treatment, WPGRF 2003.

Irrigation Treatment	LESA 75%ET Yield (lb/ac)	LESA 75%ET Grade	LESA Hull Scrape Brn + Blk	LEPA 75%ET Yield (lb/ac)	LEPA 75%ET Grade	LEPA Hull Scrape Brn + Blk
Runners	*	*		*	*	
Florunner	4,412 ab	73.3 ab	24.1	4,692 a	70.2 a	29.8
Tamrun 96	3,681 b	70.8 b	13.8	3,921 b	67.3 a	32.6
Flavor Runner 458	4,091 ab	74.3 a	16.5	4,262 ab	71.3 a	33.3
Tamrun OL 02	4,292 ab	73.4 a	21.8	4,222 ab	67.3 a	22.6
Andru II	4,502 a	74.4 a	23.0	3,961 ab	67.3 a	37.3
Tamrun OL 01	4,051 ab	72.9 ab	28.8	3,691 b	70.7 a	34.3
Spanish	*	*		*	*	
Olin	3,601 a	72.9 a	53.0	3,641 a	70.0 a	62.5
Tamspan 90	3,491 a	72.0 a	52.0	3,481 a	69.7 a	54.3

** Note: values in each column followed by the same letter are not significantly different at 0.05 probability.*

In our continuing effort to understand how irrigation affects peanut plant development, we hope to gain insight into how to best utilize the finite resource of irrigation water to produce profitable yields of high quality peanuts. To that end, we measured temperature and relative humidity in the peanut canopy during much of the season. We also had a recording rain gauge in the LESA area near the temperature-RH recording devices. We were, therefore, able to identify when we had either irrigation or rainfall and track its effect on temperature and relative humidity within the plant canopy. Both temperature and relative humidity potentially impact peanut fruit-set and development. Effects of irrigation method on temperature and relative humidity within the canopy were dependent on the time of day that the irrigation was applied. LEPA had the least impact on canopy temperature and relative humidity. LESA had short-term impacts on canopy temperature and relative humidity with the longest impact (3-4 hours) with late-night and mid-day LESA irrigation. We will continue to analyze data for both temperature and relative humidity for all irrigation and rainfall events throughout the measurement period and to compare this data with other data collected during the season.

We collected whole plant samples at essentially weekly intervals throughout much of the 2002 and 2003 seasons at WPGRF and AG-CARES to obtain data for plant weights, growth stages, and mapping of fruiting positions to help us understand the effects of irrigation regime on plant development.

During 2003, we roasted peanut samples from our 2002 irrigation experiments and reduced them to peanut paste for determining whether or not we had off-flavors and if present, whether or not they were related to variety x irrigation interactions. We did not find noticeable off-flavors in any of the 2002 samples. We have produced peanut paste for flavor analysis from our 2003 experiments and have found some samples that have significant off-flavors. Because of the subjective nature of assessing off-flavors by tasting, we must use a blind procedure in which the taster not only does not know the variety and irrigation treatment of each sample, but also does not know which experiment or location a sample is from. So, we cannot complete our data analysis until all the experimental and standard samples have been tasted. We are nearing completion of tasting samples will be able to report any association of off-flavors with variety, irrigation, or their interaction at the Dallas meeting.

Report No. 18

Plant Pathology
March 8, 2004

TITLE: Peanut Disease Screening Nurseries and Other 2003 Work

PERSONNEL: Mark C. Black, Texas Cooperative Extension,
Texas A&M University Agric. Res. Ext. Center, Uvalde

SUMMARY:

Screening Nurseries. Peanut breeders use disease data when deciding which breeding lines to save and discard. Lines with promising yield, grade, pod characteristics and earliness but susceptible disease ratings are discarded at the end of every season. Data for spotted wilt and southern blight were collected for ten tests in 2003 in Frio County. Spotted wilt ratings were low to moderate.

Variety Acreage Survey. For the seventh year, 2003 peanut variety usage was estimated with a survey of all peanut seed companies in Texas, Oklahoma, and New Mexico that provide seed for planting in Texas. Percent acres among market types were 60.8% runner, 19.1% spanish, 16.0% virginia, and 4.1% valencia. This is the lowest percent acreage use of runners in the 7 years this survey has been conducted, and was due to reduced runner acres and increased acres for the other three market types in 2003. FlavorRunner458 was again the most commonly planted variety in Texas (35.7% overall, 58.7% of runners) due to contracts for the high O:L ratio trait. Tamrun96 was the third most commonly planted variety (7.5% overall, 12.4% of runners). Tamspan90 was the second most commonly planted variety in Texas and the most common spanish (14.2% overall, 74.5% of spanish). NC 7 was the dominant virginia variety in 2003 (9.4% overall, 58.8% of virginia). High OL oil varieties were planted on 45% of acres in Texas in 2003, and these acres were mostly with runners (98% runner, 2% spanish). Varieties released by Texas breeders were planted on 29.0% of all peanut acres (19.3% ‘97, 20.7% ‘98, 29.3% ‘99, 19.7% ‘00, 22.0% ‘01, 24.3% ‘02, 29.0% ‘03), representing 22.5% of all runner acres, and 80.0% of all spanish acres.

INTRODUCTION:

Peanut diseases and environmental stresses are major profit constraints for Texas peanut growers. We need to improve, or at least maintain, partial resistance levels now available in peanut to spotted wilt (caused by *Tomato spotted wilt virus* [TSWV]), Sclerotinia blight (caused by *Sclerotinia minor*), southern blight (caused by *Sclerotium rolfsii*), rust (caused by *Puccinia arachidis*), and other peanut diseases. Long term success of the variety improvement program depends on frequent disease evaluations for breeding lines.

Availability of peanut varieties and usage of each variety depends on market preference for the high O/L trait and variety performance under Texas conditions. Seed companies, breeders, buyers, consultants, and others use the annual survey for planning purposes.

Objectives were to: 1) assist Michael Baring, Mark Burow, and Charles Simpson with variety development by screening high O/L peanut breeding lines for resistance to spotted wilt and other endemic diseases in southwest Texas (Frio County) disease nurseries and 2) survey peanut seed handlers for the annual Texas variety acreage estimates.

MATERIALS/METHODS:

Screening Nurseries. Selected varieties and breeding lines were planted 29May03 in replicated or non-replicated two-row small plot tests within irrigated production fields at Bennett Partnership Farm and Phillips Farm in Frio County by M. Baring and B. Easterling. Two-row plots for yield estimates were shortened to 13 or 14 ft. on 20June and 24June. Two of every six rows at Phillips was planted with TSWV-susceptible Tamrun88 as a susceptible check and to increase spotted wilt disease incidence in the plot area through secondary spread. The experimental design was randomized complete block with three, four, or nine replications, except for one non-replicated test.

Spotted wilt and southern blight diseases were recorded on multiple dates in Phillips tests as number of row feet with symptoms. Spotted wilt was recorded just before digging at Bennett Partnership. Data were converted to percent row feet with symptoms before statistical analysis.

Hand weeding was done at both locations and we helped with digging (16Oct.) and threshing small plots.

Variety Acreage Survey. Peanut seed handlers in Texas, Oklahoma, and New Mexico were contacted for seed sales data to estimate 2003 Texas variety planted acres. Seeding rate estimates by market type or specific variety were used to estimate acres planted to each variety using 2003 preliminary USDA market type acreage reports. One report was missing from a New Mexico company that sells valencia seed, so their 2002 data were used to estimate 2003 seed sales.

RESULTS AND DISCUSSION:

Spotted wilt and southern blight incidences were mostly in the low to moderate at Phillips and Bennett, but test averages were about double those of 2002. Heavy rains soon after emergence eroded beds and reduced stands in some plots, especially at Phillips. Little heat or moisture stress occurred in 2003 due to frequent irrigation and occasional rains after June. See the report by Baring, Burow, and Simpson for yield, grade, and value estimates in Frio County tests.

Screening Nurseries. *Breeding Lines with High O/L and TSWV Resistance, Phillips.* The low spotted wilt (test average 9.3%, range 2.1-24.0%) confirms previous ratings, and most of these lines have usable TSWV resistance (Table 1A). Most lines also held up well to southern blight (test average 7.1%, range 0-24.0%).

Breeding Lines with High O/L and Leaf Spot Resistance, Phillips. Spotted wilt was nearly twice that of the test described above (test average 17.2%, range 8.3-33.3%) because these lines had not been previously screened for TSWV resistance (Table 1B). Most lines held up well to southern blight (test average 5.1%, range 1.0-24.0%).

Baring Spanish and Bunch Lines, Phillips. A good disease screen occurred for both spotted wilt (test average 17.5%, range 3.3-52.2%) and southern blight (test average 10.3, range

0-44.4%). Several entries are more resistant to both diseases than Tamspan90 and Olin (Table 1C).

Baring Spanish and Bunch Lines, Bennett. Rankings were similar to the Phillips location, but there was less spotted wilt at this location (test average 7.0, range 1.0-27.1%)(Table 1D)

Baring Multiple Disease Selection Runner Lines, Phillips. Most lines in this test held up well to both spotted wilt (test average 10.7, range 2.1-29.2%) and southern blight (test average 5.6, range 0-24.0%)(Table 1E).

Burow Spanish and Early Maturity Breeding Lines, Phillips. The Florunner check had the lowest rating for spotted wilt (test average 21.8%, range 11.5-39.6%) and ranked in the lower half of entries for southern blight (test average 13.0, range 5.2-25.0%). Therefore, many of these lines are highly susceptible to both spotted wilt and southern blight. The two valencia checks are susceptible to both diseases (Table 1F).

Burow Runner Early Maturity Breeding Lines, Phillips. Most lines are highly susceptible to spotted wilt (test average 33.8%, range 12.5-71.9%), but southern blight ratings were too low for a good screen (test average 3.8%, range 0-14.6%)(Table 1G).

Runner Maturity Comparison, Bennett. Selected plots in this test were inverted on two dates to study earliness, but we also recorded disease right before digging the last set of plots (Table 1H). There were no significant differences, but Tx971738 had the highest spotted wilt rating, which agrees with 2002 data.

Uniform Peanut Performance Test, Bennett. Spotted wilt ratings were low (test average 4.3, range 0.8-10.2%), so this was not a good screen for resistance.

Observation Test & Seed Increase, Phillips. Spotted wilt and southern blight data were collected from this unreplicated test [data not presented].

Variety Acreage Survey. Peanut variety usage (% overall acres) continued to change in Texas (Table 2). FlavorRunner458 use increased for the seventh consecutive year (0.2% ‘97, 3.1% ‘98, 15.1% ‘99, 25.3% ‘00, 29.0% ‘01, 32.5% ‘02, 35.7% ‘03) and was the most commonly planted peanut variety in Texas in 2003 for the fourth year. Use of Florunner (27.7% ‘97, 25.4% ‘98, 16.9% ‘99, 15.4% ‘00, 6.3% ‘01, 9.1% ‘02, 0.2% ‘03) was near zero for the first time in many years. Tamrun96 acres in 2003 declined for the second year in a row (0.4% ‘97, 4.7% ‘98, 12.4% ‘99, 9.2% ‘00, 13.9% ‘01, 11.9% ‘02, 7.5% ‘03) in response to release of TamrunOL01 (0.3% ‘02, 5.8% ‘03) and TamrunOL02 (0.2% ‘03)).

Tamspan90 was the dominant spanish variety again in 2003 (14.2% overall). Relative use of spanish market type varieties in Texas increased for the third year (17.0% ‘97, 12.2% ‘98, 10.2% ‘99, 9.3% ‘00, 10.1% ‘01, 13.6% ‘02, 19.1% ‘03) and was at a seven year high. Spanish acres planted increased for the fourth year (54,146 ac ‘97, 44,870 ac ‘98, 36,593 ac ‘99, 38,847 ac ‘00, 42,582 ac ‘01, 47,197 ac ‘02, 55,068 ac ‘03) and was a seven year high spanish acreage.

Virginia market type use increased for the second time in 2003 (overall: 10.1% '97, 13.9% '98, 10.4% '99, 10.5% '00, 8.7% '01, 12.0% '02, 16.0% '03). NC 7 use decreased for the second year in 2003 (within market type: 100% '97, 100% '98, 97.8% '99, 74.9% '00, 81.4% '01, 65.3% '02, 58.8% '03) and this was a seven year low. ATVC2 use increased in Texas for the fifth year (within market type: 0.1% '99, 1.1% '00, 1.4% '01, 14.9% '02, 22.8% '03), but Jupiter use declined in 2003 (within market type: 0.2% '01, 12.2% '02, 5.2% '03).

Valencia use remained low in Texas (overall: 2.8% '97, 3.0% '98, 0.8% '99, 0.9% '00, 1.8% '01, 2.1% '02, 4.1% '03), but 2003 was a seven-year high for this market type.

Preference in parts of the peanut industry for varieties with improved oil quality (high O:L ratio) in West Texas production is a major factor in peanut variety use in Texas (overall: 4.9% '97, 5.5% '98, 17.9% '99, 28.0% '00, 31.8% '01, 41.4% '02, 45.0% '03). Tamrun OL01 and Tamrun OL02 were two high O/L varieties available in 2003 with improved disease or stress resistance.

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Table 1. Spotted wilt and southern blight ratings in 2003 screening nurseries in Southwest Texas, Frio County, TX, in % row feet with symptoms.

-------------**A.** Breeding Lines with High O/L and TSWV Resistance at Phillips---------------------

Entry	**SW1015**	**Entry**	**SB909**
97727210	24.0	96620512	24.0
97727231	12.5	97727213	16.7
994415-6	12.5	977272-9	13.5
994415-5	12.5	96620516	12.5
T-96	12.5	97727228	12.5
T-OL-1	11.5	T-OL-1	9.4
96620516	11.5	97727231	9.4
T-OL-2	10.4	97727210	8.3
96620512	8.3	994415-6	8.3
97723614	8.3	99441516	7.3
977272-3	8.3	994415-5	7.3
97727228	8.3	99441517	4.2
99441516	8.3	T-OL-2	3.1
977236-4	8.3	977236-3	3.1
977272-9	7.3	977272-3	1.0

977236-5	5.2	977236-4	1.0
99441517	5.2	977236-5	1.0
977236-9	5.2	977236-9	0.0
97727213	4.2	97723614	0.0
977236-3	2.1	T-96	0.0
LSD.05*	**9.4**		**12.5**
CV**	**61%**		**106%**
Average	**9.3**		**7.1**

*Least significant difference. Averages for two entries are significantly different at *P*=0.05 if their difference is at least the LSD.05 value.

**Low C.V. (Coefficient of Variation) indicates more consistent data.

----------**B.** Breeding Lines with High O/L and Leaf Spot Resistance at Phillips---------------------

Entry	SW1015	Entry	SB926
013805-1	33.3	013805-3	24.0
013832-5	22.9	013814-2	12.5
013828-8	22.9	013828-9	7.3
013837-4	20.8	013805-1	6.3
013843-5	20.8	013843-5	6.3
Tx964117	19.8	013834-4	6.3
013805-3	18.8	013819-6	5.2
013828-9	18.8	013828-8	5.2
013834-4	18.8	013837-4	5.2
013802-2	16.7	013843-6	4.2
T-OL-01	16.7	013802-2	3.1
013839-3	15.6	013832-5	3.1
013814-2	14.6	T-OL-01	3.1
013828-2	14.6	013828-2	2.1
013843-6	14.6	013834-6	2.1
013819-6	14.6	013839-3	2.1
Tx964120	11.5	T-96	1.0
T-OL-02	10.4	T-OL-02	1.0
T-96	10.4	Tx964117	1.0
013834-6	8.3	Tx964120	1.0
LSD.05	**11.3**		**10.4**
CV	**40%**		**124%**
Average	**17.2**		**5.1**

------**C.** Baring Spanish and Bunch Breeding Lines at Phillips---------------------

Entry	SW926	Entry	SB926
Spanco	52.2	Spanco	44.4
OLin	27.8	OLin	20.0
01F6235	27.8	T-90	16.7
T-90	25.6	01Y4192	16.7
01Y4200	20.0	01F5496	14.4
AT108	17.8	ViruGard	12.2
01Y4201	17.8	01Y4201	11.1
01Y4196	17.8	AT108	11.1
01Y4199	16.7	01Y4196	8.9
01Y4191	16.7	01Y4199	7.8
01F5407	15.6	01F5408	7.8
01F5407a	14.4	01F6234	6.7
01F6234	14.4	01F5407a	6.7
01Y4192	12.2	01Y4191	5.6
01F6217	11.1	01Y4195	5.6
01F6232	11.1	01Y4200	4.4
01F5496	10.0	01F5407	3.3
01F5408	8.9	01F6232	1.1
ViruGard	8.9	01F6235	1.1
01Y4195	3.3	01F6217	0.0
LSD.05	**12.5**		**11.7**
CV	**43%**		**69%**

---**D.** Baring Spanish and Bunch Breeding Lines at Bennett-----------

Entry	SW101
Spanco	27.1
OLin	14.6
TSpan90	13.5
Tx01881	10.4
01F6232	7.3
AT108	7.3
01Y4192	6.3
01Y4196	6.3
01Y4200	6.3
01F6235	6.3
01Y4201	5.2
ViruGard	5.2
01Y4191	5.2
01F5407	5.2
01F5408	4.2
01F5496	4.2
01F6234	2.1
01F6217	2.1
01Y4195	1.0
01Y4199	1.0
LSD.05	**7.0**
CV	**60%**

--------**E.** Baring Multiple Disease Selection Breeding Lines at Phillips-------------------------------

Entry	SW1015	Entry	SB919
SunOl95R	29.2	01F5422	24.0
FlvRn458	25.0	FlvRn458	13.5
T-OL-01	21.9	01F6251	12.5
01F6251	20.8	SunOl95R	12.5
GeoGreen	17.7	GeoGreen	11.5
01F5405	17.7	01F5470	9.4
01Y4104	16.7	961639-3	8.3
01Y4137	13.5	01F6246	8.3
01F6250	12.5	01F6212	6.3
01Y4123	11.5	01F6239	6.3
T-96	10.4	01F6269	6.3
01F5422	9.4	01F6223	6.3
01F5404	9.4	01Y4138	6.3
01F5443	8.3	01F5478	5.2
01F5478	7.3	01Y4126	5.2
01F6275	7.3	01F5443	4.2

961639-3	7.3	T-OL-01	3.1
01F6223	7.3	01F6275	3.1
01Y4133	7.3	01F6250	2.1
01F6246	7.3	01Y4104	2.1
01F5445	7.3	01Y4137	2.1
01Y4134	7.3	01F5445	2.1
01F6269	6.3	01Y4133	1.0
01F5470	6.3	01F5415	1.0
01F6212	6.3	T-96	1.0
01Y4138	5.2	01F5405	1.0
01Y4106	5.2	01Y4123	1.0
01F6239	4.2	01Y4106	1.0
01Y4126	4.2	01F5404	0.0
01F5415	2.1	01Y4134	0.0
LSD.05	**10.8**		**10.7**
CV	**62%**		**118%**
Average	**10.7**		**5.6**

--------**F.** Burow Spanish and Early Maturity Breeding Lines at Phillips-----------------------------

	Spotted wilt, % row ft.		**Southern blight, % row ft.**	
Entry	**26Sep**	**Entry**	**5Sep**	**26Sep**
NMValenC	39.6	NMValenC	20.8	25.0
TX017759	33.3	NMValenA	20.8	25.0
TX017765	32.3	TX017763	16.7	22.9
PI475919	27.1	TP922	15.6	16.7
TX017778	26.0	F435	14.6	18.8
NMValenA	25.0	TX017759	10.4	18.8
OLin	24.0	TX017778	10.4	16.7
TP922	20.8	Spanco	9.4	11.5
Spanco	20.8	TX017779	7.3	8.3
TX017764	19.8	BSS56	7.3	12.5
TX017763	19.8	Florunnr	6.3	9.4
TX017771	17.7	R22	6.3	13.5
TX017779	17.7	PI475919	5.2	8.3
R22	17.7	PI161317	5.2	12.5
PI161317	17.7	TX017771	5.2	3.1
F435	16.7	TX017764	5.2	7.3
TSpan90	15.6	TSpan90	3.1	5.2
BSS56	11.5	OLin	3.1	6.3
Florunnr	11.5	TX017765	1.0	5.2
LSD.05	**N.S.**		**11.8**	**N.S.**
CV	**49%**		**78%**	**68%**
Average	**21.8**		**9.2**	**13**

-----------**G.** Burow Runner Early Maturity Breeding Lines at Phillips-------------------------------

Entry	Spotted wilt, % row ft. 15Oct*		Entry	Southern blight, % row ft., 9Sep*
TX017748	71.9	a**	TSpan90	14.6
TX017752	64.6	ab	TX017751	11.5
TX017751	59.4	ab	TX017742	11.5
TX017754	56.3	abc	PI109839	8.3
TSpan90	55.2	abcd	FlvRn458	7.3
R22	51.0	abcde	TX017707	5.8
TX017753	43.8	bcdef	TX017752	5.2
TX017747	42.3	bcdefg	TX017731	4.3
Florunnr	37.5	cdefgh	TX017748	3.1
TX017701	35.4	cdefgh	TX017744	3.1
TX017727	34.4	defgh	TX017727	3.1
PI109839	33.3	efgh	TX017711	3.1
TX017740	32.3	efgh	PI161317	3.1
TX017711	30.2	efghi	Langley	3.1
TX017742	30.2	efghi	TX017747	2.7
TX017723	29.2	fghi	TX017703	2.7
TX017703	28.3	fghi	TX017754	2.1
TX017744	28.1	fghi	TX017753	2.1
TX017746	28.1	fghi	TX017722	2.1
PI161317	27.1	fghi	TX017701	2.1
FlvRn458	26.0	fghi	TR-OL-01	2.1
TR-OL-01	25.0	fghi	R22	2.1
Langley	24.0	fghi	Florunnr	2.1
TX017731	23.6	fghi	Tamrun96	1.3
TX017730	22.0	fghi	TX017730	1.1
TX017707	18.9	ghi	TX017746	1.0
TX017722	17.7	hi	TX017740	1.0
Tamrun96	14.3	i	TX017723	1.0
TR-OL-02	12.5	i	TR-OL-02	0.0
				N.S.* **
CV	**38%**			**138%**
Test average	**33.8**			**3.8**

*All entry averages are least squares means because the experiment was unbalanced.

**Entry comparison with T test on least squares means. Averages followed by the same letter are not significantly different at *P*=0.05.

***Not significant at *P*=0.05.

-----**H.** Runner Maturity Comparison at Bennett---------

Entry	SW101
Tx971738	11.1
FlvRn458	10.4
T-OL-01	8.7
Tx971783	8.3
Tx977053	8.0
Tx994380	7.6
Tamrun96	6.6
Langley	6.6
Tx977239	5.2
Tx994432	5.2
LSD.05	**N.S.**
CV	**85%**
Average	**7.8**

----**I.** Uniform Peanut Performance Test at Bennett------

Entry	SW101
T-OL-01	10.2
T-OL-02	8.6
FlvRn458	7.8
Tamrun96	7.0
N98003	6.3
Florunner	5.5
NC7	4.7
N0090ol(7)	4.7
Tx994389	4.7
Tx994371	3.9
CRSP14	3.9
VT9506102-6	3.9
UF00324	3.9
UF02328	3.1
CRSP08	2.3
GA002501	1.6
GA002506	1.6
UF00620	0.8
C34-24	0.8
GA982502	0.8
LSD.05	**5.2**
CV	**85%**
Average	**4.3**

Table 2. 2003 Texas Peanut Variety Survey.*

----------**A.** Variety within market type--

Runner variety	Pounds	Percent lbs.	Acres	Percent acres**
FlavorRunner458	9,790,650	56.7	103,059	58.7
Tamrun96	2,065,550	12.0	21,743	12.4
TamrunOL01	1,926,600	11.2	16,753	9.5
GeorgiaGreen	1,002,550	5.8	10,553	6.0
ViruGard	776,050	4.5	6,748	3.8
AT1-1	562,400	3.3	5,920	3.4
AT-108	473,600	2.7	4,118	2.4
AT-120	270,850	1.6	2,355	1.3
Okrun	220,950	1.3	2,326	1.3
TamrunOL02	48,250	0.3	508	0.3
NemaTAM	46,900	0.3	494	0.3
Florunner	44,950	0.3	473	0.3
GP-1	35,650	0.2	375	0.2
Norden	15,000	0.1	158	0.1
Andru II	50	0.0	1	0.0
Carver	50	0.0	1	0.0
Hull	50	0.0	1	0.0
All runner	7,280,100	100.0	175,585	100.0
Spanish variety				
Tamspan90	3,488,600	74.5	41,042	74.5
Spanco	912,850	19.5	10,739	19.5
Olin	256,800	5.5	3,021	5.5
Spanish VNS***	22,500	0.5	265	0.5
All spanish	4,680,750	100.0	55,068	100.0
Virginia variety				
NC7	3,400,900	58.8	27,207	58.8
ATVC2	1,319,150	22.8	10,553	22.8
NC12C	492,600	8.5	3,941	8.5
Jupiter	301,200	5.2	2,410	5.2
Perry	211,150	3.7	1,689	3.7
Gregory	63,350	1.1	507	1.1
All virginia	5,788,350	100.0	46,307	100.0

Valencia variety				
ValenciaC	381,075	60.0	7,057	60.0
ValenciaA	129,317	20.4	2,395	20.4
McRan	124,900	19.7	2,313	19.7
All valencia	635,292	100.0	11,765	100.0

------------**B.** Overall by variety--

Variety	**Pounds**	**Percent lbs.**	**Acres**	**Percent acres**
FlavorRunner458	9,790,650	34.5	103,059	35.7
Tamrun96	2,065,550	7.3	21,743	7.5
TamrunOL01	1,926,600	6.8	16,753	5.8
GeorgiaGreen	1,002,550	3.5	10,553	3.7
ViruGard	776,050	2.7	6,748	2.3
AT1-1	562,400	2.0	5,920	2.1
AT-108	473,600	1.7	4,118	1.4
AT-120	270,850	1.0	2,355	0.8
Okrun	220,950	0.8	2,326	0.8
TamrunOL02	48,250	0.2	508	0.2
NemaTAM	46,900	0.2	494	0.2
Florunner	44,950	0.2	473	0.2
GP-1	35,650	0.1	375	0.1
Norden	15,000	0.1	158	0.1
Andru II	50	0.0	1	0.0
Carver	50	0.0	1	0.0
Hull	50	0.0	1	0.0
Tamspan90	3,488,600	12.3	41,042	14.2
Spanco	912,850	3.2	10,739	3.7
Olin	256,800	0.9	3,021	1.1
Spanish VNS	22,500	0.1	265	0.1
NC7	3,400,900	12.0	27,207	9.4
ATVC2	1,319,150	4.7	10,553	3.7
NC12C	492,600	1.7	3,941	1.4
Jupiter	301,200	1.1	2,410	0.8
Perry	211,150	0.7	1,689	0.6
Gregory	63,350	0.2	507	0.2
ValenciaC	381,075	1.3	7,057	2.4
ValenciaA	129,317	0.5	2,395	0.8
McRan	124,900	0.4	2,313	0.8
All varieties	8,384,492	0.0	288,724	100.0

--------**C.** Overall by market type

Market type	**Pounds**	**Percent lbs.**	**Acres**	**Percent acres**
Runner	17,280,100	60.9	175,585	60.8
Spanish	4,680,750	16.5	55,068	19.1
Virginia	5,788,350	20.4	46,307	16.0
Valencia	635,292	2.2	11,765	4.1
All market types	28,384,492	100.0	288,724	100.0

*Cooperators in this survey were: Birdsong Peanut Co., Gorman, TX; Golden Peanut Co., DeLeon, TX; Wilco Peanut Co., Pleasanton, TX; Clint Williams Peanut Co., Madill, OK; Lee County Peanut Co., Giddings, TX; and Borden Peanuts, Portales, NM.

**Assumptions: Average seeding rates used in 2003 were estimated by variety or entire market type for combined irrigated and dryland acres as follows. Runners: 95 lb/ac (Flavor Runner 458, Tamrun96, Georgia Green, AT1-1, AT-108, AT-120, Okrun, TamrunOL02, NemaTAM, Florunner, GP-1, Norden, AndruII, Carver, Hull); or 115 lb/ac (TamrunOL01, ViruGard, AT-108, AT-120). Spanish: 85 lb/ac. Virginias: 125 lb/ac. Valencias: 54 lb/ac. It may be necessary to modify seeding rate estimates and to revise this report in order to reconcile final peanut acreage by market type data from the USDA in the spring of 2004.

***VNS = Variety Not Stated.